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Contents

Foreword

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

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shall indicates a mandatory requirement to do something

shall not indicates an interdiction (prohibition) to do something

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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 Nsmf Service Based Interface. It provides stage 3 protocol definitions and message flows, and specifies the API for each service offered by the SMF other than the Session Management Event Exposure service and Session Management services for Non-IP Data Delivery (NIDD).

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].

The Session Management Event Exposure Service is specified in 3GPP TS 29.508 [6]. The Session Management services for Non-IP Data Delivery (NIDD) are specified in 3GPP TS 29.542 [37].

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 29.508: "5G System; Session Management Event Exposure Service; Stage 3".

[7] 3GPP TS 24.501: "Non-Access-Stratum (NAS) protocol for 5G System (5GS); Stage 3".

[8] 3GPP TS 24.007: "Mobile radio interface signalling layer 3; General aspects".

[9] 3GPP TS 38.413: "NG Radio Access Network (NG-RAN); NG Application Protocol (NGAP)".

[10] IETF RFC 2387: "The MIME Multipart/Related Content-type".

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

[12] IETF RFC 2045: "Multipurpose Internet Mail Extensions (MIME) Part One: Format of Internet Message Bodies".

[13] 3GPP TS 29.571: "5G System; Common Data Types for Service Based Interfaces; Stage 3".

[14] IETF RFC 9113: "HTTP/2".

[15] OpenAPI Initiative, "OpenAPI Specification Version 3.0.0", https://spec.openapis.org/oas/v3.0.0.

[16] 3GPP TS 29.274: "3GPP Evolved Packet System (EPS); Evolved General Packet Radio Service (GPRS) Tunnelling Protocol for Control plane (GTPv2-C); Stage 3".

[17] 3GPP TS 33.501: "Security architecture and procedures for 5G system".

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

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

[20] 3GPP TS 29.518: "5G System; Access and Mobility Management Service; Stage 3".

[21] 3GPP TS 23.380: "IMS Restoration Procedures".

[22] 3GPP TS 32.422: "Telecommunication management; Subscriber and equipment trace; Trace control and configuration management".

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

[24] 3GPP TS 23.527: "5G System; Restoration Procedures".

[25] 3GPP TS 32.255: "Charging management; 5G data connectivity domain charging; stage 2".

[26] 3GPP TS 32.291: "Charging management; 5G system, charging service; Stage 3".

[27] 3GPP TS 24.301: "Non-Access-Stratum (NAS) protocol for Evolved Packet System (EPS); Stage 3".

[28] 3GPP TR 21.900: "Technical Specification Group working methods".

[29] 3GPP TS 29.244: "Interface between the Control Plane and the User Plane Nodes; stage 3".

[30] 3GPP TS 29.512: "5G System; Session Management Policy Control Service; Stage 3".

[31] Void

[32] IETF RFC 9110: "HTTP Semantics".

[33] 3GPP TS 23.401: "General Packet Radio Service (GPRS) enhancements for Evolved Universal Terrestrial Radio Access Network (E-UTRAN) access; Stage 2".

[34] 3GPP TS 29.524: "5G System; Cause codes mapping between 5GC interfaces; Stage 3".

[35] 3GPP TS 23.216: "Single Radio Voice Call Continuity (SRVCC); Stage 2".

[36] 3GPP TS 23.316: "Wireless and wireline convergence access support for the 5G System (5GS)".

[37] 3GPP TS 29.542: "5G System; Session Management Services for Non-IP Data Delivery (NIDD); Stage 3".

[38] 3GPP TS 29.519: "5G System; Usage of the Unified Data Repository service for Policy Control Data, Application Data and Structured Data for Exposure; Stage 3".

[39] 3GPP TS 23.548: "5G System Enhancements for Edge Computing; Stage 2".

[40] 3GPP TS 29.531: "5G System; Network Slice Selection Services; Stage 3".

[41] 3GPP TS 23.256: "Support of Uncrewed Aerial Systems (UAS) connectivity, identification and tracking; Stage 2".

[42] 3GPP TS 23.015: "Technical realization of Operator Determined Barring (ODB)".

[43] 3GPP TS 23.304: "Proximity based Services (ProSe) in the 5G System (5GS)".

[44] 3GPP TS 23.247: "Architectural enhancements for 5G multicast-broadcast services; Stage 2".

[45] 3GPP TS 23.007: "Restoration procedures".

[46] 3GPP TS 29.503: "5G System; Unified Data Management Services; Stage 3".

[47] 3GPP TS 24.008: "Mobile Radio Interface Layer 3 specification; Core Network Protocols; Stage 3".

[48] 3GPP TS 29.564: "5G System; User Plane Function Services; Stage 3".

[49] 3GPP TS 29.514: "5G System; Policy Authorization Service; Stage 3".

3 Definitions and abbreviations

3.1 Definitions

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

Alternative S-NSSAI: Indicating a compatible S-NSSAI for an S-NSSAI in the Allowed NSSAI that the AMF uses to replace an S-NSSAI when the S-NSSAI is not available or congested, as specified in 3GPP TS 23.501 [2].

3.2 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [1] and 3GPP TS 23.501 [2] and the following apply. An abbreviation defined in the present document or in 3GPP TS 23.501 [2] takes precedence over the definition of the same abbreviation, if any, in 3GPP TR 21.905 [1]. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in 3GPP TS 23.501 [2].

BP	Branching Point
DNAI	Data Network Access Identifier
DNN	Data Network Name
HR	Home Routed
HR-SBO	Home Routed Session BreakOut
H-SMF	Home SMF
I-SMF	Intermediate SMF
JSON	Javascript Object NotationNAS Non-Access Stratum
LADN	Local Area Data Network
MA	Multi-Access
MO	Mobile Originated
MT	Mobile TerminatedPSA PDU Session Anchor
N3QAI	Non-3GPP QoS Assistance Information
PIN	Personal IoT Network
RSN	Redundancy Sequence Number
SM	Session Management
SMF	Session Management Function
SNPN	Stand-alone Non-Public Network
TNGF	Trusted Non-3GPP Gateway Function
TWIF	Trusted WLAN Interworking Function
UAS	Uncrewed Aerial System
UAV	Uncrewed Aerial Vehicle
UL CL	Uplink Classifier
UPF	User Plane Function
USS	UAS Service Supplier
UUAA	USS UAV Authorization/Authentication
V-SMF	Visited SMF
W-AGF	Wireline Access Gateway Function

4 Overview

4.1 Introduction

Within the 5GC, the SMF offers services to NF service consumers via the Nsmf service based interface (see 3GPP TS 23.501 [2] and 3GPP TS 23.502 [3]).

Figure 4.1-1 provides the reference model (in service based interface representation and in reference point representation), with focus on the SMF services specified within the present specification.

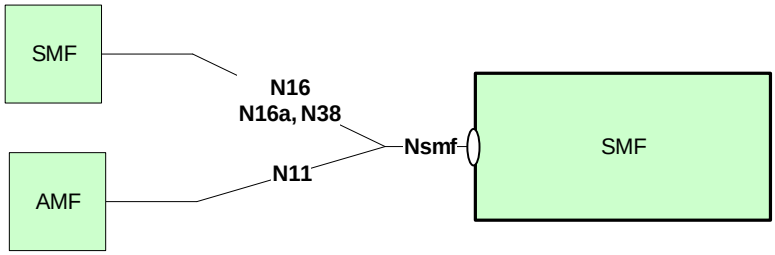

Figure 4.1-1: Reference model – SMF

N16 is the reference point between the V-SMF and H-SMF in Home Routed (HR) roaming cases, or between the V-SMF (in the hosting operator's network) and the H-SMF (in the participating operator's network) in Indirect Network Sharing deployments.

N16a is the reference point between SMF and I-SMF.

N38 is the reference point between I-SMFs or V-SMFs.

The functionalities supported by the SMF are listed in clause 6.2.2 of 3GPP TS 23.501 [2].

5 Services offered by the SMF

5.1 Introduction

The SMF supports the following services.

Table 5.1-1: NF Services provided by SMF

Service Name	Description	Example Consumer
Nsmf_PDUSession	This service manages the PDU sessions and uses the policy and charging rules received from the PCF. The service operations exposed by this NF service allows the consumer NFs to establish, modify and delete the PDU sessions, and to send mobile originated data.	V-SMF, H-SMF, I-SMF, SMF, AMF
Nsmf_EventExposure	See 3GPP TS 29.508 [6].	
Nsmf_NIDD	See 3GPP TS 29.542 [37].	

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

Table 5.1-2: API Descriptions

Service Name	Clause	Description	OpenAPI Specification File	apiName	Annex
Nsmf_PDUSession	6.1	SMF PDU Session Service	TS29502_Nsmf_PDUSession.yaml	nsmf-pdusession	A.2

5.2 Nsmf_PDUSession Service

5.2.1 Service Description

The Nsmf_PDUSession service operates on the PDU Sessions. The service operations exposed by this service allow other NFs to establish, modify and release the PDU Sessions. The following are the key functionalities of this NF service:

- Creation, modification and deletion of SM contexts for PDU Sessions; an SM context represents an association between the NF Service Consumer (e.g. AMF) and the SMF for a PDU session;
- Retrieval of SM contexts of PDU sessions (i.e. UE EPS PDN connection or complete SM context), e.g. to move PDU sessions towards the EPC using the N26 interface or to transfer SM contexts between I-SMFs or V-SMFs over the N38 interface;
- Creation, modification and deletion of PDU sessions between the V-SMF and H-SMF in HR roaming scenarios/Indirect Network Sharing case, or between the I-SMF and SMF for PDU sessions involving an I-SMF;
- Sending of mobile originated data (received over NAS) for a PDU session to the SMF, V-SMF in HR roaming scenarios, or I-SMF for PDU sessions involving an I-SMF;
- Transferring of NEF anchored mobile originated data for a PDU session to the H-SMF in HR roaming scenarios, or SMF for PDU sessions involving an I-SMF;
- Transferring of NEF anchored mobile terminated data for a PDU session to the V-SMF in HR roaming scenarios, or I-SMF for PDU sessions involving an I-SMF;
- Association of policy and charging rules with PDU Sessions and binding the policy and charging rules to flows;
- Interacting with the UPF over N4 for creating, modifying and releasing user plane sessions;
- Process user plane events from the UPF and apply the corresponding policy and charging rules.

The Nsmf_PDUSession service supports the following service operations. The V-SMF or H-SMF described in the Table may also refer to the V-SMF of the hosting operator's network or the H-SMF of the participating operator's network in Indirect Network Sharing deployments.

Table 5.2.1-1: Service operations supported by the Nsmf_PDUSession service

Service Operations	Description	Operation Semantics	Example Consumer(s)
Create SM Context	Create an SM context in SMF, or in V-SMF in HR roaming scenarios, or in I-SMF during the I-SMF insertion and change scenarios, for a PDU session.	Request/Response	AMF
Update SM Context	Update the SM context of a PDU session and/or provide the SMF with N1 or N2 SM information received from the UE or from the AN.	Request/Response	AMF, I-SMF
Release SM Context	Release the SM context of a PDU session when the PDU session has been released.	Request/Response	AMF
Notify SM Context Status (NOTE 1)	Notify the NF Service Consumer about the status of an SM Context of a PDU session (e.g. the SM Context is released within the SMF).	Subscribe/Notify	AMF
Retrieve SM Context (NOTE 2)	Retrieve an SM context of a PDU session: - from SMF, or from V-SMF in HR roaming scenarios, for 5GS to EPS mobility; - from SMF during I-SMF insertion or from I-SMF during I-SMF change/removal; - from V-SMF during change of V-SMF.	Request/Response	AMF, I-SMF, V-SMF, SMF
Create	Create a PDU session in the H-SMF in HR roaming scenarios, or in the SMF for PDU sessions involving an I-SMF.	Request/Response	V-SMF, I-SMF
Update	Update a PDU session in the H-SMF or V-SMF in HR roaming scenarios, or in the I-SMF or SMF for PDU sessions involving an I-SMF.	Request/Response	V-SMF, H-SMF, I-SMF, SMF
Release	Release a PDU session in the H-SMF in HR roaming scenarios, or in the SMF for PDU sessions involving an I-SMF.	Request/Response	V-SMF, I-SMF
Notify Status (NOTE 3)	Notify the NF Service Consumer about the status of a PDU session (e.g. the PDU session is released due to local reasons within the SMF).	Subscribe/Notify	V-SMF, I-SMF
Retrieve (NOTE 2)	Retrieve information from a PDU session context from the H-SMF for a HR PDU session, or from the SMF for a PDU session with an I-SMF.	Request/Response	V-SMF, I-SMF
Send MO Data	Send mobile originated data received over NAS for a PDU session	Request/Response	AMF
Transfer MO Data (NOTE 4)	Transfer NEF anchored mobile originated data received from AMF for a PDU session	Request/Response	V-SMF, I-SMF
Transfer MT Data (NOTE 5)	Transfer NEF anchored mobile terminated data received from NEF for a PDU session	Request/Response	H-SMF, SMF
NOTE 1: This corresponds to the SMContextStatusNotify service operation defined in 3GPP TS 23.502 [3]. NOTE 2: This corresponds to the ContextRequest service operation defined in 3GPP TS 23.502 [3]. NOTE 3: This corresponds to the StatusNotify service operation defined in 3GPP TS 23.502 [3]. NOTE 4: This corresponds to the MessageTransfer service operation in clause 4.25.4 of 3GPP TS 23.502 [3]. NOTE 5: This corresponds to the MessageTransfer service operation in clause 4.25.5 of 3GPP TS 23.502 [3].			

Unless specified otherwise, the requirements specified in this specification for home-routed PDU sessions shall also apply to Indirect Network Sharing scenarios, whereby the H-SMF acts as the anchor SMF in the participating operator network and the V-SMF acts as the SMF in the hosting operator network.

5.2.2 Service Operations

5.2.2.1 Introduction

See Table 5.2.1-1 for an overview of the service operations supported by the Nsmf_PDUSession service.

5.2.2.2 Create SM Context service operation

5.2.2.2.1 General

The Create SM Context service operation shall be used to create an individual SM context, for a given PDU session, in the SMF, in the V-SMF for HR roaming scenarios, or in the I-SMF for a PDU session with an I-SMF.

It is used in the following procedures:

- UE requested PDU Session Establishment (see clauses 4.3.2 and 4.23.5.1 of 3GPP TS 23.502 [3]) and clause 6.10.2.2 of 3GPP TS 23.548 [39]);
- EPS to 5GS Idle mode mobility, EPS to 5GS Idle mode mobility with data forwarding or handover using N26 interface (see clauses 4.11.1, 4.23.12.3, 4.23.12.5 and 4.23.12.7 of 3GPP TS 23.502 [3]);
- EPS to 5GS mobility without N26 interface (see clause 4.11.2.3 3GPP TS 23.502 [3]);
- Handover of a PDU session between 3GPP access and non-3GPP access, when the target AMF does not know the SMF resource identifier of the SM context used by the source AMF, e.g. when the target AMF is not in the PLMN of the N3IWF (see clause 4.9.2.3.2 of 3GPP TS 23.502 [3]), or when the UE is roaming and the selected N3IWF is in the HPLMN (see clause 4.9.2.4.2 of 3GPP TS 23.502 [3]);
- Handover from EPS to 5GC-N3IWF (see clause 4.11.3.1 of 3GPP TS 23.502 [3]);
- Handover from EPC/ePDG to 5GS (see clause 4.11.4.1 of 3GPP TS 23.502 [3]);
- Xn based or N2 based handover with I-SMF or V-SMF insertion and change (see clauses 4.23.7.3, 4.23.11 and 4.23.12 of 3GPP TS 23.502 [3]) and clause 6.10.2.4 of 3GPP TS 23.548 [39]);
- UE Triggered Service Request with I-SMF insertion/change/removal or V-SMF change (see clause 4.23.4.3 of 3GPP TS 23.502 [3]) and clause 6.10.2.4 of 3GPP TS 23.548 [39]);
- Registration procedure for a UE with a PDU session with I-SMF or V-SMF insertion, change and removal (see clause 4.23.3 of 3GPP TS 23.502 [3]) and clause 6.10.2.4 of 3GPP TS 23.548 [39]);
- Handover from EPC/ePDG to 5GS with I-SMF insertion (see clause 4.23 of 3GPP TS 23.502 [3]) and clause 6.10.2.4 of 3GPP TS 23.548 [39]);
- Handover from non-3GPP to 3GPP access with I-SMF insertion or V-SMF change, and Handover from 3GPP to non-3GPP access with I-SMF removal (see clause 4.23.16 of 3GPP TS 23.502 [3]) and clause 6.10.2.4 of 3GPP TS 23.548 [39]);
- SMF Context Transfer procedure, LBO or no Roaming, no I-SMF (see clause 4.26.5.3 of 3GPP TS 23.502 [3]);
- I-SMF Context Transfer procedure (see clause 4.26.5.2 of 3GPP TS 23.502 [3]);
- 5G-RG requested PDU Session Establishment via W-5GAN (see clause 7.3.1 of 3GPP TS 23.316 [36]);
- FN-RG related PDU Session Establishment via W-5GAN (see clause 7.3.4 of 3GPP TS 23.316 [36]);
- Non-5G capable device behind 5G-CRG and FN-CRG requested PDU Session Establishment via W-5GAN (see clause 4.10a of 3GPP TS 23.316 [36]);
- Handover from 3GPP access/EPS to W-5GAN/5GC (see clause 7.6.4.1 of 3GPP TS 23.316 [36]);
- SMF triggered I-SMF selection or removal (see clause 4.23.5.4 of 3GPP TS 23.502 [3]);
- Multicast Session join and session establishment procedure in clause 7.2.1.3 of 3GPP TS 23.247 [44];
- N2-based handover with V-SMF insertion/change/removal in HR-SBO case (see clause 6.7.2.6 of 3GPP TS 23.548 [39]);
- Inter V-SMF mobility registration update in HR-SBO (see clause 6.7.2.7 of 3GPP TS 23.548 [39]).

There shall be only one individual SM context per PDU session.

The NF Service Consumer (e.g. AMF) shall create an SM context by using the HTTP POST method as shown in Figure 5.2.2.2.1-1.

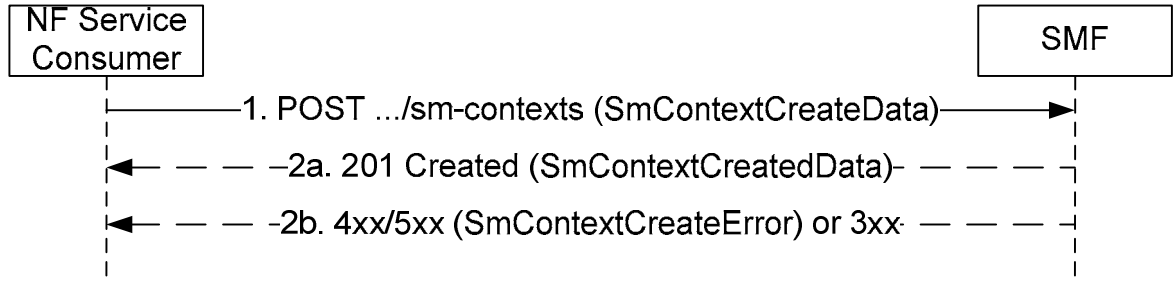

Figure 5.2.2.2.1-1: SM context creation

1. The NF Service Consumer shall send a POST request to the resource representing the SM contexts collection resource of the SMF. The content of the POST request shall contain:

   - a representation of the individual SM context resource to be created;

   - the requestType IE, if the Request type IE is received from the UE for a single access PDU session and if the request refers to an existing PDU session or an existing Emergency PDU session; the requestType IE shall not be included for a MA-PDU session establishment request; it may be included otherwise;

   - the Old PDU Session ID, if it is received from the UE (i.e. for a PDU session establishment for the SSC mode 3 operation);

   - the indication that the UE is inside or outside of the LADN (Local Area Data Network) service area, if the DNN corresponds to a LADN;

   - the perLadnDnnSnssaiInd IE, indicating that the PDU Session is subject to LADN per LADN DNN and S-NSSAI, if the AMF enforces the LADN Service Area per LADN DNN and S-NSSAI;

   - the indication that a MA-PDU session is requested if a MA-PDU session is requested to be established by the UE, or the indication that the PDU session is allowed to be upgraded to a MA-PDU session if so indicated by the UE;

   - the n3gPathSwitchSupportInd IE if the AMF supports non-3GPP access path switching while maintaining two N2 connections for non-3GPP access, the selected SMF supports non-3GPP path switching and if the UE supports non-3GPP access path switching as specified in clause 4.22.2.1 of 3GPP TS 23.502 [3];

   - the indication that the same PCF is required for the requested DNN and S-NSSAI, if it is received by the AMF from UE Subscription data in the UDM, together with the PCF ID selected by the AMF;

   - the alternative S-NSSAI, if the NF service consumer and UE support the network slice replacement and it is requested to replace the S-NSSAI with the alternative S-NSSAI (see clause 5.15.19 of 3GPP TS 23.501 [2]);

   - the alternative HPLMN S-NSSAI, if the NF service consumer and UE support the network slice replacement and it is requested to replace the HPLMN S-NSSAI with the alternative HPLMN S-NSSAI for a roaming PDU session (see clause 5.15.19 of 3GPP TS 23.501 [2]);

NOTE: If the alternative S-NSSAI is present in the PDU Session Establishment procedure, the AMF selects an SMF that supports both the original S-NSSAI and the alternative S-NSSAI. The alternative (HPLMN) S-NSSAI is provided to the SMF together with the original (HPLMN) S-NSSAI to be replaced. The SMF uses the original (H-PLMN) S-NSSAI to retrieve the session management subscription data from the UDM.

   - the anType;

   - the additionalAnType, if the UE is registered over both 3GPP and Non-3GPP accesses;

   - the cpCiotEnabled IE with the value "True", if the NF service consumer (e.g. the AMF) has verified that the CIOT feature is supported by the SMF (and for a home-routed session, that it is also supported by the H-SMF), and Control Plane CIoT 5GS Optimisation is enabled for this PDU session;

- the cpOnlyInd IE with the value "True", if the PDU session shall only use Control Plane CIoT 5GS Optimisation;

- the Invoke NEF indication with the value "True" for a home-routed PDU session, if the cpCiotEnabled IE is set to "True" and data delivery via NEF is selected for the PDU session;

- a subscription for SM context status notification;

- the servingNfId identifying the serving AMF;

- trace control and configuration parameters, if trace is to be activated (see 3GPP TS 32.422 [22]);

- identifiers (i.e. FQDN or IP address) of N3 terminations at the W-AGF, TNGF or TWIF, if available;

- a subscription for DDN failure notification, if the Availability after DDN failure event is subscribed by the UDM;

- the upipSupported IE set to "true", if the UE supports User Plane Integrity Protection with EPS and if the AMF supports the related functionality; and

- the localOffloadingMgtAllowedInd IE set to true, if Local Offloading Management is allowed based on subscription data and the UE is within a local offloading management service area.

For the UE requested PDU Session Establishment procedure in home routed roaming scenario (see clause 4.3.2.2.2 of 3GPP TS 23.502 [3]), the NF Service Consumer shall provide the URI of the Nsmf_PDUSession service of the H-SMF in the hSmfUri IE and optionally the corresponding SMF ID, and may provide the URI of the Nsmf_PDUSession service of additional H-SMF(s) with the corresponding SMF ID(s). The V-SMF shall try to create the PDU session using the hSmfUri IE. If due to communication failure on the N16 interface the V-SMF does not receive any response from the H-SMF, then:

- depending on operator policy, the V-SMF may try reaching the hSmfUri via an alternate path; or

- if additional H-SMF URI is provided, the V-SMF may try to create the PDU session on one of the additional H-SMF(s) provided.

If additional H-SMF(s) are provided, the V-SMF may also try to create the PDU session on one of the additional H-SMF(s) when the PDU session resource cannot be created due to H-SMF server failure (e.g. insufficient resource).

For a PDU session establishment with an I-SMF (see clause 4.23.5.1 of of 3GPP TS 23.502 [3] and clause 6.10.2.2 of 3GPP TS 23.548 [39]), the NF Service Consumer shall provide the URI of the Nsmf_PDUSession service of the SMF in the smfUri IE and optionally the corresponding SMF ID, and may provide the URI of the Nsmf_PDUSession service of additional SMF(s) with the corresponding SMF ID(s). The I-SMF shall try to create the PDU session using the smfUri IE. If due to communication failure on the N16a interface the I-SMF does not receive any response from the SMF, then:

- depending on operator policy, the I-SMF may try reaching the smfUri via an alternate path; or

- if additional SMF URI is provided, the I-SMF may try to create the PDU session on one of the additional SMF(s) provided.

If additional SMF(s) are provided, the I-SMF may also try to create the PDU session on one of the additional SMFs when the PDU session resource cannot be created due to SMF server failure (e.g. insufficient resource).

For the UE requested PDU Session Establishment procedure, if the AMF determines that the RAT type is NB-IoT and the UE has already 2 PDU Sessions with user plane resources activated, the AMF may continue with the PDU Session establishment and include the cpCiotEnabled IE or cpOnlyInd IE with the value "True" to the SMF as specified in clause 4.3.2.2.1 of 3GPP TS 23.502 [3].

The content of the POST request may further contain:

- the name of the AMF service to which SM context status notification are to be sent (see clause 6.5.2.2 of 3GPP TS 29.500 [4]), encoded in the serviceName attribute;

- the remote provisioning server information, if both the AMF and SMF support the Remote Provisioning of UEs in Onboarding Network procedures and the AMF received the information from AUSF for remote provisioning of the UE via user plane;

- the Onboarding Indication, if the UE is registered for onboarding in an SNPN;

- the indication of Notification for SM Policy Association events with the value "true" and the callback information of the PCF for the UE (i.e. the PCF for AM Policy and possibly UE Policy) to receive the notification, if both NF service consumer and the SMF support the "SPAE" feature and if the SM Policy Association Establishment and Termination events should be reported for the PDU session by the PCF for SM Policy to the PCF for the UE. See clause 4.3.2.2.1 of 3GPP TS 23.502 [3];

- the satelliteBackhaulCat IE indicating the category of the satellite backhaul used towards the 5G AN serving the UE, if the AMF is aware of that a satellite backhaul is used towards the 5G AN;

- the disasterRoamingInd IE set to true if the UE is registered for Disaster Roaming service;

- the hrsboAllowedInd IE set to true if the Session Breakout for HR session in VPLMN is allowed;

- the indication of PDU session establishment rejection together with the corresponding rejection cause, if the SMF supports the "PSER" (PDU Session Establishment Rejection) feature and the NF service consumer (i.e. the AMF) has determined that the PDU Session Establishment shall be rejected (e.g. due to the ODB configuration retrieved from the UDM);

- the sliceAreaRestrictInd set to true if the PDU Session is subject to area restriction for the S-NSSAI, i.e. if the S-NSSAI is part of the partially allowed NSSAI (see clause 5.15.17 of 3GPP TS 23.501 [2]) or if the support of the S-NSSAI is restricted to a NS-AoS (see clause 5.15.18 of 3GPP TS 23.501 [2]).

2a. On success, "201 Created" shall be returned, the content of the POST response shall contain the representation describing the status of the request and the "Location" header shall be present and shall contain the URI of the created resource. The authority and/or deployment-specific string of the apiRoot of the created resource URI may differ from the authority and/or deployment-specific string of the apiRoot of the request URI received in the POST request.

If the requestType IE was received in the request and set to EXISTING_PDU_SESSION or EXISTING_EMERGENCY_PDU_SESSION (i.e. indicating that this is a UE request for an existing PDU session or an existing emergency PDU session), the SMF shall identify the existing PDU session or emergency PDU session based on the PDU Session ID; in this case, the SMF shall not create a new SM context but instead update the existing SM context and provide the representation of the updated SM context in the "201 Created" response to the NF Service Consumer.

The POST request shall be considered as colliding with an existing SM context if:

- this is a request to establish a new PDU session, i.e.:

  - the RequestType IE is present in the request and set to INITIAL_REQUEST or INITIAL_EMERGENCY_REQUEST (e.g. single access PDU session establishment request);

  - the RequestType IE and the maRequestInd IE are both absent in the request (e.g. EPS to 5GS mobility); or

  - the maRequestInd IE is present in the request (i.e. MA-PDU session establishment request) and the access type indicated in the request corresponds to the access type of the existing SM context.

and either of the following conditions is met:

- this is a request to establish a non-emergency PDU session and the request includes the same SUPI and the same PDU Session ID as for an existing SM context; or

- this is a request to establish an emergency PDU session and the request includes the same SUPI, or PEI for an emergency registered UE without a UICC or without an authenticated SUPI, as for an existing SM context for an emergency PDU session.

A POST request that collides with an existing SM context shall be treated as a request for a new SM context. Before creating the new SM context, the SMF should delete the existing SM context locally and any associated

resources in the UPF, PCF, CHF, and UDM. If the UP connection of the existing PDU session is active, the SMF should also request (R)AN to release associated resources. See also clause 5.2.3.3.1 for the handling of requests which collide with an existing SM context. If the smContextStatusUri of the existing SM context differs from the smContextStatusUri received in the POST request, the SMF shall also send an SM context status notification (see clause 5.2.2.5) targeting the smContextStatusUri of the existing SM context to notify the release of the existing SM context. For a HR PDU session, if the H-SMF URI in the request is different from the H-SMF URI of the existing PDU session, the V-SMF should also delete the existing PDU session in the H-SMF by invoking the Release service operation (see clause 5.2.2.9). For a PDU session with an I-SMF, if the SMF URI in the request is different from the SMF URI of the existing PDU session, the I-SMF should also delete the existing PDU session in the SMF by invoking the Release service operation (see clause 5.2.2.9).

If the requestType IE was received in the request and indicates this is a request for a new PDU session (i.e. INITIAL_REQUEST) and if the Old PDU Session ID was also included in the request, the SMF shall identify the existing PDU session to release and to which the new PDU session establishment relates, based on the Old PDU Session ID.

If no GPSI IE is provided in the request, e.g. for a PDU session moved from another access or another system, and the SMF knows that a GPSI is already associated with the PDU session (or a GPSI is received from h-SMF for a HR PDU session), the SMF shall include the GPSI in the response.

If the indication of Notification for SM Policy Association events was received with the value "true" together with the callback information of the PCF for the UE in the request and SM Policy Association is to be established for the PDU session, the SMF shall provide the callback information of the PCF for the UE to the PCF for SM Policy during SM Policy Association Establishment.

If the sliceAreaRestrictInd is set to true in the request, the SMF shall subscribe to the AoI reporting event with the AoI defined by the S-NSSAI, for being notified by the AMF whether the UE is located in an area supporting the S-NSSAI, if this event has not been subscribed already.

2b. If the request does not include the "UE presence in LADN service area" indication and the SMF determines that the DNN corresponds to a LADN, then the SMF shall consider that the UE is outside of the LADN service area. The SMF shall reject the request if the UE is outside of the LADN service area.

On failure, or redirection during a UE requested PDU Session Establishment, one of the HTTP status code listed in Table 6.1.3.2.3.1-3 shall be returned. For a 4xx/5xx response, the message body shall contain an SmContextCreateError structure, including:

- a ProblemDetails structure with the "cause" attribute set to one of the application error listed in Table 6.1.3.2.3.1-3;
- N1 SM information (PDU Session Reject), if the request included N1 SM information, except if the error prevents the SMF from generating a response to the UE (e.g. invalid request format).

For the UE requested PDU Session Establishment, the SMF shall reject the request with "EXCEEDED_SLICE_DATA_RATE" application error if the SMF receives from the PCF that the maximum bit rate per S-NSSAI is exceeded, or with "EXCEEDED_UE_SLICE_DATA_RATE" application error if the SMF receives from the PCF that the maximum bit rate per S-NSSAI per UE is exceeded.

For the UE requested PDU Session Establishment, the SMF shall directly reject the request if the SMF supports the "PSER" feature and it has received the indication of PDU Session Establishment Rejection from the AMF in the Create SM Context request.

5.2.2.2.2 EPS to 5GS Idle mode mobility using N26 interface (with or without data forwarding)

The NF Service Consumer (e.g. AMF) shall request the SMF to move a UE EPS PDN connection to 5GS using N26 interface, as follows.

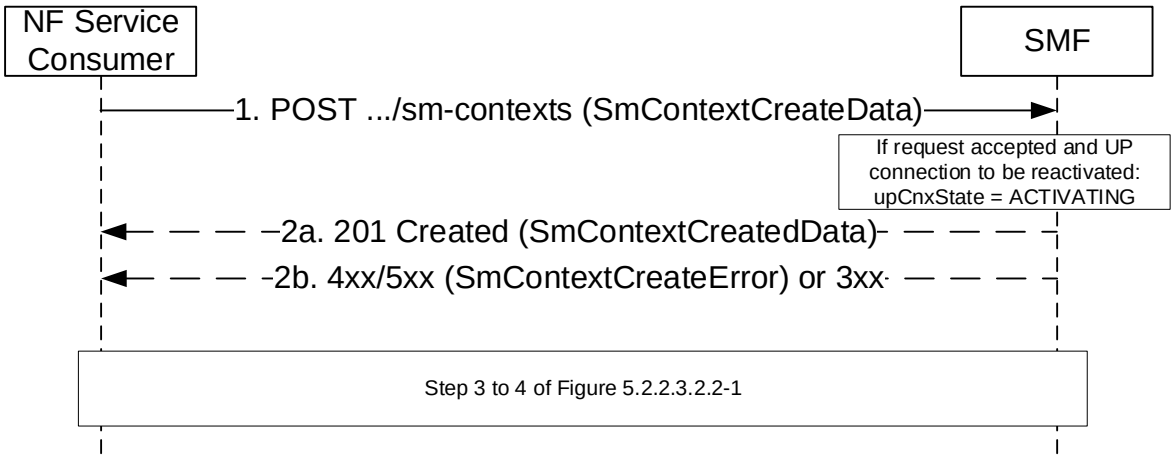

Figure 5.2.2.2.2-1: EPS to 5GS Idle mode mobility using N26 interface

1. The NF Service Consumer shall send a POST request towards the SMF (+PGW-C) of each UE EPS PDN connection, as specified in clause 5.2.2.2.1, with the following additional information:

   - UE EPS PDN connection, including the EPS bearer contexts, received from the MME, representing the individual SM context resource to be created;
   - the pduSessionsActivateList attribute, including the PDU Session ID of all the PDU session(s) to be re-activated;
   - the epsBearerCtxStatus attribute, indicating the status of all the EPS bearer contexts in the UE, if corresponding information is received in the Registration Request from the UE;
   - the dlDataWaitingInd attribute, indicating that DL data buffered in EPS needs to be forwarded to the UE, if such indication is present in the Context Response received from the MME.

2a. Upon receipt of such a request, if:

   - a corresponding PDU session is found based on the EPS bearer contexts (after invoking a Create service operation towards the H-SMF for a Home Routed PDU session, or towards the SMF for a PDU session with an I-SMF);
   - the default EPS bearer context of the corresponding PDU session is not reported as inactive by the UE in the epsBearerCtxStatus attribute, if received; and
   - it is possible to proceed with moving the PDN connection to 5GS,

   then the SMF shall return a 201 Created response including the following information:

   - PDU Session ID corresponding to the default EPS bearer ID of the EPS PDN connection;
   - S-NSSAI assigned to the PDU session; in home routed roaming case, the S-NSSAI for home PLMN shall be returned;
   - the allocatedEbiList attribute, containing the EBI(s) allocated to the PDU session;

   and, if the PDU session that is derived by the SMF based on the EPS bearer contexts was requested to be re-activated, i.e. if the PDU Session ID was present in the pduSessionsActivateList,or if DL data buffered in EPS needs to be forwarded to the UE:

   - the upCnxState attribute set to ACTIVATING;
   - N2 SM information to request the 5G-AN to assign resources to the PDU session (see PDU Session Resource Setup Request Transfer IE in clause 9.3.4.1 of 3GPP TS 38.413 [9]), including (among others) the transport layer address and tunnel endpoint of the uplink termination point for the user plane data for this PDU session (i.e. UPF's GTP-U F-TEID for uplink traffic).

The "Location" header shall be present in the POST response and shall contain the URI of the created SM context resource.

If the epsBearerCtxStatus attribute is received in the request, the SMF shall check whether some EPS bearer(s) of the corresponding PDU session have been deleted by the UE but not notified to the EPS, and if so, the SMF shall release these EPS bearers, corresponding QoS rules and QoS flow level parameters locally, as specified in clause 4.11.1.3.3 of 3GPP TS 23.502 [3].

The NF Service Consumer (e.g. AMF) shall store the association of the PDU Session ID and the SMF ID, and store the allocated EBI(s) associated to the PDU Session ID.

NOTE: The behaviour specified in this step also applies if the POST request collides with an existing SM context, i.e. if the POST request includes the same SUPI, or PEI for an emergency registered UE without a UICC or without an authenticated SUPI, and the default EPS bearer ID received in the UE EPS PDN connection is the same as in the existing SM context.

2b. Same as step 2b of figure 5.2.2.2.1-1. Steps 3 to 4 are skipped in this case.

If the SMF determines that seamless session continuity from EPS to 5GS is not supported for the PDU session, the SMF shall set the "cause" attribute in the ProblemDetails structure to "NO_EPS_5GS_CONTINUITY".

If the default EPS bearer context of the PDU session is reported as inactive by the UE in the epsBearerCtxStatus attribute, the SMF shall set the "cause" attribute in the ProblemDetails structure to "DEFAULT_EPS_BEARER_INACTIVE".

3. Same as step 3 of figure 5.2.2.3.2.2-1, if the SMF returned a 201 Created response with the upConnectionState set to ACTIVATING and N2 SM Information,

4. Same as step 4 of figure 5.2.2.3.2.2-1. During an EPS to 5GS Idle mode mobility using N26 interface with data forwarding (see clause 4.11.1.3.3A of 3GPP TS 23.502 [3]), the 200 OK response shall additionally contain the CN tunnel information for data forwarding from EPS, i.e. the forwardingFTeid attribute or the forwarding bearer contexts to be sent to the MME in the Context Acknowledge, based on the association between the EPS bearer ID(s) and QFI(s) for the QoS flow(s).

5.2.2.2.3 EPS to 5GS Handover Preparation using N26 interface

The NF Service Consumer (e.g. AMF) shall request the SMF to handover a UE EPS PDN connection to 5GS using N26 interface, as follows.

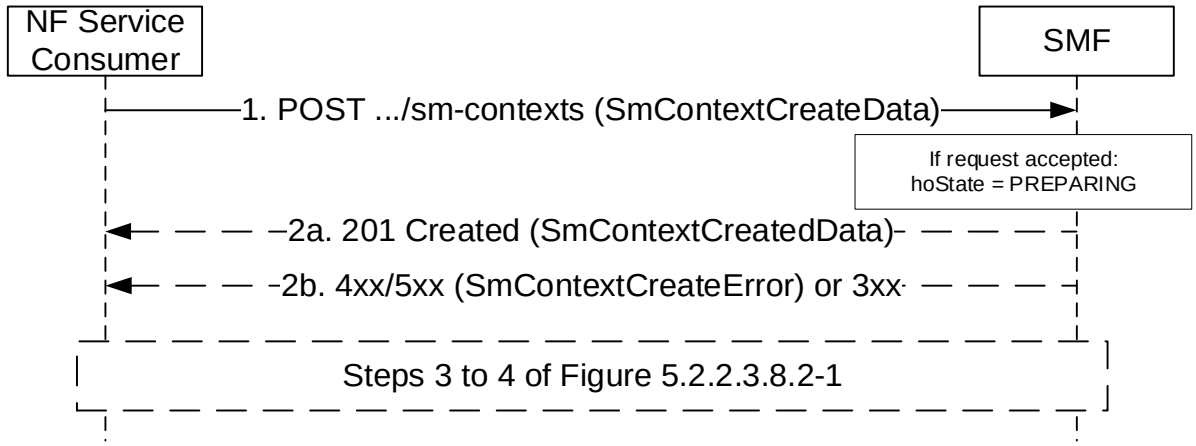

Figure 5.2.2.2.3-1: EPS to 5GS handover using N26 interface

1. The NF Service Consumer shall send a POST request, as specified in clause 5.2.2.2.1, with the following additional information:

   - UE EPS PDN connection, including the EPS bearer contexts, representing the individual SM context resource to be created;

   - hoState attribute set to PREPARING (see clause 5.2.2.3.4.1);

- the indication of whether direct or indirect DL data forwarding applies;

- targetId identifying the target RAN Node ID and TAI based on the Target ID IE received in the Forward Relocation Request message from the source MME.

NOTE 1: The Target ID IE can be set to the Target NG-RAN Node ID containing a Global RAN Node ID and selected TAI with 3-octets length, or the Target eNB ID containing a Global eNB ID and selected TAI with 2-octets length; for the latter case, the NF Service Consumer, i.e. the AMF needs determine a value for the Target NG-RAN Node ID and TAI with 3-octets length based on the local configuration to be provided to the SMF.

2a. Upon receipt of such a request, if a corresponding PDU session is found based on the EPS bearer contexts (after invoking a Create service operation towards the H-SMF, for a Home Routed PDU session) and it is possible to proceed with handing over the PDN connection to 5GS, the SMF shall return a 201 Created response including the following information:

- hoState attribute set to PREPARING and N2 SM information to request the target 5G-AN to assign resources to the PDU session, as specified in step 2 of Figure 5.2.2.3.4.2-1; if the SMF was indicated in step 1 that direct data forwarding is applicable, the SMF shall include an indication that a direct forwarding path is available in the N2 SM information;

- PDU Session ID corresponding to the default EPS bearer ID of the EPS PDN connection;

- S-NSSAI assigned to the PDU session; in home routed roaming case, the S-NSSAI for home PLMN shall be returned;

- allocatedEbiList, containing the EBI(s) allocated to the PDU session;

- optional udmGroupId, containing the identity of the UDM group serving the UE, to facilitate the UDM selection at the target AMF;

- optional pcfGroupId, containing the identity of the PCF group for Session Management Policy for the PDU session, to facilitate the PCF selection at the target AMF.

The "Location" header shall be present in the POST response and shall contain the URI of the created SM context resource.

The NF Service Consumer (e.g. AMF) shall store the association of the PDU Session ID and the SMF ID, and store the allocated EBI(s) associated to the PDU Session ID.

NOTE 2: The behaviour specified in this step also applies if the POST request collides with an existing SM context, i.e. if the POST request includes the same SUPI, or PEI for an emergency registered UE without a UICC or without an authenticated SUPI, and the default EPS bearer ID received in the UE EPS PDN connection is the same as in the existing SM context.

2b. Same as step 2b of figure 5.2.2.2.1-1 with the following additions. Steps 3 and 4 of figure 5.2.2.3.8.2-1 are skipped in this case.

If the SMF determines that seamless session continuity from EPS to 5GS is not supported for the PDU session, the SMF shall set the "cause" attribute in the ProblemDetails structure to "NO_EPS_5GS_CONTINUITY".

When receiving a 4xx/5xx response from the SMF, the NF service consumer (e.g. the AMF) shall regard the hoState of the SM Context to be NONE.

5.2.2.2.4 I-SMF Insertion, Change or Removal during Xn based Handover

The NF Service Consumer (e.g. AMF) shall request the I-SMF (for I-SMF insertion or change) or the SMF (for I-SMF removal) to create a SM context during Xn based handover, as follows.

1. The NF Service Consumer shall send a POST request, with the following additional information:

   - N2 SM information received from the target 5G-AN (see Path Switch Request Transfer IE in clause 9.3.4.8 of 3GPP TS 38.413 [9]);

- additional N2 SM information received from the source 5G-AN (see Secondary RAT Data Usage Report Transfer IE in clause 9.3.4.23 of 3GPP TS 38.413 [9]), if any;

- the smContextRef attribute set to the identifier of the SM Context resource in the SMF during I-SMF insertion, or the SM Context resource in the source I-SMF during I-SMF change or removal, and optionally the NF instance identifier of the SMF hosting the SM Context resource;

- the smfUri IE attribute set to the API URI of the Nsmf_PDUSession service of the SMF during I-SMF insertion or change, and optionally the NF instance identifier of the SMF, if the "ACSCR" feature is not supported by the AMF and I-SMF.

2a. On success, the SMF shall return a 201 Created response.

The "Location" header shall be present in the POST response and shall contain the URI of the created SM context resource.

The NF Service Consumer (e.g. AMF) shall store the association of the PDU Session ID and the SMF ID.

2b. Same as step 2b of figure 5.2.2.2.1-1.

If the Path Swith Request Transfer IE is included within the N2 SM Information in the request message but the path switch failed, the message body shall contain an SmContextCreateError structure, including:

- N2 SM information (Path Swith Request Unsuccessful Transfer).

5.2.2.2.5 I-SMF Insertion, Change or Removal during N2 based Handover

The NF Service Consumer (e.g. AMF) shall request the I-SMF (for I-SMF insertion or change) or the SMF (for I-SMF removal) to create a SM context during N2 based handover, as follows.

1. The NF Service Consumer shall send a POST request, with the following additional information:

- N2 SM information received from the source NG-RAN (see Handover Required Transfer IE in clause 9.3.4.14 of 3GPP TS 38.413 [9]);

- the hoState attribute set to PREPARING (see clause 5.2.2.3.4.1);

- the smContextRef attribute set to the identifier of the SM Context resource in the SMF during I-SMF insertion,,or the SM Context resource in the source I-SMF during I-SMF change or removal, and optionally the NF instance identifier of the SMF hosting the SM Context resource;

- the smfUri IE attribute set to the API URI of the Nsmf_PDUSession service of the SMF during I-SMF insertion or change, and optionally the NF instance identifier of the SMF, if the "ACSCR" feature is not supported by the AMF and I-SMF.

2a. On success, the SMF shall return a 201 Created response including the following information:

- hoState attribute set to PREPARING and N2 SM information to request the target 5G-AN to assign resources to the PDU session, as specified in step 2 of Figure 5.2.2.3.4.2-1;

The "Location" header shall be present in the POST response and shall contain the URI of the created SM context resource.

The NF Service Consumer (e.g. AMF) shall store the association of the PDU Session ID and the SMF ID.

2b. Same as step 2b of figure 5.2.2.2.1-1.

5.2.2.2.6 Service Request with I-SMF insertion/change/removal or with V-SMF change

The NF Service Consumer (e.g. AMF) shall request the new I-SMF or new V-SMF to create a SM context during a Service Request with I-SMF insertion/change or with V-SMF change, or shall request the SMF to create a SM context during a Service Request with I-SMF removal, as follows.

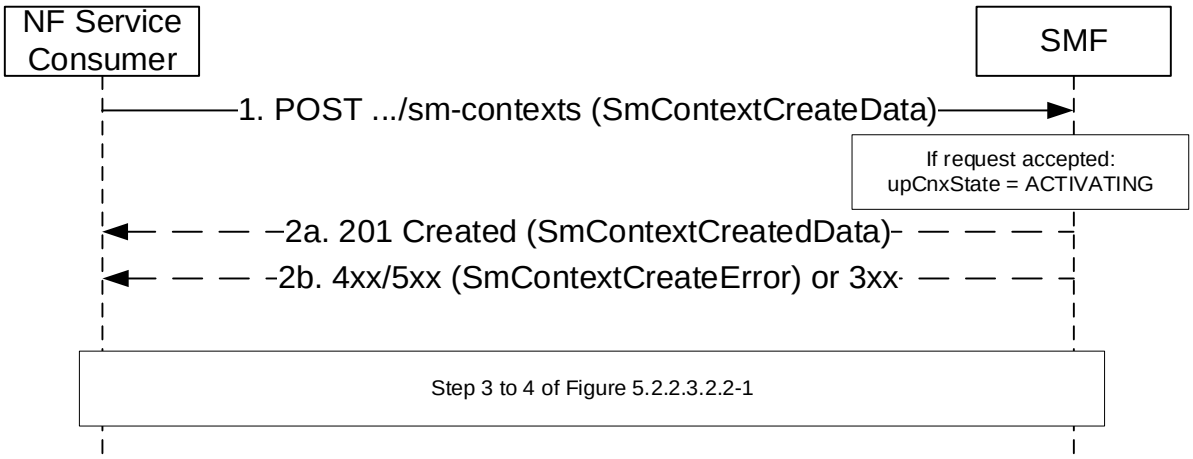

Figure 5.2.2.2.6-1: Service Request with I-SMF insertion/change/removal or with V-SMF change

1. The NF Service Consumer shall send a POST request as specified in clause 5.2.2.2.1, with the following additional information:

   - the smContextRef attribute set to the identifier of the SM Context resource in the SMF (for a Service Request with an I-SMF insertion) or in the old I-SMF (for a Service Request with an I-SMF change or removal) or in the old V-SMF (for a Service Request with a V-SMF change), and optionally the NF instance identifier of the SMF hosting the SM Context resource.

   - the upCnxState attribute set to ACTIVATING (see clause 5.2.2.3.2.1) to indicate the establishment of N3 tunnel User Plane resources for the PDU Session;

   - the smfUri IE attribute set to the API URI of the Nsmf_PDUSession service of the SMF (for a Service Request with an I-SMF insertion or change), and optionally the NF instance identifier of the SMF, if the "ACSCR" feature is not supported by the AMF and I-SMF;

   - the hSmfUri IE attribute set to the API URI of the Nsmf_PDUSession service of the H-SMF (for a Service Request with an V-SMF change), and optionally the NF instance identifier of the H-SMF, if the "ACSCR" feature is not supported by the AMF and V-SMF.

2a. On success, the SMF shall return a 201 Created response as specified in clause 5.2.2.2.1 with the following additional information:

   - the upCnxState attribute set to ACTIVATING;

   - N2 SM information to request the 5G-AN to assign resources to the PDU session (see PDU Session Resource Setup Request Transfer IE in clause 9.3.4.1 of 3GPP TS 38.413 [9]), including the transport layer address and tunnel endpoint of the uplink termination point for the user plane data for this PDU session (i.e. UPF's GTP-U F-TEID for uplink traffic).

2b. Same as step 2b of figure 5.2.2.2.1-1. Steps 3 to 4 of figure 5.2.2.3.2.2-1 are skipped in this case.

5.2.2.2.7 Registration procedure for a UE with a PDU session with I-SMF or V-SMF insertion, change and removal

The NF Service Consumer (e.g. AMF) shall request the SMF to create a SM context during UE Registration procedure for a PDU session with I-SMF or V-SMF insertion, change and removal, as follows.

1. Same as step 1 of 5.2.2.2.1-1, the NF Service Consumer shall send a POST request, with the following additional information:

   - the smContextRef attribute set to the identifier of the SM Context resource in the SMF during I-SMF or V-SMF insertion or the SM Context resource in the I-SMF or V-SMF during I-SMF or V-SMF removal or the SM Context resource in the old I-SMF or old V-SMF during I-SMF or V-SMF change, and optionally the NF instance identifier of the SMF hosting the SM Context resource;

- the upCnxState attribute set to ACTIVATING (see clause 5.2.2.3.2.1) to indicate the establishment of N3 tunnel User Plane resources for the PDU Session, if the UE requested to activate the PDU session;

- if the UE is in CM-CONNECTED state during the registration procedure after an EPS to 5GS handover (see clause 4.11.1.3.3 of 3GPP TS 23.502 [3]), the ranUnchangedInd attribute shall be set to indicate that NG-RAN is not changed for the PDU Session (i.e. for this case, the NG-RAN tunnel info shall be included in SM context retrieved from old I-SMF, or old V-SMF or SMF);

- the smfUri IE attribute set to the API URI of the Nsmf_PDUSession service of the SMF during I-SMF insertion or change, and optionally the NF instance identifier of the SMF, if the "ACSCR" feature is not supported by the AMF and I-SMF.

2a. On success, the SMF shall return a 201 Created response.

If the SMF establishes N3 tunnel User Plane resources for the PDU Session, e.g. due to the NF Service Consumer requesting so or due to buffered DL data in the old I-SMF/I-UPF or old V-SMF/V-UPF (see clause 4.23.3 of 3GPP TS 23.502 [3]), the 201 Created response shall contain the following additional information:

- the upCnxState attribute set to ACTIVATING;

- N2 SM information to request the 5G-AN to assign resources to the PDU session (see PDU Session Resource Setup Request Transfer IE in clause 9.3.4.1 of 3GPP TS 38.413 [9]), including the transport layer address and tunnel endpoint of the uplink termination point for the user plane data for this PDU session (i.e. UPF's GTP-U F-TEID for uplink traffic).

If the SMF receives the ranUnchangedInd attribute set to indicate that NG-RAN is not changed for the PDU Session, the SMF shall respond with a 201 Created with the following additional information:

- N2 SM information to request the 5G-AN to update UPF tunnel info of the PDU session (see PDU Session Resource Modify Request Transfer IE in clause 9.3.4.3 of 3GPP TS 38.413 [9]), including the transport layer address and tunnel endpoint of the uplink termination point for the user plane data for this PDU session (i.e. UPF's GTP-U F-TEID for uplink traffic and NG-RAN's GTP-U F-TEID for downlink traffic).

The "Location" header shall be present in the POST response and shall contain the URI of the created SM context resource.

The NF Service Consumer (e.g. AMF) shall store the association of the PDU Session ID and the SMF ID.

2b. Same as step 2b of figure 5.2.2.2.1-1.

5.2.2.2.8 SMF Context Transfer procedure, LBO or no Roaming, no I-SMF

The NF Service Consumer (e.g. AMF) shall request the SMF to create a SM context during an SMF Context Transfer procedure, LBO or no Roaming, no I-SMF, as follows.

1. Same as step 1 of 5.2.2.2.1-1, the NF Service Consumer shall send a POST request, with the following additional information:

   - SMF transfer indication, Old SMF ID, the identifier of the SM Context resource in old SMF.

2a. On success, the SMF shall return a 201 Created response.

The "Location" header shall be present in the POST response and shall contain the URI of the created SM context resource.

The NF Service Consumer (e.g. AMF) shall store the association of the PDU Session ID and the SMF ID.

2b. Same as step 2b of figure 5.2.2.2.1-1.

5.2.2.2.9 I-SMF Context Transfer procedure

The NF Service Consumer (e.g. AMF) shall request the SMF to create a SM context during I-SMF Context Transfer procedure, as follows.

1. Same as step 1 of 5.2.2.2.1-1, the NF Service Consumer shall send a POST request, with the following additional information:

   - SMF transfer indication, Old SMF ID, the identifier of the SM Context resource in old SMF.

2a. On success, the SMF shall return a 201 Created response.

   The "Location" header shall be present in the POST response and shall contain the URI of the created SM context resource.

   The NF Service Consumer (e.g. AMF) shall store the association of the PDU Session ID and the SMF ID.

2b. Same as step 2b of figure 5.2.2.2.1-1.

5.2.2.2.10 Handover between 3GPP and non-3GPP accesses with I-SMF insertion/removal or V-SMF change

The NF Service Consumer (e.g. AMF) shall request the I-SMF (for I-SMF insertion during a handover from non-3GPP to 3GPP access), the V-SMF (for V-SMF change during a handover from non-3GPP to 3GPP access) or the SMF (for I-SMF removal during a handover from 3GPP to non-3GPP access) to create a SM context as follows.

1. The NF Service Consumer shall send a POST request as specified in clause 5.2.2.2.1, with the following additional information:

   - the smContextRef attribute set to the identifier of the SM Context resource in the SMF (during I-SMF insertion), the SM Context resource in the source I-SMF during I-SMF removal, or the SM Context resource in the source V-SMF during V-SMF change, and optionally the NF instance identifier of the SMF hosting the SM Context resource;

   - the smfUri IE attribute set to the API URI of the Nsmf_PDUSession service of the SMF (during I-SMF insertion), and optionally the NF instance identifier of the SMF, if the "ACSCR" feature is not supported by the AMF and I-SMF;

   - the hSmfUri IE attribute set to the API URI of the Nsmf_PDUSession service of the H-SMF (during V-SMF change), and optionally the NF instance identifier of the H-SMF, if the "ACSCR" feature is not supported by the AMF and V-SMF.

2a. Same as step 2a of figure 5.2.2.2.1-1.

2b. Same as step 2b of figure 5.2.2.2.1-1.

The SMF (for I-SMF removal during a handover from 3GPP to non-3GPP access) may perform Network Slice Admission Control before the PDU Session is moved to the target access (i.e., before the N3 tunnel for the PDU Session is established).

5.2.2.2.11 Void

5.2.2.2.12 SMF triggered I-SMF selection/removal or V-SMF selection

The NF Service Consumer (e.g. AMF) shall invoke the following procedure to request:

- the new I-SMF to create a SM context if the SMF (or the associated old I-SMF) cannot serve the target DNAI; or

- the SMF to create the SM context if an I-SMF is used for the PDU Session and the SMF itself can serve the target DNAI hence the existing I-SMF is no longer needed; or

- the SMF to create the SM context if an I-SMF is used for the PDU Session and the DNAI currently served by I-SMF is not used for the PDU Session anymore, hence the existing I-SMF is not needed; or

- the new V-SMF to create a SM context if the associated old V-SMF cannot serve the target DNAI.

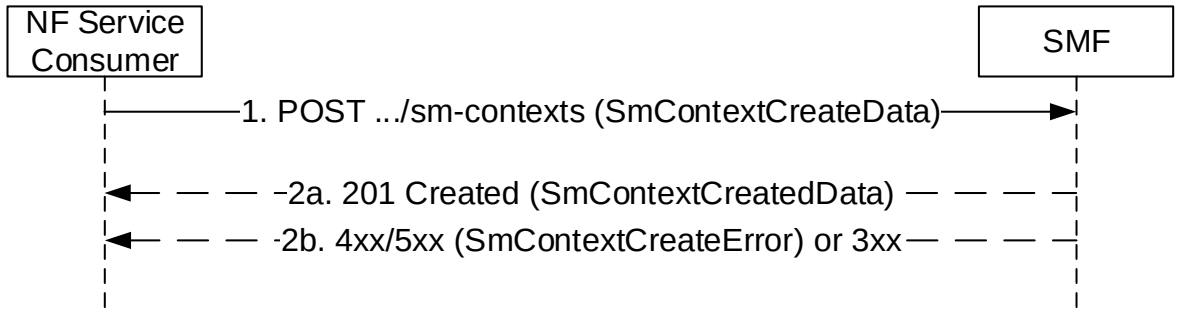

Figure 5.2.2.2.12-1: I-SMF selection/removal or V-SMF selection per DNAI

1. The NF Service Consumer shall send a POST request as defined in step 1 of Figure 5.2.2.2.6-1, with the following additional information:

   - the smContextRef attribute set to the identifier of the SM Context resource in the SMF during I-SMF insertion, or the SM Context resource in the source I-SMF during I-SMF change/removal, or the SM Context resource in the source V-SMF during V-SMF change, and optionally the NF instance identifier of the SMF hosting the SM Context resource;

   - the target DNAI, if it is received in the targetDnaiInfo attribute of the SM context status notification;

   - if the UE is in CM-CONNECTED state, the ranUnchangedInd attribute shall be set to indicate that NG-RAN is not changed for the PDU Session (i.e. for this case, the NG-RAN tunnel info shall be included in SM context retrieved from old I-SMF, old V-SMF or SMF) as specified in clause 4.23.5.4 of 3GPP TS 23.502 [3] and clause 6.7.3.2 of 3GPP TS 23.548 [74];

   - the smfUri IE attribute set to the API URI of the Nsmf_PDUSession service of the SMF (during I-SMF insertion/change, or V-SMF change), and optionally the NF instance identifier of the SMF, if the "ACSCR" feature is not supported by the AMF, I-SMF or V-SMF.

2a. On success, the SMF shall return a 201 Created response, with the following additional information:

   If the SMF receives the ranUnchangedInd attribute set to indicate that NG-RAN is not changed for the PDU Session, the SMF shall include the N2 SM information to request the 5G-AN to update UPF tunnel info of the PDU session (see PDU Session Resource Modify Request Transfer IE in clause 9.3.4.3 of 3GPP TS 38.413 [9]), including the transport layer address and tunnel endpoint of the uplink termination point for the user plane data for this PDU session (i.e. UPF's GTP-U F-TEID for uplink traffic and NG-RAN's GTP-U F-TEID for downlink traffic).

   The "Location" header shall be present in the POST response and shall contain the URI of the created SM context resource.

   The NF Service Consumer (e.g. AMF) shall store the association of the PDU Session ID and the SMF ID.

2b. Same as step 2b of figure 5.2.2.2.1-1.

5.2.2.3 Update SM Context service operation

5.2.2.3.1 General

The Update SM Context service operation shall be used to update an individual SM context and/or provide N1 or N2 SM information received from the UE or the AN, for a given PDU session, towards the SMF, or the V-SMF for HR roaming scenarios, or the I-SMF for a PDU session with an I-SMF.

It is used in the following procedures:

- PDU Session modification (see clause 4.3.3 of 3GPP TS 23.502 [3]);

- UE or network requested PDU session release (see clause 4.3.4.2 and clause 4.3.4.3 of 3GPP TS 23.502 [3]);

- UE requested MA PDU session establishment over the other access (see clause 4.22.7 of 3GPP TS 23.502 [3]);

- UE or network-initiated MA PDU session release over a single access (see clause 4.22 of 3GPP TS 23.502 [3]);
- Activation or Deactivation of the User Plane connection of an existing PDU session, i.e. establishment or release of the N3 tunnel between the AN and serving CN (see clause 5.6.8 of 3GPP TS 23.501 [2], clauses 4.2.2.2, 4.2.3, 4.2.6, 4.2.10 and 4.9.1.3.3 of 3GPP TS 23.502 [3], clauses 7.2.2.1, 7.2.2.2, 7.2.5.2 and 7.2.5.3 of 3GPP TS 23.316 [36]) and clause 7.2.5.2 of 3GPP TS 23.247 [44];
- Xn and N2 Handover procedures (see clauses 4.9.1, 4.23.7 and 4.23.11 of 3GPP TS 23.502 [3]);
- Handover between 3GPP and untrusted non-3GPP access procedures (see clause 4.9.2 of 3GPP TS 23.502 [3]);
- Inter-AMF change due to AMF planned maintenance or AMF failure (see clause 5.21.2 of 3GPP TS 23.501 [2]), or inter-AMF mobility in CM-IDLE mode (see clauses 4.2.2.2 and 4.23.3 of 3GPP TS 23.502 [3]);
- RAN Initiated QoS Flow Mobility (see clause 4.14.1 of 3GPP TS 23.502 [3] and clause 8.2.5 of 3GPP TS 38.413 [9]);
- All procedures requiring to provide N1 or N2 SM information to the SMF, e.g. UE requested PDU Session Establishment procedure (see clause 4.3.2.2 of 3GPP TS 23.502 [3]), USS UAV Authorization/Authentication (UUAA) to carry the UUAA authentication message during the PDU Session Establishment (see clause 5.2.3.2 of 3GPP TS 23.256 [41] and Service-level-AA container in 3GPP TS 24.501 [7]), session continuity procedure (see clause 4.3.5 of 3GPP TS 23.502 [3]);
- EPS to 5GS Idle mode mobility, EPS to 5GS Idle mode mobility with data forwarding or handover using N26 interface (see clause 4.11 of 3GPP TS 23.502 [3]);
- 5GS to EPS Handover using N26 interface (see clause 4.11.1.2 of 3GPP TS 23.502 [3]);
- 5GS to EPS Idle mode mobility using N26 interface with data forwarding (see clause 4.11.1.3.2A of 3GPP TS 23.502 [3]);
- PDU Session Reactivation during P-CSCF Restoration procedure via AMF (see clause 5.8.4.3 of 3GPP TS 23.380 [21]);
- AMF requested PDU session release due to a change of the set of network slices for a UE where a network slice instance is no longer available (see clause 4.3.4.2 of 3GPP TS 23.502 [3]);
- AMF receives an "initial request" with PDU Session Id which already exists in PDU session context of the UE (see clause 5.4.5.2.5 of 3GPP TS 24.501 [7]);
- Secondary RAT Usage Data Reporting (see clause 4.21 of 3GPP TS 23.502 [3]);
- Service Request Procedures with I-SMF change or I-SMF removal when downlink data packets are buffered at the I-UPF (See clause 4.23.4 of 3GPP TS 23.502 [3]);
- Connection Suspend procedure (see clause 4.8.1.2 of 3GPP TS 23.502 [3]);
- Connection Resume in CM-IDLE with Suspend procedure (see clause 4.8.2.3 of 3GPP TS 23.502 [3]);
- 5G-RG or Network requested PDU Session Modification via W-5GAN (see clause 7.3.2 of 3GPP TS 23.316 [36]);
- 5G-RG or Network requested PDU Session Release via W-5GAN (see clause 7.3.3 of 3GPP TS 23.316 [36]);
- FN-RG or Network requested PDU Session Modification via W-5GAN (see clause 7.3.6 of 3GPP TS 23.316 [36]);
- FN-RG or Network requested PDU Session Release via W-5GAN (see clause 7.3.7 of 3GPP TS 23.316 [36]);
- Handover between 3GPP access/5GC and W-5GAN access (see clause 7.6.3 of 3GPP TS 23.316 [36]);
- AMF requested PDU session release due to Network Slice-Specific (Re-)Authentication and (Re-)Authorization failure or revocation (see clauses 4.2.9.2, 4.2.9.3 and 4.2.9.4 of 3GPP TS 23.502 [3]);
- 5G-RG requested PDU Session Establishment via W-5GAN (see clause 7.3.1 of 3GPP TS 23.316 [36]);
- FN-RG related PDU Session Establishment via W-5GAN (see clause 7.3.4 of 3GPP TS 23.316 [36]);

- Non-5G capable device behind 5G-CRG and FN-CRG requested PDU Session Establishment via W-5GAN (see clause 4.10a of 3GPP TS 23.316 [36]);
- Non-5G capable device behind 5G-CRG and FN-CRG or Network requested PDU Session Modification via W-5GAN (see clause 4.10a of 3GPP TS 23.316 [36]);
- Non-5G capable device behind 5G-CRG and FN-CRG or Network requested PDU Session Release via W-5GAN (see clause 4.10a of 3GPP TS 23.316 [36]);
- CN-initiated selective deactivation of UP connection of an existing PDU Session associated with W-5GAN Access (see clause 7.3.5 of 3GPP TS 23.316 [36]);
- Handover between 3GPP access / EPS and W-5GAN/5GC access (see clause 7.6.4 of 3GPP TS 23.316 [36]);
- AMF requested PDU session release due to Control Plane Only indication associated with PDU Session is not applicable any longer as described in 3GPP TS 23.501 [2] clause 5.31.4.1;
- Subscribe to / unsubscribe from the DDN failure status notification (see clauses 4.15.3.2.7 and 4.15.3.2.9 of 3GPP TS 23.502 [3]);
- AMF requested PDU session release due to ODB changes (see clause 2.6C.2 of 3GPP TS 23.015 [42]);
- Simultaneous change of Branching Points or UL CLs controlled by different I-SMFs (see clause 4.23.9.5 of 3GPP TS 23.502 [3]);
- Remote UE Report during 5G ProSe Communication via 5G ProSe Layer-3 UE-to-Network Relay without N3IWF (see clause 6.5.1.1 of 3GPP TS 23.304 [43];
- Multicast Session join and session establishment procedure in clause 7.2.1.3 of 3GPP TS 23.247 [44];
- Multicast MBS session leave and release procedure in clause 7.2.2 of 3GPP TS 23.247 [44];
- MBS session activation procedure in clause 7.2.5.2 of 3GPP TS 23.247 [44];
- Mobility procedures for MBS in clause 7.2.3 of 3GPP TS 23.247 [44];
- Connection Inactive procedure with CN based MT communication handling in clause 4.8.1.1a of 3GPP TS 23.502 [3];
- UE Triggered Connection Resume in RRC Inactive procedure in clause 4.8.2.2 of 3GPP TS 23.502 [3];
- Network Slice Replacement, see clause 5.15.19 of 3GPP TS 23.501 [2];
- AMF requested PDU Session release due to MBSR not authorized as described in clause 5.35A.4 of 3GPP TS 23.501 [2] and in clause 4.3.4.2 of 3GPP TS 23.502 [3];
- AMF correlated UDM Re-Discovery for UDR Restoration during Subscription Data Migration (see clause 6.7.3 of 3GPP TS 23.527 [24]);
- Xn Handover without V-SMF change or N2-based handover with V-SMF insertion/change/removal in HR-SBO case (see clauses 6.7.2.6 and 6.7.2.10 of 3GPP TS 23.548 [39]);
- AMF indication of AMF Data Restoration resynchronization is initiated (see clause 6.7.4 of 3GPP TS 23.527 [24]).

The NF Service Consumer (e.g. AMF) shall update an individual SM context and/or provide N1 or N2 SM information to the SMF by using the HTTP POST method (modify custom operation) as shown in Figure 5.2.2.3.1-1.

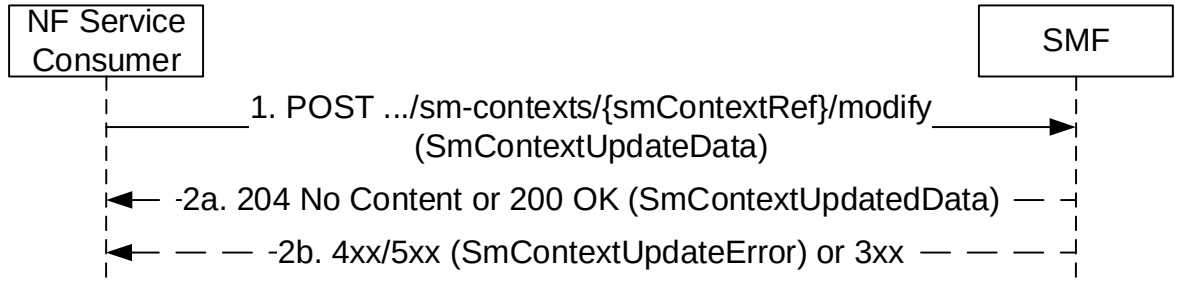

Figure 5.2.2.3.1-1: SM context update

1. The NF Service Consumer shall send a POST request to the resource representing the individual SM context resource in the SMF. The content of the POST request shall contain the modification instructions and/or the N1 or N2 SM information, or the indication that the PDU session is allowed to be upgraded to a MA PDU session if so indicated by the UE as specified in clause 6.4.2.2 of 3GPP TS 24.501 [7], or subscribe/unsubscribe of the DDN failure notification as specified in clause 4.15.3.2.7 of 3GPP TS 23.502 [3]. If the request contains EBI(s) to revoke, then the SMF shall disassociate the EBI(s) with the QFI(s) with which they are associated.

2a. On success, "204 No Content" or "200 OK" shall be returned; in the latter case, the content of the POST response shall contain the representation describing the status of the request and/or N1 or N2 SM information.

   If the ExemptionInd IE is included in the request message, indicating that the NAS SM message included in the request was exempted from NAS congestion control by the AMF, the SMF shall verify that the included 5G SM message can be exempted from a NAS SM congestion control activated in the AMF as specified in clause 5.19.7 of 3GPP TS 23.501 [2].

   The SMF may indicate to the NF Service Consumer that it shall release EBI(s) that were assigned to the PDU session by including the releaseEbiList IE, e.g. when a QoS flow is released.

2b. On failure or redirection, one of the HTTP status codes listed in Table 6.1.3.3.4.2.2-2 shall be returned. For a 4xx/5xx response, the message body shall contain an SmContextUpdateError structure, including:

   - a ProblemDetails structure with the "cause" attribute set to one of the application errors listed in Table 6.1.3.3.4.2.2-2;
   - N1 SM information, if the SMF needs and can return a response to the UE;
   - N2 SM information, if the SMF needs and can return a response to the NG-RAN.

The following clauses specify additional requirements applicable to specific scenarios.

5.2.2.3.2 Activation and Deactivation of the User Plane connection of a PDU session

5.2.2.3.2.1 General

The upCnxState attribute of an SM context represents the state of the User Plane connection of the PDU session. The upCnxState attribute may take the following values:

- ACTIVATED: a N3 tunnel is established between the 5G-AN and UPF (F-TEIDs assigned for both uplink and downlink traffic);
- DEACTIVATED: no N3 tunnel is established between the 5G-AN and UPF;
- ACTIVATING: a N3 tunnel is being established (5G-AN's F-TEID for downlink traffic is not assigned yet).

Clauses 5.2.2.3.2.2 and 5.2.2.3.2.3 specify how the NF Service Consumer (e.g. AMF) request the SMF to activate or deactivate the User Plane connection of the PDU session, e.g. upon receiving a Service Request from the UE requesting to activate a PDU session or upon an AN release procedure respectively. Clause 5.2.2.3.2.3 also applies in case of 5G-AN requested PDU session resource release by sending the NGAP PDU SESSION RESOURCE NOTIFY to the AMF (see step 1d in clause 4.3.4.2 of 3GPP TS 23.502 [3]).

In scenarios where the SMF takes the initiative to activate or deactivate the User Plane connection of the PDU session, e.g. during a Network Triggered Service Request or CN-initiated selective deactivation of the User Plane connection of

a PDU session respectively, the SMF invokes the Namf_N1N2MessageTransfer procedure with the inclusion of N2 SM Information (and optionally of a N1 SM Container) as specified in 3GPP TS 23.502 [3] to request the establishment or release of the PDU session's resources in the 5G-AN. The Update SM Context service operation is then used as specified in clause 5.2.2.3.1 to transfer the response to the SMF.

Clause 5.2.2.3.2.4 specifies how the NF Service Consumer (e.g. AMF) indicates to the SMF that the access type of a PDU session can be changed from non-3GPP access to 3GPP access, during a Network Triggered Service Request initiated for a PDU session associated to the non-3GPP access, if the PDU Session for which the UE was paged or notified is in the List Of Allowed PDU Sessions provided by the UE and if the AMF has received N2 SM Information only or N1 SM Container and N2 SM Information for that PDU session from the SMF in step 3a of clause 4.2.3.3 of 3GPP TS 23.502 [3].

5.2.2.3.2.2 Activation of User Plane connectivity of a PDU session

The NF Service Consumer (e.g. AMF) shall request the SMF to activate the User Plane connection of an existing PDU session, i.e. establish the N3 tunnel between the 5G-AN and UPF, as follows.

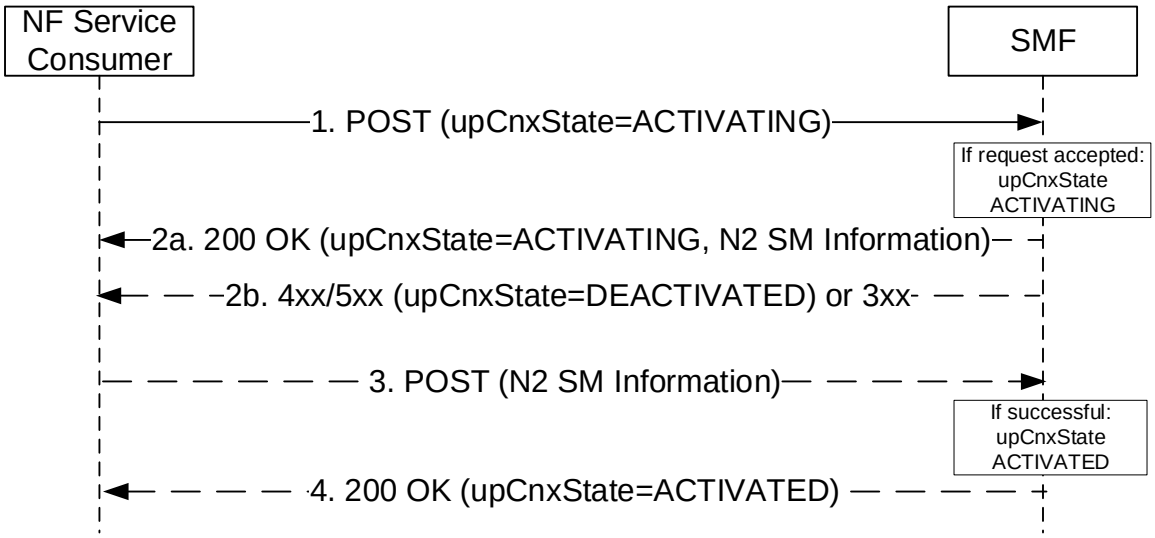

Figure 5.2.2.3.2.2-1: Activation of the User Plane connection of a PDU session

1. The NF Service Consumer shall request the SMF to activate the user plane connection of the PDU session by sending a POST request, as specified in clause 5.2.2.3.1, with the following information:

   - the upCnxState attribute set to ACTIVATING;
   - the user location and access type associated to the PDU session, if modified;
   - the indication that the UE is inside or outside of the LADN service area, if the DNN of the established PDU session corresponds to a LADN;
   - the access type for which the user plane connection needs to be re-activated, for a MA PDU session (i.e. the access type over which a Registration or Service Request was received);
   - the "MO Exception Data Counter" if the UE has accessed the network by using "MO exception data" RRC establishment cause;
   - the n3gPathSwitchExecutionInd IE if the AMF receives the indication "Non-3GPP access path switching while using old AN resources" in the registration request message from the UE and if the SMF supports non-3GPP path switching, so to request the SMF to add a new non-3GPP access path (while also keeping the existing one) during a UE requested non-3GPP access switching for a MA-PDU session;
   - other information, if necessary.

2a. Upon receipt of such a request, if the SMF can proceed with activating the user plane connection of the PDU session (see clause 4.2.3 of 3GPP TS 23.502 [3]), the SMF shall set the upCnxState attribute to ACTIVATING and shall return a 200 OK response including the following information:

- upCnxState attribute set to ACTIVATING;

- N2 SM information to request the 5G-AN to assign resources to the PDU session (see PDU Session Resource Setup Request Transfer IE in clause 9.3.4.1 of 3GPP TS 38.413 [9]), including the transport layer address and tunnel endpoint of the uplink termination point for the user plane data for this PDU session (i.e. UPF's GTP-U F-TEID for uplink traffic).

If the SMF finds the PDU session already activated when receiving the request in step 1, the SMF shall delete the N3 tunnel information and update the UPF accordingly (see step 8a of clause 4.2.3.2 of 3GPP TS 23.502 [3]).

For a MA-PDU session, the SMF shall perform the above requirements for the access type for which the user plane connection is requested to be re-activated (i.e. the access type indicated in the anTypeToReactivate attribute). The SMF shall not modify the user plane connection status for the other access type, e.g. if the user plane connection is already established for the other access type, it shall remain established. If the SMF receives the n3gPathSwitchExecutionInd IE the SMF shall not trigger the release of the UP connection in the old non-3GPP access.

If the "MO Exception Data Counter" is included in the request and Small Data Rate Control is enabled for the PDU session, then the V-SMF/I-SMF shall forward the counter to the H-SMF/SMF.

2b. If the request does not include the "UE presence in LADN service area" indication and the SMF determines that the DNN corresponds to a LADN, then the SMF shall consider that the UE is outside of the LADN service area. The SMF shall reject the request if the UE is outside of the LADN service area.

If the SMF cannot proceed with activating the user plane connection of the PDU session (e.g. if the PDU session corresponds to a PDU session of SSC mode 2 and the SMF decides to change the PDU Session Anchor), the SMF shall return an error response, as specified for step 2b of figure 5.2.2.3.1-1. For a 4xx/5xx response, the SmContextUpdateError structure shall include the following additional information:

- upCnxState attribute set to DEACTIVATED.

3. If the SMF returned a 200 OK response, the NF Service Consumer (e.g. AMF) shall subsequently update the SM context in the SMF by sending POST request, as specified in clause 5.2.2.3.1, with the following information:

- N2 SM information received from the 5G-AN (see PDU Session Resource Setup Response Transfer IE in clause 9.3.4.2 of 3GPP TS 38.413 [9]), including the transport layer address and tunnel endpoint of one or two downlink termination point(s) and the associated list of QoS flows for this PDU session (i.e. 5G-AN's GTP-U F-TEID(s) for downlink traffic), if the 5G-AN succeeded in establishing resources for the PDU sessions; or

- N2 SM information received from the 5G-AN (see PDU Session Resource Setup Unsuccessful Transfer IE in clause 9.3.4.16 of 3GPP TS 38.413 [9]), including the Cause of the failure, if resources failed to be established for the PDU session.

Upon receipt of this request, the SMF shall:

- update the UPF with the 5G-AN's F-TEID(s) and set the upCnxState attribute to ACTIVATED, if the 5G-AN succeeded in establishing resources for the PDU sessions; or

- consider that the activation of the User Plane connection has failed and set the upCnxState attribute to DEACTIVATED" otherwise.

4. The SMF shall then return a 200 OK response including the upCnxState attribute representing the final state of the user plane connection. If the activation of the User Plane connection failed due to insufficient resources, the cause IE shall be included in the response and set to "INSUFFICIENT_UP_RESOURCES".

5.2.2.3.2.3 Deactivation of User Plane connectivity of a PDU session

The NF Service Consumer (e.g. AMF) shall request the SMF to deactivate the User Plane connectivity of an existing PDU session, i.e. release the N3 tunnel, as follows.

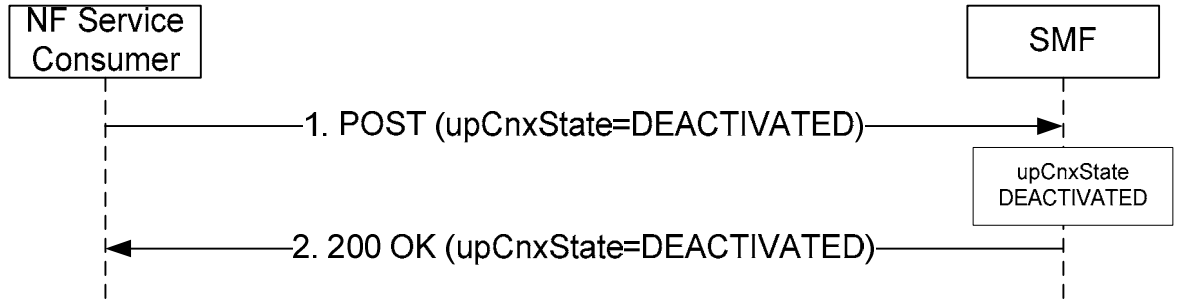

Figure 5.2.2.3.2.2-1: Deactivation of the User Plane connection of a PDU session

1. The NF Service Consumer shall request the SMF to deactivate the user plane connection of the PDU session by sending a POST request, as specified in clause 5.2.2.3.1, with the following information:

   - upCnxState attribute set to DEACTIVATED;
   - user location and user location timestamp;
   - cause of the user plane deactivation; the cause may indicate a cause received from the 5G-AN or AMF has detected that the UE has moved out of the network slice support area or due to an AMF internal event;
   - N2 SM information received from the 5G-AN (see PDU Session Resource Notify Released Transfer IE in clause 9.3.4.13 of 3GPP TS 38.413 [9] and PDU Session Resource Release Response Transfer IE in clause 9.3.4.21 of 3GPP TS 38.413 [9]), if the request is triggered due to an 5G-AN requested PDU session resource release or due to an AN Release procedure respectively;
   - other information, if necessary.

NOTE: The SMF can receive a N2 SM information (PDU Session Resource Release Response Transfer IE) without having sent any prior N2 SM information (PDU Session Resource Release Command Transfer IE) to the AMF.

2. Upon receipt of such a request, the SMF shall deactivate release the N3 tunnel of the PDU session, set the upCnxState attribute to DEACTIVATED and return a 200 OK response including the upCnxState attribute set to DEACTIVATED.

   If the request is triggered due to 5G-AN requested PDU session resource release, the SMF may decide to keep the PDU Session (with user plane connection deactivated) or release the PDU Session. If the SMF decides to keep the PDU Session, it shall return "200 OK" with the *upCnxState* attribute set to DEACTIVATED, but not including *n1SmMsg* and *n2SmInfo*. If the SMF decides to release the PDU Session, it shall return "200 OK" with the *upCnxState* attribute set to DEACTIVATED, including *n1SmMsg* IE but not-including *n2SmInfo* IE.

5.2.2.3.2.4 Changing the access type of a PDU session from non-3GPP access to 3GPP access during a Service Request procedure

The NF Service Consumer (e.g. AMF) shall indicate to the SMF that the access type of a PDU session can be changed as follows:

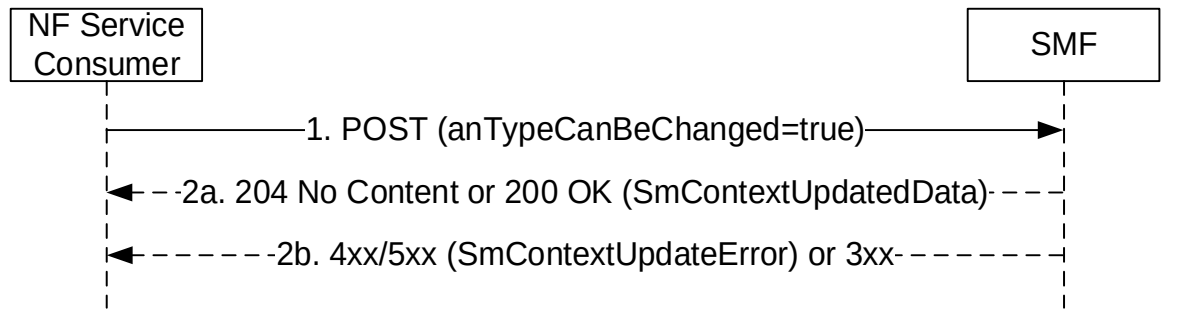

Figure 5.2.2.3.2.4-1: Indicating that the access type of a PDU session can be changed

1. The NF Service Consumer shall indicate that the access type of a PDU session can be changed by sending a POST request, as specified in clause 5.2.2.3.1, with the following information:

   - anTypeCanBeChanged attribute set to "true";

   - other information, if necessary.

2a. Same as step 2a of figure 5.2.2.3.1-1. In HR roaming scenarios, the V-SMF shall invoke the Update service operation towards the H-SMF to notify that the access type of the PDU session can be changed (see clause 5.2.2.8.2.2).

2b. Same as step 2b of figure 5.2.2.3.1-1.

NOTE: This is used during a Service Request procedure (see clause 4.2.3.2 of 3GPP TS 23.502 [3]), in response to paging or NAS notification indicating non-3GPP access, if the PDU Session for which the UE was paged or notified is in the List Of Allowed PDU Sessions provided by the UE and if the AMF has received N2 SM Information only or N1 SM Container and N2 SM Information for that PDU session from the SMF in step 3a of clause 4.2.3.3 of 3GPP TS 23.502 [3].

The SMF may perform Network Slice Admission Control before the PDU Session is moved from the non-3GPP access to 3GPP access (i,e, before N3 tunnel for the PDU Session is established).

If the PDU Session is moved from the non-3GPP access to 3GPP access (i.e. N3 tunnel for the PDU Session is established successfully), the SMF and NF Service Consumer (e.g. AMF) updates the associated access of the PDU Session.

5.2.2.3.3 Xn Handover

The NF Service Consumer (e.g. AMF) shall request the SMF to switch the downlink N3 tunnel of the PDU session towards a new GTP tunnel endpoint as follows.

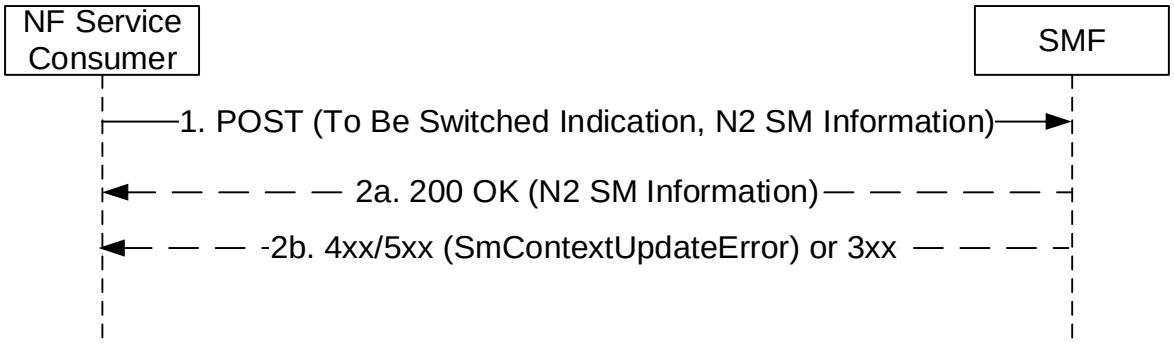

Figure 5.2.2.3.3-1: Xn handover

1. The NF Service Consumer shall request the SMF to switch the downlink N3 tunnel of the PDU session towards a new GTP tunnel endpoint by sending a POST request, as specified in clause 5.2.2.3.1, with the following information:

   - the indication that the PDU session is to be switched;

   - N2 SM information received from the target 5G-AN (see Path Switch Request Transfer IE in clause 9.3.4.8 of 3GPP TS 38.413 [9]), including the new transport layer address and tunnel endpoint of the downlink termination point for the user data for this PDU session (i.e. 5G-AN's GTP-U F-TEID for downlink traffic);

   - additional N2 SM information received from the source 5G-AN (see Secondary RAT Data Usage Report Transfer IE in clause 9.3.4.23 of 3GPP TS 38.413 [9]), if any;

   - the user location associated to the PDU session;

   - the indication that the UE is inside or outside of the LADN service area, if the DNN of the established PDU session corresponds to a LADN;

   - other information, if necessary.

2a. If the SMF can proceed with switching the user plane connection of the PDU session, the SMF shall return a 200 OK response including the following information:

- N2 SM information (see Path Switch Request Acknowledge Transfer IE in clause 9.3.4.9 of 3GPP TS 38.413 [9]), including the transport layer address and tunnel endpoint of the uplink termination point for the user data for this PDU session (i.e. UPF's GTP-U F-TEID for uplink traffic).

If the request does not include the "UE presence in LADN service area" indication and the SMF determines that the DNN corresponds to a LADN, then the SMF shall consider that the UE is outside of the LADN service area. The SMF shall proceed as specified in clause 5.6.5 of 3GPP TS 23.501 [2].

2b. If the SMF cannot proceed with switching the user plane connection of the PDU session, the SMF shall return an error response, as specified for step 2b of figure 5.2.2.3.1-1, including:

- N2 SM information (see Path Switch Request Unsuccessul Transfer IE in clause 9.3.4.20 of 3GPP TS 38.413 [9]), including the cause of the failure.

For a PDU session that is rejected by the target RAN (i.e. a PDU session indicated as failed to setup in the PATH SWITCH REQUEST), the NF Service Consumer (e.g. AMF) shall indicate the failure to setup the PDU session in the target RAN as follows.

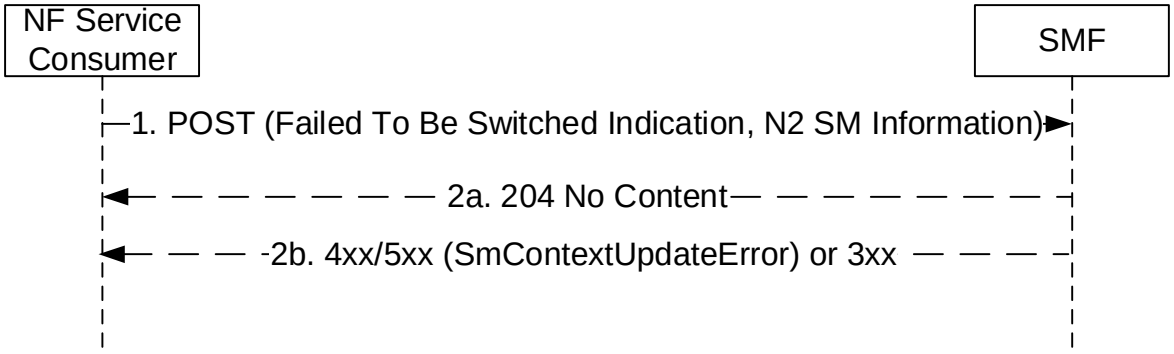

Figure 5.2.2.3.3-2: Xn handover – PDU session rejected by the target RAN

1. The NF Service Consumer shall indicate to the SMF that the PDU session could not be setup in the target RAN by sending a POST request, as specified in clause 5.2.2.3.1, with the following information:

- the indication that the PDU session failed to be switched;

- N2 SM information received from the target 5G-AN (see Path Switch Request Setup Failed Transfer IE in clause 9.3.4.15 of 3GPP TS 38.413 [9]), including the cause why the session could not be setup;

- additional N2 SM information received from the source 5G-AN (see Secondary RAT Data Usage Report Transfer IE in clause 9.3.4.23 of 3GPP TS 38.413 [9]), if any;

- other information, if necessary.

2a. Upon receipt of such a request, the SMF shall return a "204 No Content" response. The SMF shall decide whether to release the PDU session or deactivate the user plane connection of the PDU session, as specified in clause 4.9.1.2 of 3GPP TS 23.502 [3].

2b. Same as step 2b of figure 5.2.2.3.1-1.

5.2.2.3.4 N2 Handover

5.2.2.3.4.1 General

The hoState attribute of an SM context represents the handover state of the PDU session. The hoState attribute may take the following values:

- NONE: no handover is in progress for the PDU session;
- PREPARING: a handover is in preparation for the PDU session; SMF is preparing the N3 tunnel between the target 5G-AN and UPF, i.e. the UPF's F-TEID is assigned for uplink traffic;
- PREPARED: a handover is prepared for the PDU session; SMF is updated for the N3 tunnel between the target 5G-AN and UPF, with the target 5G-AN's F-TEID to be assigned for downlink traffic upon handover execution;
- COMPLETED: the handover is completed (successfully);
- CANCELLED: the handover is cancelled.

5.2.2.3.4.2 N2 Handover Preparation

The NF Service Consumer (e.g. T-AMF) shall request the SMF to prepare the handover of an existing PDU session, i.e. prepare the N3 tunnel between the target 5G-AN and UPF, as follows.

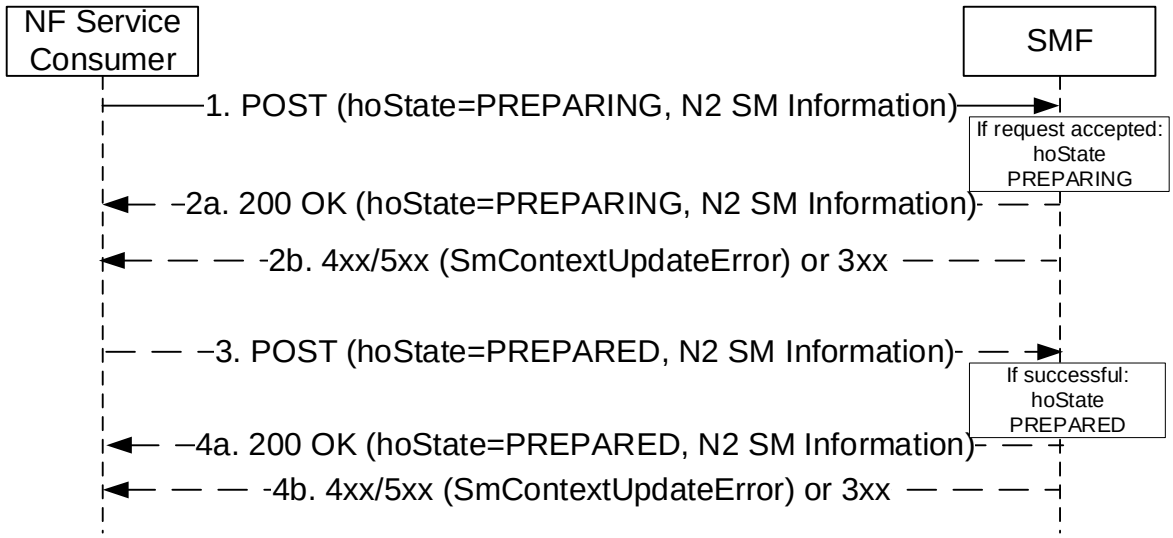

Figure 5.2.2.3.4.2-1: N2 Handover Preparation

1. The NF Service Consumer shall request the SMF to prepare the handover of the PDU session by sending a POST request, as specified in clause 5.2.2.3.1, with the following information:
   - updating the hoState attribute of the individual SM Context resource in the SMF to PREPARING;
   - targetId identifying the target RAN Node ID and TAI received in the Handover Required from the source NG-RAN;
   - targetServingNfId set to the target AMF Id, for a N2 handover with AMF change;
   - N2 SM information received from the source NG-RAN (see Handover Required Transfer IE in clause 9.3.4.14 of 3GPP TS 38.413 [9]), indicating whether a direct path is available;
   - the supportedFeatures IE indicating the features it supports, if at least one feature defined in clause 6.1.8 is supported;
   - other information, if necessary.

2a. Upon receipt of such a request, if the SMF can proceed with preparing the handover of the PDU session (see clause 4.9.1.3 of 3GPP TS 23.502 [3]), the SMF shall set the hoState attribute to PREPARING and shall return a 200 OK response including the following information:
   - hoState attribute set to PREPARING;
   - N2 SM information to request the target 5G-AN to assign resources to the PDU session (see PDU Session Resource Setup Request Transfer IE in clause 9.3.4.1 of 3GPP TS 38.413 [9]), including (among others) the

transport layer address and tunnel endpoint of the uplink termination point for the user plane data for this PDU session (i.e. UPF's GTP-U F-TEID for uplink traffic);

- the supportedFeatures IE in the response, if the supportedFeatures IE was received in the request and at least one feature defined in clause 6.1.8 is supported by the updated SM context resource.

The SMF shall store the targetServingNfId, if received in the request, but the SMF shall still consider the AMF (previously) received in the servingNfId IE as the serving AMF for the UE.

2b. If the SMF cannot proceed with preparing the handover of the PDU session (e.g. the UE moves into a non-allowed service area, the SMF cannot select a suitable I-UPF, or the UE is only reachable for regulatory prioritized services), the SMF shall set the hoState to NONE and return an error response, as specified in step 2b of figure 5.2.2.3.1-1. For a 4xx/5xx response, the SmContextUpdateError structure shall include the following additional information:

- N2 SM information (see Handover Preparation Unsuccessful Transfer IE in clause 9.3.4.18 of 3GPP TS 38.413 [9]) indicating the cause of the failure;

- the cause in the error attribute set to one of the application errors listed in Table 6.1.3.3.4.2.2-2.

When receiving a 4xx/5xx response from the SMF, the NF service consumer (e.g. the AMF) shall regard the hoState of the SM Context to be NONE.

3. If the SMF returned a 200 OK response in step 2a, the NF Service Consumer (e.g. AMF) shall subsequently update the SM context in the SMF by sending POST request, as specified in clause 5.2.2.3.1, with the following information:

- hoState attribute set to PREPARED;

- N2 SM information received from the target 5G-AN (see Handover Request Acknowledge Transfer IE in clause 9.3.4.11 of 3GPP TS 38.413 [9]), including (among others) the transport layer address and tunnel endpoint of the downlink termination point for the user data for this PDU session (i.e. target 5G-AN's GTP-U F-TEID for downlink traffic), if the target 5G-AN succeeded in establishing resources for the PDU session;

- N2 SM information received from the target 5G-AN (see Handover Resource Allocation Unsuccessful Transfer IE in clause 9.3.4.19 of 3GPP TS 38.413 [9]), including the Cause of the failure, if resources failed to be established for the PDU sessions.

4a. If the target 5G-AN succeeded in establishing resources for the PDU sessions, the SMF shall set the hoState attribute to PREPARED and return a 200 OK response including the following information:

- hoState attribute to PREPARED;

- N2 SM information (see Handover Command Transfer IE in clause 9.3.4.10 of 3GPP TS 38.413 [9]) containing DL forwarding tunnel information to be sent to the source 5G-AN by the AMF if direct or indirect data forwarding applies (see step 11f of clause 4.9.1.3.2 of 3GPP TS 23.502 [3]).

4b. If the SMF cannot proceed with preparing the handover of the PDU session (e.g. the target 5G-AN failed to establish resources for the PDU session), the SMF shall set the hoState to NONE, release resources reserved for the handover to the target 5G-AN, and return an error response as specified in step 2b of figure 5.2.2.3.1-1. For a 4xx/5xx response, the SmContextUpdateError structure shall include the following additional information:

- N2 SM information (see Handover Preparation Unsuccessful Transfer IE in clause 9.3.4.18 of 3GPP TS 38.413 [9]) indicating the cause of the failure;

- the cause in the error attribute set to HANDOVER_RESOURCE_ALLOCATION_FAILURE, if the target 5G-AN failed to establish resources for the PDU session.

When receiving a 4xx/5xx response from the SMF, the NF service consumer (e.g. the AMF) shall regard the hoState of the SM Context to be NONE.

If the handover preparation fails completely on the target 5G-AN (i.e. target 5G-AN returns a NGAP HANDOVER_FAILURE), the (T-)AMF shall request the SMF to cancel the handover of the PDU session as described in clause 5.2.2.3.4.4.

5.2.2.3.4.3 N2 Handover Execution

The NF Service Consumer (e.g. T-AMF) shall request the SMF to complete the execution the handover of an existing PDU session, upon being notified by the target 5G-AN that the handover to the target 5G-AN has been successful, as follows.

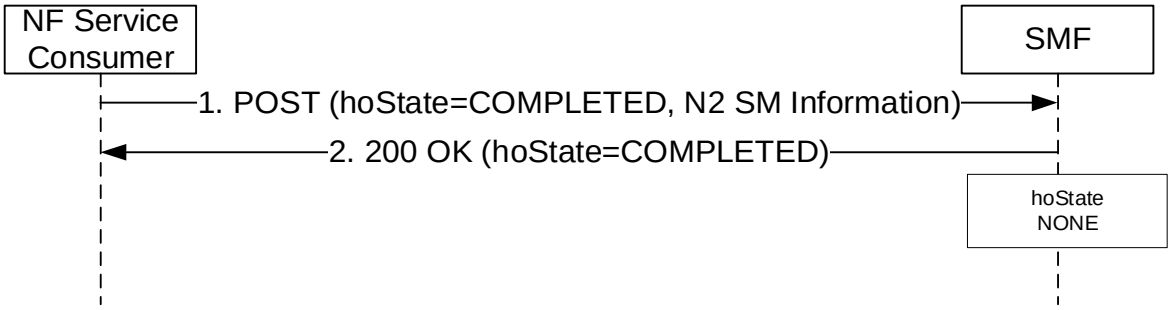

Figure 5.2.2.3.4.3-1: N2 Handover Execution

1. The NF Service Consumer shall request the SMF to complete the execution of the handover of the PDU session by sending a POST request, as specified in clause 5.2.2.3.1, with the following information:

   - updating the hoState attribute of the individual SM Context resource in the SMF to COMPLETED;
   - servingNfId set to the new serving AMF Id, for a N2 handover with AMF change;
   - the indication that the UE is inside or outside of the LADN service area, if the DNN of the established PDU session corresponds to a LADN;
   - N2 SM information received from the source 5G-AN (see Secondary RAT Data Usage Report Transfer IE in clause 9.3.4.23 of 3GPP TS 38.413 [9]), if any;
   - other information, if necessary.

2. Upon receipt of such a request, the SMF shall return a 200 OK response including the following information:

   - hoState attribute set to COMPLETED.

   The SMF shall complete the execution of the handover, e.g. switch the PDU session towards the downlink termination point for the user data received from the target 5G-AN (i.e. target 5G-AN's GTP-U F-TEID for downlink traffic), set the hoState to NONE and delete any stored targetServingNfId. For PDU session with I-SMF insertion, the I-SMF shall complete the execution of the handover by initiating an Update service operation towards the anchor SMF in order to switch the PDU session towards the I-UPF controlled by I-SMF (see clause 5.2.2.8.2.12).

   If the request does not include the "UE presence in LADN service area" indication and the SMF determines that the DNN corresponds to a LADN, then the SMF shall consider that the UE is outside of the LADN service area. The SMF shall proceed as specified in clause 5.6.5 of 3GPP TS 23.501 [2].

The (T-)AMF shall request the SMF to complete the execution of the handover of the PDU session only for those PDU sessions that successfully completed the handover procedure.

If there are PDU sessions that failed to handover due to timeout of SMF responses in any step of the handover preparation phase (e.g. if the Update SM Context Response arrived too late or not at all during the handover preparation phase, see step 7 of clause 4.9.1.3.3 of 3GPP TS 23.502 [3]), then the (T-)AMF shall inform the SMF about this failure, by sending a POST request with the cause attribute set to "HO_FAILURE" for every such PDU session, upon receipt of the NGAP HANDOVER NOTIFY. The SMF shall then consider that the PDU session is deactivated and that the handover attempt is terminated for the PDU session. The SMF may subsequently release the PDU session, or the SMF may keep the PDU session with the User Plane deactived by setting the hoState to NONE and deleting any stored targetServingNfId. If the SMF decided to keep the PDU session, the SMF shall forward DL traffic towards the target 5G-AN, i.e. activate the User Plane via the target AMF upon reception of DL traffic. For PDU session with I-SMF insertion, the I-SMF shall handle the HO Failure following the procedure described in clause 5.2.2.8.2.12.

If the handover fails completely on the target 5G-AN due to the execution phase not completed successfully (i.e. missing NGAP HANDOVER NOTIFY), the (T-)AMF shall request the SMF to cancel the handover of the PDU session as described in clause 5.2.2.3.4.4.

5.2.2.3.4.4 N2 Handover Cancellation

The NF Service Consumer (e.g. T-AMF) shall request the SMF to cancel the handover of an existing PDU session, e.g. upon receipt of such a request from the source 5G-AN, as follows.

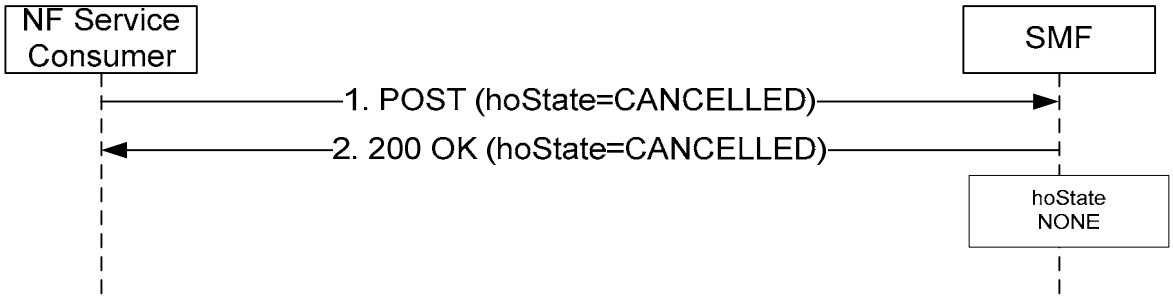

Figure 5.2.2.3.4.3-1: N2 Handover Cancellation

1. The NF Service Consumer shall request the SMF to cancel the execution of the handover of the PDU session by sending a POST request, as specified in clause 5.2.2.3.1, with the following information:

   - updating the hoState attribute of the individual SM Context resource in the SMF to CANCELLED;
   - cause information;
   - other information, if necessary.

2. Upon receipt of such a request, the SMF return a 200 OK response including the following information:

   - hoState attribute set to CANCELLED.

   The SMF shall cancel the execution of the handover, e.g. release resources reserved for the handover to the target 5G-AN, set the hoState to NONE and delete any stored targetServingNfId. For PDU Session with I-SMF insertion, the I-SMF shall cancel the handover by initiating an Update service operation towards the anchor SMF in order to release resources at the SMF and PSA UPF reserved during handover preparation (see clause 5.2.2.8.2.13).

5.2.2.3.5 Handover between 3GPP and untrusted non-3GPP access procedures

5.2.2.3.5.1 General

The handover of a PDU session between 3GPP and untrusted non-3GPP access shall be supported as specified in clause 4.9.2 of 3GPP TS 23.502 [3]. Such a handover may involve:

- the same AMF, or a target AMF in the same PLMN as the source AMF (see clauses 4.9.2.1, 4.9.2.2, 4.9.2.3.1 and 4.9.2.4.1 of 3GPP TS 23.502 [3]). The Update SM Context service operation is used in these cases; or
- a target AMF in a different PLMN than the source AMF (see clauses 4.9.2.3.2 and 4.9.2.4.2 of 3GPP TS 23.502 [3]). The Create SM Context service operation is used in this case (see clause 5.2.2.2).

For a Home-Routed PDU session, the target AMF may be located in the VPLMN, or in the HPLMN when the N3IWF is in the HPLMN.

5.2.2.3.5.2 Handover of a PDU session without AMF change or with target AMF in same PLMN

In these scenarios, the same V-SMF is used before and after the handover.

The NF Service Consumer (e.g. AMF) shall request the SMF to handover an existing PDU session from 3GPP access to untrusted non-3GPP access, or vice-versa, as follows.

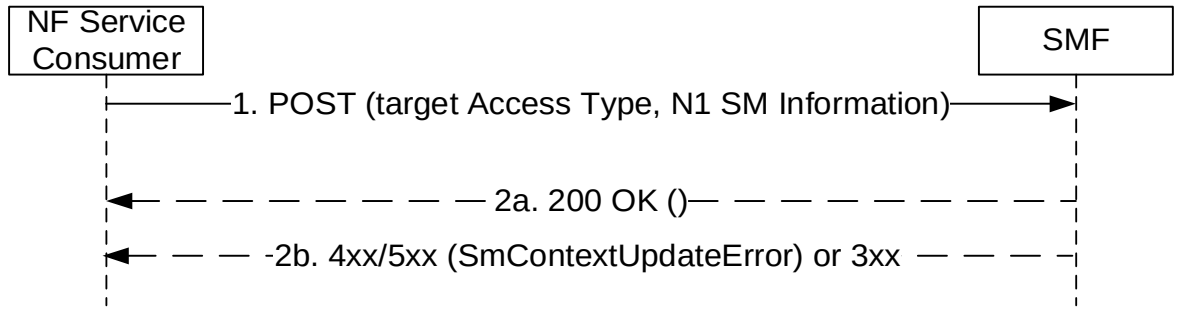

Figure 5.2.2.3.5.2-1: Handover between 3GPP and untrusted non-3GPP access

1. The NF Service Consumer shall request the SMF to handover an existing PDU session from 3GPP access to untrusted non-3GPP access, or vice-versa, by sending a POST request, as specified in clause 5.2.2.3.1, with the following information:

   - updating the anType attribute of the individual SM Context resource in the SMF to the target access type, i.e. to 3GPP_ACCESS or NON_3GPP_ACCESS;

   - other information, if necessary.

2a. Same as step 2a of Figure 5.2.2.3.1-1.

2b. If the SMF cannot proceed with handing over the PDU session to the target access type, the SMF shall return an error response, as specified for step 2b of figure 5.2.2.3.1-1. For a 4xx/5xx response, the SmContextUpdateError structure shall include the following additional information:

   - N1 SM Information to reject the UE request.

The anchor SMF may perform Network Slice Admission Control before the PDU Session is moved to the target access (i.e., before the N3 tunnel for the PDU Session is established).

5.2.2.3.6 Inter-AMF change or mobility

The NF Service Consumer (e.g. new AMF) shall inform the SMF that it has taken over the role of serving the UE (e.g. it has taken the responsibility of the signalling towards the UE), when so required by 3GPP TS 23.501 [2] and 3GPP TS 23.502 [3], as follows.

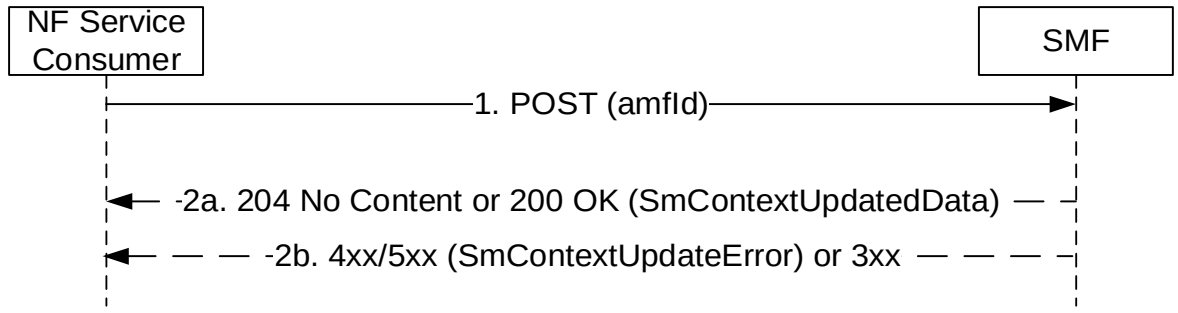

Figure 5.2.2.3.6-1: Inter-AMF change or mobility

1. The NF Service Consumer shall update the SMF with the new serving AMF, by sending a POST request, as specified in clause 5.2.2.3.1, with the following information:

   - servingNfId set to the new serving AMF Id;

   - the supportedFeatures IE indicating the features it supports, if at least one feature defined in clause 6.1.8 is supported;

   - other information, if necessary, e.g. to activate the user plane connection of the PDU session (see clause 5.2.2.3.2.2).

2a. Same as step 2a of Figure 5.2.2.3.1-1. In addition, the SMF shall include the supportedFeatures IE in the response, if the supportedFeatures IE was received in the request and at least one feature defined in clause 6.1.8 is supported by the updated SM context resource. If the AMF has indicated to activate the user plane connection of the PDU session by setting upCnxState to ACTIVATING in the request message and if the SMF accepts the update of the SmContext of the serving AMF:

- the SMF shall include the upCnxState IE and set it to "DEACTIVATED", and the cause IE indicating the reason of failure to establish the user plane connection, e.g. INSUFFICIENT_UP_RESOURCES, in the SmContextUpdatedData if it fails to setup the user plane connection; otherwise,

- the SMF shall include the upCnxState IE and set it to "ACTIVATING" and N2 SM information to request the 5G-AN to assign resources to the PDU session in the SmContextUpdatedData as specified in clause 5.2.2.3.2.2 if the SMF can proceed with activating the user plane connection of the PDU session.

2b. Same as step 2b of figure 5.2.2.3.1-1.

5.2.2.3.7 RAN Initiated QoS Flow Mobility

The NF Service Consumer (e.g. AMF) shall request the SMF to transfer QoS flows to and from Secondary RAN node, or more generally, handle a NG-RAN PDU Session Resource Modify Indication, as follows.

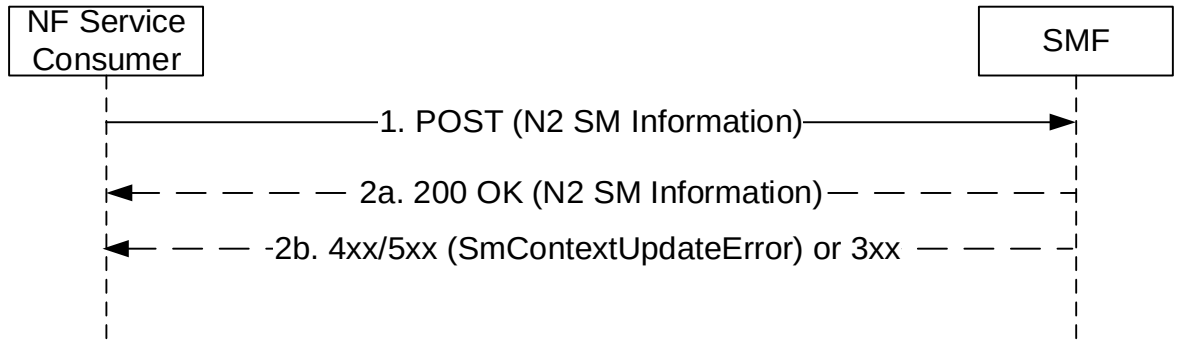

Figure 5.2.2.3.7-1: RAN Initiated QoS Flow Mobility

1. The NF Service Consumer shall request the SMF to modify the PDU session, as requested by the NG-RAN, by sending a POST request, as specified in clause 5.2.2.3.1, with the following information:

   - N2 SM information received from the 5G-AN (see PDU Session Resource Modify Indication Transfer IE in clause 9.3.4.6 of 3GPP TS 38.413 [9]), including the transport layer information for the QoS flows of this PDU session (i.e. 5G-AN's GTP-U F-TEIDs for downlink traffic);

   - other information, if necessary.

2a. Upon receipt of such a request, if the SMF can proceed with switching the QoS flows of the PDU session, the SMF shall return a 200 OK response including the following information:

   - N2 SM information (see PDU Session Resource Modify Confirm Transfer IE in clause 9.3.4.7 of 3GPP TS 38.413 [9]), including the list of QoS flows which were modified successfully and the list of QoS flows which failed to be modified if available.

2b. If the SMF cannot proceed with switching the QoS flows of the PDU session, the SMF shall return an error response, as specified for step 2b of figure 5.2.2.3.1-1, including:

   - N2 SM information (see PDU Session Resource Modify Indication Unsuccessful Transfer IE in clause 9.3.4.22 of 3GPP TS 38.413 [9]).

5.2.2.3.8 EPS to 5GS Handover using N26 interface

5.2.2.3.8.1 General

The NF Service Consumer (e.g. AMF) shall request the SMF to handover a UE EPS PDN connection to 5GS using N26 interface, following the same requirements as specified for N2 handover in clause 5.2.2.3.4 with the modifications specified in this clause.

5.2.2.3.8.2 EPS to 5GS Handover Preparation

The requirements specified in clause 5.2.2.3.4.2 shall apply with the following modifications.

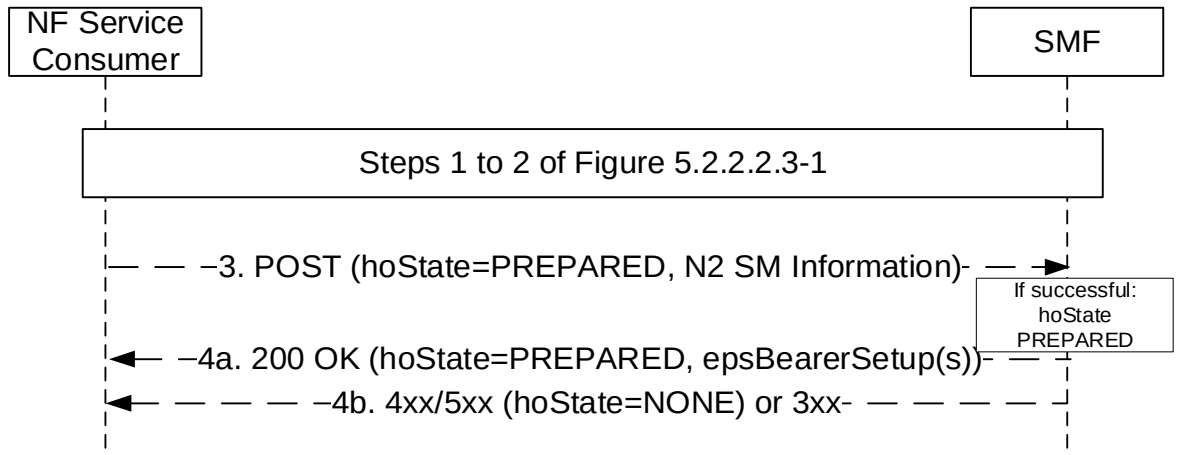

Figure 5.2.2.3.8.2-1: EPS to 5GS Handover Preparation

1. Same as step 1 of Figure 5.2.2.2.3-1.

2a. Same as step 2 of Figure 5.2.2.2.3-1.

2b. Same as step 2b of figure 5.2.2.3.1-1.

3. Same as step 3 of Figure 5.2.2.3.4.2-1.

4a. Same as step 4 of Figure 5.2.2.3.4.2-1, with the following modifications:

The 200 OK response shall not include N2 SM information for DL forwarding tunnel setup, but shall additionally contain:

- the epsBearerSetup IE(s), containing the list of EPS bearer context(s) successfully handed over to the 5GS and DL data forwarding information, containing either:
  - CN tunnel information generated based on the list of accepted QFI(s) received from the 5G-RAN, if indirect data forwarding applies; or
  - NG-RAN F-TEID per E-RAB accepted for direct data forwarding, as received from the target NG-RAN, if direct data forwarding applies.

4b. Same as step 2b of figure 5.2.2.3.4.2-1.

5.2.2.3.8.3 EPS to 5GS Handover Execution

The requirements specified in clause 5.2.2.3.4.3 shall apply, with the following modifications.

In step 1 of Figure 5.2.2.3.4.3-1, the NF Service Consumer, i.e. the target AMF, shall include one or more SecondaryRatUsageDataReportContainer(s) in the SmContextUpdateData for the POST request if it received one or more Secondary RAT Usage Data Report(s) applicable for the PDU session from the source MME.

In step 2 of Figure 5.2.2.3.4.3-1, for a Home Routed PDU session, the SMF shall complete the execution of the handover by initiating an Update service operation towards the H-SMF in order to switch the PDU session towards the V-UPF (see clause 5.2.2.8.2.3).

If there are PDU sessions that failed to handover due to timeout of SMF responses in any step of the handover preparation phase (e.g. if the Update SM Context Response arrived too late or not at all during the handover preparation phase), then the AMF shall consider that the PDU session will be released by the MME and remove the PDU session context from the UE context. For a HR PDU session or a PDU session with I-SMF, the AMF shall also release the SM Context in the V-SMF or the I-SMF only.

5.2.2.3.8.4 EPS to 5GS Handover Cancellation

The requirements specified in clause 5.2.2.3.4.4 shall apply, with the following modifications.

In step 2 of Figure 5.2.2.3.4.4-1, for a Home Routed PDU session, the V-SMF shall cancel the handover by initiating an Update service operation towards the H-SMF in order to release resources at H-SMF and H-UPF reserved for handover (see clause 5.2.2.8.2.14).

5.2.2.3.8.5 EPS to 5GS Handover Failure

If the handover to 5GS failed, e.g. rejected by the target NG-RAN, the requirements specified in clause 5.2.2.3.4.4 shall apply, with the following modifications:

- the hoState attribute set to "CANCELLED", to indicate the handover is cancelled;
- the cause attribute set to "HO_FAILURE".

In step 2 of Figure 5.2.2.3.4.4-1, for a Home Routed PDU session, the V-SMF shall cancel the handover by initiating an Update service operation towards the H-SMF in order to release resources at H-SMF and H-UPF reserved for handover (see clause 5.2.2.8.2.17).

5.2.2.3.9 5GS to EPS Handover using N26 interface

5.2.2.3.9.1 General

The NF Service Consumer (e.g. AMF) shall request the SMF to setup data forwarding tunnels if direct or indirect data forwarding applies to the 5GS to EPS handover using N26 interface, and to remove the indirect data forwarding tunnels previously established when the handover is cancelled or failed.

The AMF should initiate this procedure only if data forwarding is enabled and the MME returns data forwarding F-TEIDs for the related PDN connection context in the Forward Relocation response.

5.2.2.3.9.2 Data forwarding tunnels setup during 5GS to EPS handover

If direct or indirect data forwarding applies to the 5GS to EPS handover, the NF Service Consumer (e.g. AMF) shall provide the SMF with the data forwarding information received from the MME, as specified in clause 4.11.1.2.1 of 3GPP TS 23.502 [3]), as follows.

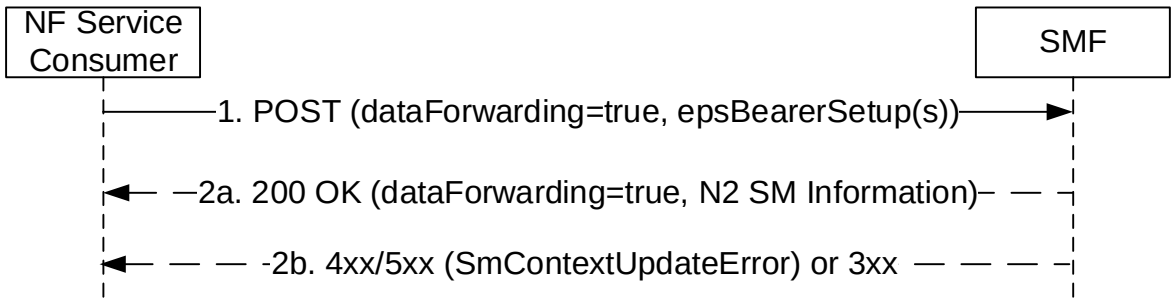

Figure 5.2.2.3.9-1: 5GS to EPS Handover using N26 interface (data forwarding tunnels setup)

1. The NF Service Consumer shall send a POST request, as specified in clause 5.2.2.3.1, with the following information:

   - dataForwarding IE set to true;

   - EPS bearer contexts received from the MME in the Forward Relocation Response, including F-TEID(s) for DL data forwarding tunnel(s) towards the target eNB (for direct data forwarding) or towards the forwarding SGW (for indirect data forwarding).

2a. If indirect data forwarding applies, the SMF shall map the EPS bearers for Data Forwarding to the 5G QoS flows based on the association between the EPS bearer ID(s) and QFI(s) for the QoS flow(s).

   The SMF shall return a 200 OK response including the following information:

   - N2 SM information (see Handover Command Transfer IE in clause 9.3.4.10 of 3GPP TS 38.413 [9]) containing DL forwarding tunnel information to be sent to the source 5G-AN by the AMF if direct or indirect data forwarding applies (see step 11f of clause 4.9.1.3.2 of 3GPP TS 23.502 [3]).

     If direct data forwarding applies, the DL forwarding tunnel information shall contain the E-UTRAN tunnel info for data forwarding per EPS bearer received from the MME.

     If indirect data forwarding applies, the DL forwarding tunnel information shall contain the CN transport layer address and tunnel endpoint (i.e. UPF's GTP-U F-TEID) for Data Forwarding and the QoS flows for Data Forwarding for this PDU session.

2b. If the SMF cannot proceed with the request, the SMF shall return an error response, as specified for step 2b of figure 5.2.2.3.1-1.
   If none of the EPS bearer contexts received in the POST request body includes an F-TEID for DL data forwarding, the SMF shall return a 403 Forbidden response including a ProblemDetails structure with the "cause" attribute set to "NO_DATA_FORWARDING". Upon receipt of this response, the AMF shall proceed with the handover procedure (as if data forwarding was disabled).

NOTE: The above use case can occur if an AMF initiates this procedure without checking whether the MME returns data forwarding F-TEIDs for the related PDN connection context in the Forward Relocation response (e.g. pre-Rel-17 or Rel-17 AMF that does not support such checking).

5.2.2.3.9.3 Indirect data forwarding tunnels removal for 5GS to EPS handover cancellation or failure

During 5GS to EPS handover, if indirect data forwarding tunnel(s) have been previously established during the preparation phase and the handover is cancelled, the AMF shall update the SMF of handover cancellation by sending a POST request with the cause attribute set to "HO_CANCEL" and dataForwarding IE set to false with an empty list of EPS bearer contexts. The SMF shall then release the resources prepared for the handover and proceed with the PDU session as if no handover procedure had taken place.

If no resources for EPS bearer(s) can be assigned for any PDU session attempted to be handed over, the AMF shall update the SMF with the information that the handover preparation failed by sending a POST request with the cause attribute set to "HO_FAILURE" and with an empty list of EPS bearer contexts (and without the dataForwarding IE). The SMF shall then release the resources prepared for the handover and proceed with the PDU session as if no handover procedure had taken place.

5.2.2.3.10 P-CSCF Restoration Procedure via AMF

The requirements specified in clause 5.2.2.3.1 shall apply with the following modifications.

1. Same as step 1 of Figure 5.2.2.3.1-1, with the following modifications.

   The POST request shall contain:

   - the release IE set to true;

   - the cause IE set to REL_DUE_TO_REACTIVATION.

5.2.2.3.11 AMF requested PDU Session Release due to duplicated PDU Session Id

When the AMF receives an "initial request" with PDU Session Id which already exists in PDU session context of the UE (see clause 5.4.5.2.5 of 3GPP TS 24.501 [7]), the AMF shall request the SMF to release the existing PDU Session; upon subsequent receipt of an SM context status notification indicating that the SM context has been deleted in the SMF, the AMF shall release the stored context for the PDU session and proceed with the "initial request" with the PDU Session Id.

The requirements for releasing the existing PDU Session specified in clause 5.2.2.3.1 shall apply with the following modifications.

1. Same as step 1 of Figure 5.2.2.3.1-1, with the following modifications.

   The POST request shall contain:

   - the release IE set to true;
   - the cause IE set to REL_DUE_TO_DUPLICATE_SESSION_ID.

When the SMF receives the request from AMF, the SMF shall start the PDU Session Release procedure to release all the associated resources in UPF, PCF, CHF, and UDM. If the UP connection of the existing PDU session is active, the SMF should also request (R)AN to release associated resources.

NOTE: The SMF does not send NAS signaling to UE for the PDU session release in this procedure.

5.2.2.3.12 AMF requested PDU Session Release due to slice not available

If a network slice is detected as not available (e.g. due to slice congestion or operational disable the slice), the NF Service Consumer (i.e. AMF) shall use this procedure to release the PDU session associated to the unavailable network slice. Such handling of PDU session release may also happen in network slice replacement procedure if the AMF determines the PDU session cannot be retained with the alternative S-NSSAI due to certain reason (e.g. V-SMF/I-SMF cannot support the alternative S-NSSAI) (see clause 4.3.3.3 of 3GPP TS 23.502 [3]).

The requirements specified in clause 5.2.2.3.1 shall apply with the following modifications.

1. Same as step 1 of Figure 5.2.2.3.1-1, with the following modifications.

   The POST request shall contain:

   - the release IE set to true;
   - the cause IE set to S_NSSAI_CONGESTION or REL_DUE_TO_SLICE_NOT_AVAILABLE;
   - optionally the skipN2PduSessionResRelInd IE with the value "true" to skip RAN resources release for the PDU session, e.g. for a PDU session with active UP associated with a slice that is no longer available after a handover.

5.2.2.3.13 Indirect Data Forwarding Tunnel establishment during N2 based Handover with I-SMF

During N2 based handover with I-SMF insertion/change/removal, the NF Service Consumer (e.g. target I-SMF) shall use this procedure to exchange N3/N9 forwarding tunnel information with the NF Service Producer (e.g. source I-SMF).

The NF Service Consumer (e.g. target I-SMF) shall request the SMF to establish one or more downlink and/or uplink indirect data forwarding tunnels, as follows.

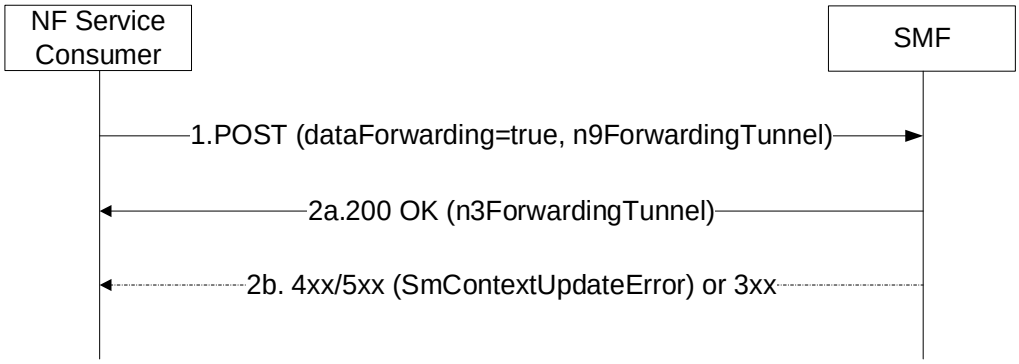

Figure 5.2.2.3.13-1: Indirect Data Forwarding Tunnel establishment during N2 based Handover with I-SMF

1. The NF Service Consumer shall send a POST request, as specified in clause 5.2.2.3.1, with the following information:

   - dataForwarding attribute set to true, for the N2 based handover with I-SMF insertion/change/removal;
   - n9DlForwardingTnlList attribute carrying the N9 downlink indirect data forwarding tunnel(s) info of target I-UPF;
   - n9UlForwardingTnlList attribute carrying the N9 uplink indirect data forwarding tunnel(s) info of target I-UPF;
   - other information, if necessary.

2a. Same as step 2a of Figure 5.2.2.3.1-1, with the following information:

   - n3DlForwardingTnlList attribute carrying the N3 downlink indirect data forwarding tunnel(s) info of source I-UPF or source UPF;
   - n3UlForwardingTnlList attribute carrying the N3 uplink indirect data forwarding tunnel(s) info of source I-UPF or source UPF;
   - other information, if necessary.

2b. If the source SMF cannot proceed with the request, the source I-SMF shall return an error response, as specified for step 2b of figure 5.2.2.3.1-1.

5.2.2.3.13A Indirect Data Forwarding Tunnel removal during N2 based Handover with I-SMF

During N2 based handover cancellation with I-SMF insertion/change/removal, the NF Service Consumer (e.g. target I-SMF) shall use this procedure to remove previously established Indirect Data Forwarding Tunnel(s) at NF Service Producer (e.g. source I-SMF).

The NF Service Consumer (e.g. target I-SMF) shall request the NF service producer to remove the established Indirect Data Forwarding Tunnel(s), as follows.

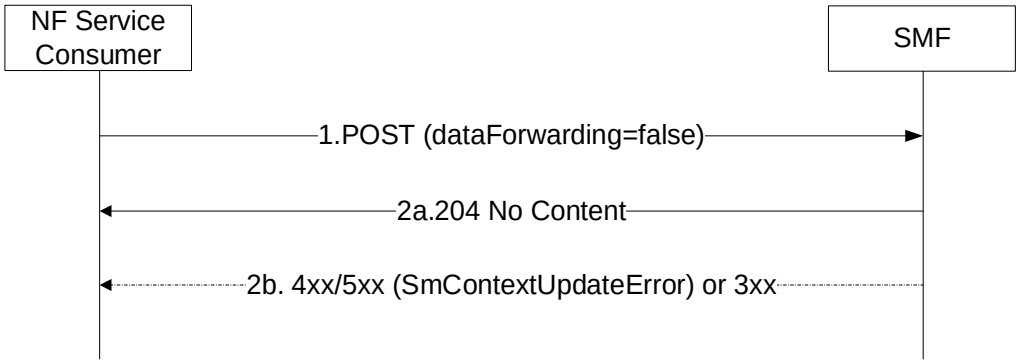

Figure 5.2.2.3.13A-1: Indirect Data Forwarding Tunnel Removal during N2 based Handover with I-SMF

1. The NF Service Consumer shall send a POST request, as specified in clause 5.2.2.3.1, with the following information:

   - dataForwarding attribute set to false;

   - other information, if necessary.

2a. If successful, the SMF shall return a 204 No Content response.

2b. If the SMF cannot proceed with the request, the SMF shall return an error response, as specified for step 2b of figure 5.2.2.3.1-1.

5.2.2.3.14 Request to forward buffered downlink data packets at I-UPF

For I-SMF change or I-SMF removal when downlink data packets are buffered at the I-UPF, the new I-SMF (for I-SMF change) or SMF (for I-SMF removal) shall request the (old) I-SMF to forward buffered downlink data packets as following:

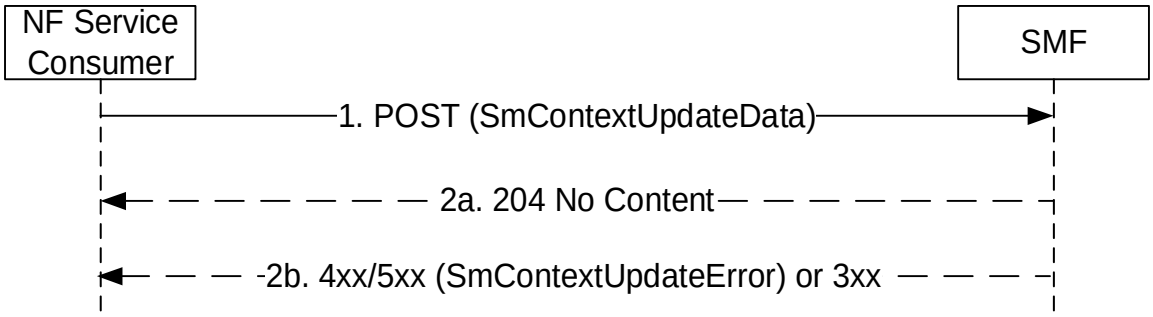

Figure 5.2.2.3.14-1: Request to forward buffered downlink data packets at I-UPF

1. The NF Service Consumer shall send a POST request, as specified in clause 5.2.2.3.1, with the following information:

   - n9ForwardingTunnel IE indicating the allocated tunnel endpoints information to receive the buffered downlink data packets.

2a. On success, the SMF shall initiate N4 session modification to the I-UPF trigger the sending of buffered DL data towards received tunnel endpoints and shall return "204 No Content" response.

2b. If the SMF cannot proceed with the request, the SMF shall return an error response, as specified for step 2b of figure 5.2.2.3.1-1.

5.2.2.3.15 Connection Suspend procedure

The procedures specified in this clause and clause 5.2.2.3.16 are to support the Connection Suspend and Connection Resume in CM-IDLE with Suspend procedures as specified in clauses 4.8.1.2 and 4.8.2.3 of 3GPP TS 23.502 [3]. These procedures are used to support the User Plane CIoT 5GS Optimisation feature for E-UTRAN access as specified in clauses 5.31.1 and 5.31.18 of 3GPP TS 23.501 [2].

The NF Service Consumer (e.g. AMF) shall request the SMF to suspend the User Plane connection of an existing PDU session if the SMF support the UPCSMT feature, as follows.

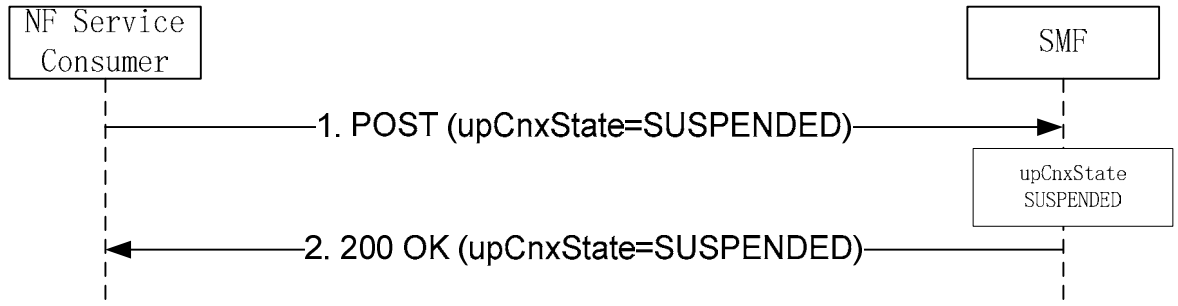

Figure 5.2.2.3.15-1: Connection Suspend

1. The NF Service Consumer shall request the SMF to suspend the user plane connection of the PDU session by sending a POST request, as specified in clause 5.2.2.3.1, with the following information:

   - upCnxState attribute set to SUSPENDED;
   - user location and user location timestamp;
   - N2 SM information received from the 5G-AN, including UE Context Suspend Request Transfer IE, if available;
   - other information, if necessary.

2. Upon receipt of such a request, the SMF shall deactivate the N3 tunnel of the PDU session, set the upCnxState attribute to SUSPENDED and return a 200 OK response including the upCnxState attribute set to SUSPENDED. The SMF shall store the N3 tunnel info (including both AN Tunnel Info and the CN Tunnel Info), and upon receiving subsequent DL Data report from the UPF, the SMF will invoke the Namf_MT EnableUEReachability service operation to trigger the AMF to page the UE.

5.2.2.3.16 Connection Resume in CM-IDLE with Suspend procedure

The NF Service Consumer (e.g. AMF) shall request the SMF to resume the User Plane connection of an existing PDU session, i.e. establish the N3 tunnel between the 5G-AN and UPF, as follows.

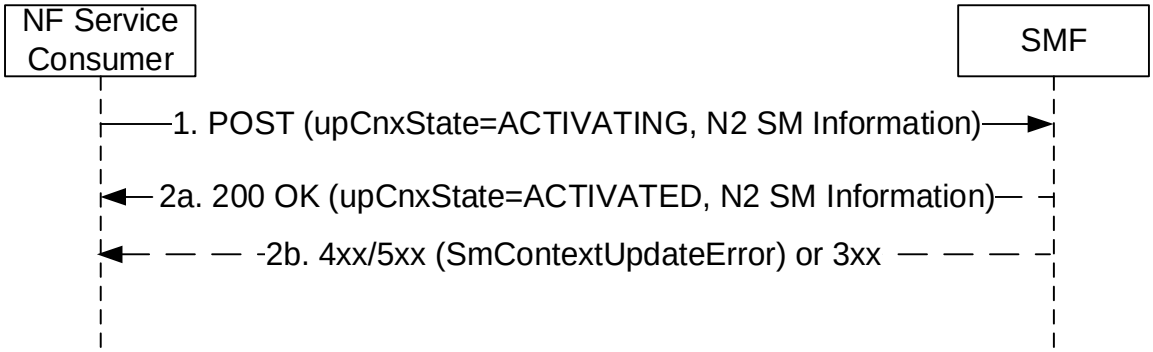

Figure 5.2.2.3.16-1: Connection Resume in CM-IDLE with Suspend

1. The NF Service Consumer shall request the SMF to resume the user plane connection of the PDU session by sending a POST request, as specified in clause 5.2.2.3.1, with the following information:

- the upCnxState attribute set to ACTIVATING;
- user location and user location timestamp;
- cause attribute set to "PDU_SESSION_RESUMED";
- N2 SM information received from the 5G-AN, i.e. Path Switch Request Transfer including the new transport layer address and tunnel endpoint of the downlink termination point for the user data for this PDU session (i.e. 5G-AN's GTP-U F-TEID for downlink traffic), or UE Context Resume Request Transfer;
- additional N2 SM information received from the 5G-AN, if any;
- the "MO Exception Data Counter" if the UE has accessed the network by using "MO exception data" RRC establishment cause;
- other information, if necessary.

2a. If the SMF can proceed with resuming the user plane connection of the PDU session, the SMF shall return a 200 OK response including the following information:

- the upCnxState attribute set to ACTIVATED;
- N2 SM information, i.e. Path Switch Response Transfer including the transport layer address and tunnel endpoint of the uplink termination point for the user data for this PDU session (i.e. UPF's GTP-U F-TEID for uplink traffic), or UE Context Resume Response Transfer.

If the "MO Exception Data Counter is included in the request and Small Data Rate Control is enabled for the PDU session, the V-SMF shall update the H-SMF (see clause 5.2.2.8.2.2) for HR PDU Session (or I-SMF shall update the SMF for PDU session with I-SMF).

2b. If the SMF cannot proceed with resuming the user plane connection of the PDU session, the SMF shall return an error response, as specified for step 2b of figure 5.2.2.3.1-1, including:

- the upCnxState attribute representing the final state of the user plane connection (e.g. SUSPENDED);
- N2 SM information, including the cause of the failure.

5.2.2.3.17 AMF requested PDU Session Release due to Network Slice-Specific Authentication and Authorization failure or revocation

The requirements specified in clause 5.2.2.3.1 shall apply with the following modifications.

1. Same as step 1 of Figure 5.2.2.3.1-1, with the following modifications.

   The POST request shall contain:

   - the release IE set to true;
   - the cause IE set to REL_DUE_TO_SLICE_NOT_AUTHORIZED.

5.2.2.3.18 5GS to EPS Idle mode mobility using N26 interface with data forwarding

The NF Service Consumer (e.g. AMF) shall request the SMF to forward buffered DL data towards the EPS during a 5GS to EPS Idle mode mobility using N26 interface with data forwarding (see 4.11.1.3.2A of 3GPP TS 23.502 [3]), as follows.

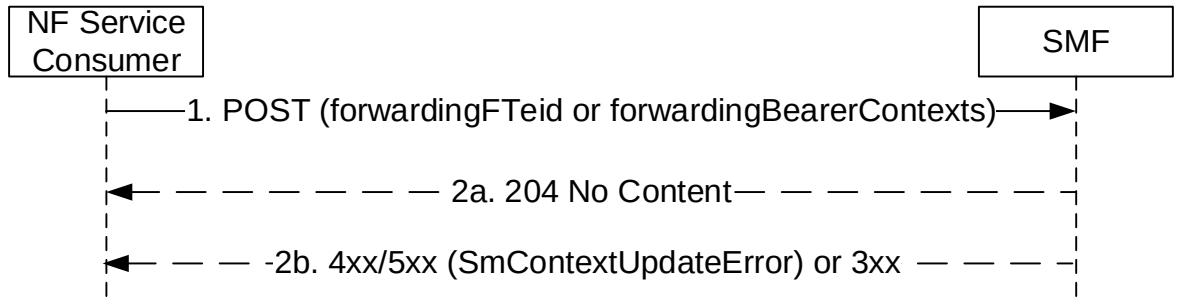

Figure 5.2.2.3.18-1: 5GS to EPS Idle mode mobility using N26 interface with data forwarding

1. The NF Service Consumer shall send a POST request, as specified in clause 5.2.2.3.1, with the following information:

   - forwardingFTeid received from the MME in the Context Acknowdge, if any; or
   - forwarding bearer contexts received from the MME in Context Acknowdge, if any.

2a. Upon receipt of such a request, the SMF shall forward the buffered DL data on the forwarding tunnel(s).

2b. If the SMF cannot proceed with the request, the SMF shall return an error response, as specified for step 2b of figure 5.2.2.3.1-1.

5.2.2.3.19 AMF requested PDU Session Release due to Control Plane Only indication associated with PDU Session is not applicable any longer

The requirements specified in clause 5.2.2.3.1 shall apply with the following modifications.

1. Same as step 1 of Figure 5.2.2.3.1-1, with the following modifications.

   The POST request shall contain:

   - the release IE set to true;
   - the cause IE set to REL_DUE_TO_CP_ONLY_NOT_APPLICABLE.

5.2.2.3.20 AMF requested PDU Session Release due to ODB changes

The requirements specified in clause 5.2.2.3.1 shall apply with the following modifications.

1. Same as step 1 of Figure 5.2.2.3.1-1, with the following modifications.

   The POST request shall contain:

   - the release IE set to true;
   - the cause IE set to REL_DUE_TO_SUBSCRIPTION_CHANGE.

5.2.2.3.21 N9 Forwarding Tunnel establishment between Branching Points or UL CLs controlled by different I-SMFs

During simultaneous change of Branching Points or UL CLs controlled by different I-SMFs, the NF Service Consumer (e.g. target I-SMF) shall use this procedure to exchange N9 forwarding tunnel information with the NF Service Producer (e.g. source I-SMF).

The NF Service Consumer (e.g. target I-SMF) shall request the source I-SMF to establish one downlink and/or one uplink N9 data forwarding tunnels, as follows.

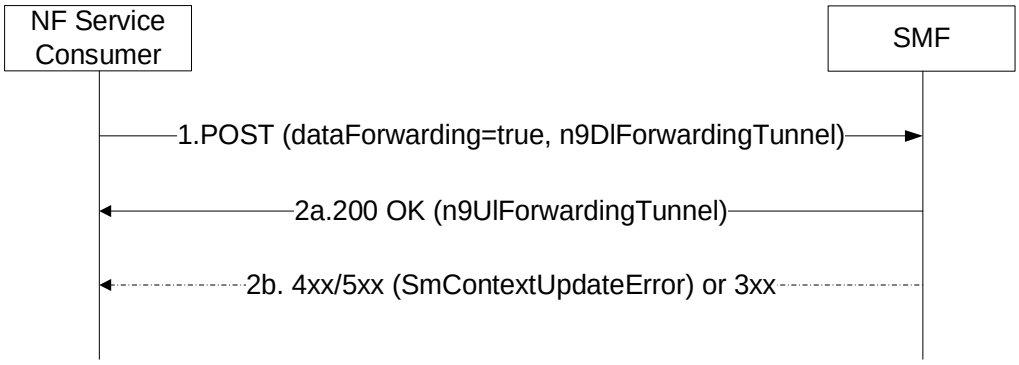

Figure 5.2.2.3.21-1: N9 Forwarding Tunnel establishment between Branching Points or UL CLs controlled by different I-SMFs

1. The NF Service Consumer shall send a POST request, as specified in clause 5.2.2.3.1, with the following information:

   - dataForwarding attribute set to true, for the N9 Forwarding Tunnel establishment between Branching Points or UL CLs controlled by different I-SMFs;
   - n9DlForwardingTunnel attribute carrying the N9 downlink data forwarding tunnel info of target Branching Point or UL CL;
   - other information, if necessary.

2a. Same as step 2a of Figure 5.2.2.3.1-1, with the following information:

   - n9UlForwardingTunnel attribute carrying the N9 uplink data forwarding tunnel info of source Branching Point or UL CL;
   - other information, if necessary.

2b. If the source I-SMF cannot proceed with the request, the source I-SMF shall return an error response, as specified for step 2b of figure 5.2.2.3.1-1.

5.2.2.3.22 Remote UE Report during 5G ProSe Communication via 5G ProSe Layer-3 UE-to-Network Relay without N3IWF procedure

The requirements specified in clause 5.2.2.3.1 shall apply with the following modifications.

1. Same as step 1 of Figure 5.2.2.3.1-1, with the following modifications.

   The POST request shall contain:

   - the n1SmMsg IE containing the Remote UE Report NAS Message.

   For Home-Routed PDU Session or PDU session with I-SMF, the V-SMF or I-SMF shall invoke the Update service operation on the (H-)SMF, as specified in clause 5.2.2.8.2.24.

2. Same as step 2 of Figure 5.2.2.3.1-1, with the following modifications.

   The POST response shall contain:

   - the n1SmMsg IE containing the Remote UE Report Response NAS Message.

5.2.2.3.23 AMF requested PDU Session Release due to V/I-SMF failure

The AMF may request PDU Session Release towards an alternative V/I-SMF in the same SMF Set when it detects the V/I-SMF has failed and if the V/I-SMF supports the DLSET feature while the (H-)SMF doesn't support the PSETR

feature as specified in clause 6.8.2 of 3GPP TS 23.527 [24]. When the AMF sends an Update SM Context Request, the requirements specified in clause 5.2.2.3.1 shall apply with the following modifications.

1. Same as step 1 of Figure 5.2.2.3.1-1, with the following modifications.

   The POST request shall contain:

   - the release IE set to true;
   - the cause IE set to REL_DUE_TO_SMF_NOT_SUPPORT_PSETR.

5.2.2.3.24 Connection Inactive procedure with CN based MT communication handling

The NF Service Consumer (e.g. AMF) shall request the SMF to apply CN based MT communication handling as specified in clauses 4.8.1.1a and 4.8.2.2b of 3GPP TS 23.502 [3] when the AMF is notified by the NG-RAN that the NG-RAN has transited the UE using eDRX to RRC_INACTIVE state and the SMF supports the UPCSMT feature (see clause 6.1.8).

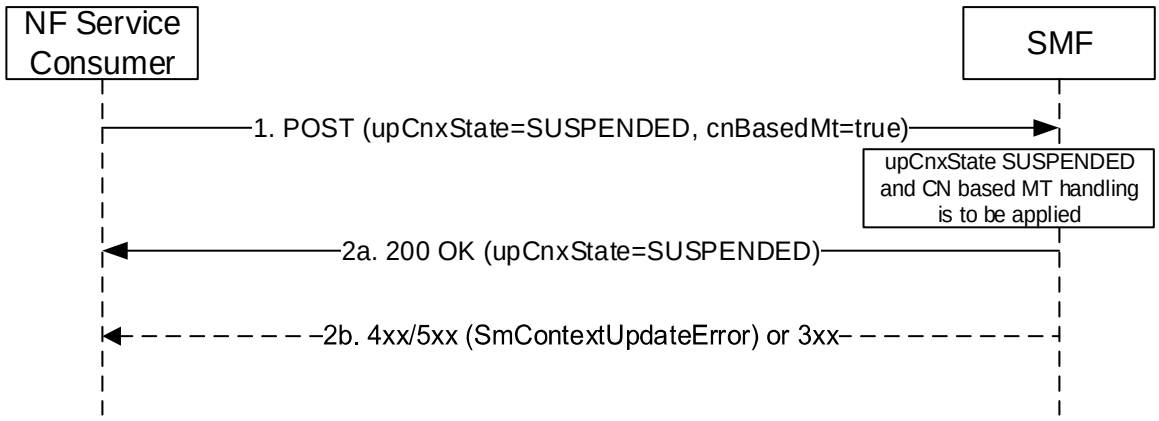

Figure 5.2.2.3.24-1: NG-RAN initiated Connection Inactive procedure

1. The NF Service Consumer shall request the SMF to suspend the user plane connection of the PDU session by sending a POST request, as specified in clause 5.2.2.3.1, with the following information:

   - cnBasedMt is set to "true"
   - upCnxState attribute set to SUSPENDED;
   - user location and user location timestamp;
   - other information, if necessary.

NOTE: As an implementation option, the AMF can force the UE to enter CM Idle if the SMF does not support the UPCSMT feature.

2a. Upon receipt of such a request, the SMF shall keep the NG-RAN N3 DL F-TEID and set the upCnxState attribute to SUSPENDED and return a 200 OK response including the upCnxState attribute set to SUSPENDED. The SMF will request the UPF to buffer any subsequent downlink data and report the receiving DL data to the SMF. Upon receiving DL data report, the SMF will invoke the Namf_MT_EnableUEReachability service operation when the upCnxState of the PDU session is set to SUSPENDED, to trigger a NG-RAN paging.

2b. Same as step 2b of figure 5.2.2.3.1-1.

5.2.2.3.25 UE Triggered Connection Resume in RRC Inactive procedure

Upon receiving a notification from NG-RAN that the UE is in RRC_CONNECTED mode or when receiving from NG-RAN a MT Communication Handling request indicating the UE is now reachable for downlink data and/or signalling as specified in clause 4.8.2.2 of 3GPP TS 23.502 [3], the NF Service Consumer (e.g. AMF) shall request the SMF to

resume the User Plane connection of an existing PDU session, i.e. establish the N3 tunnel between the 5G-AN and UPF, as follows.

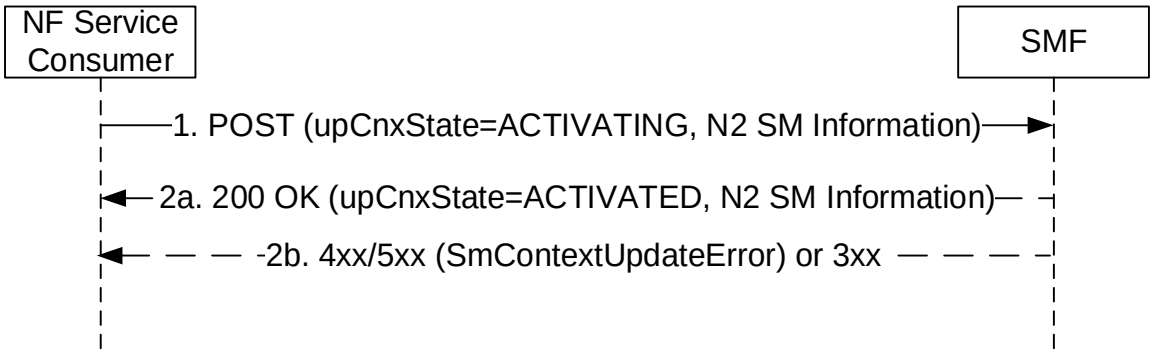

Figure 5.2.2.3.25-1: UE Triggered Connection Resume in RRC Inactive

1. The NF Service Consumer shall request the SMF to resume the user plane connection of the PDU session by sending a POST request, as specified in clause 5.2.2.3.1, with the following information:

   - the upCnxState attribute set to ACTIVATING;
   - user location and user location timestamp;
   - cause attribute set to "PDU_SESSION_RESUMED";
   - N2 SM information received from the 5G-AN if the accessed 5G-AN is able to retrieve the UE Context and the accessed 5G-AN node initiates N2 Path Switch procedure, i.e. the Path Switch Request Transfer including the new transport layer address and tunnel endpoint of the downlink termination point for the user data for this PDU session (i.e. 5G-AN's GTP-U F-TEID for downlink traffic);
   - additional N2 SM information received from the 5G-AN, if any;
   - other information, if necessary.

2a. If the SMF can proceed with resuming the user plane connection of the PDU session, i.e. request the UPF to forward any received DL data to the NG-RAN DL F-TEID which is stored in the SMF when the SMF is requested to apply CN based MT handling, the SMF shall return a 200 OK response including the following information:

   - the upCnxState attribute set to ACTIVATED;
   - N2 SM information to 5G-AN if N2 SM information with Path Switch Request Transfer is received in the request, i.e. Path Switch Response Transfer including the transport layer address and tunnel endpoint of the uplink termination point for the user data for this PDU session (i.e. UPF's GTP-U F-TEID for uplink traffic).

2b. If the SMF cannot proceed with resuming the user plane connection of the PDU session, the SMF shall return an error response, as specified for step 2b of figure 5.2.2.3.1-1, including:

   - the upCnxState attribute representing the final state of the user plane connection (e.g. DEACTIVATED);
   - N2 SM information, including the cause of the failure.

5.2.2.3.26 AMF requested PDU Session Release due to Network Slice instance not available

The requirements specified in clause 5.2.2.3.1 shall apply with the following modifications.

1. Same as step 1 of Figure 5.2.2.3.1-1, with the following modifications.

   The POST request shall contain:

   - the release IE set to true;

- the cause IE set to "REL_DUE_TO_NSI_NOT_AVAILABLE".

5.2.2.3.27 AMF requested PDU Session Release due to MBSR not authorized

The requirements specified in clause 5.2.2.3.1 shall apply with the following modifications.

1. Same as step 1 of Figure 5.2.2.3.1-1, with the following modifications.

   The POST request shall contain:

   - the release IE set to true;
   - the cause IE set to "REL_DUE_TO_MBSR_NOT_AUTHORIZED".

5.2.2.3.28 AMF correlated UDM Re-Discovery for UDR Restoration during Subscription Data Migration

The requirements specified in clause 5.2.2.3.1 shall apply with the following modifications.

1. Same as step 1 of Figure 5.2.2.3.1-1, with the following modifications.

   The POST request shall contain:

   - the new UDM group ID associated to the UE.

If the UDM group ID locally stored is different from the one received for this UE, then the SMF shall overwrite it and use it for the UDM selection. See clause 6.7.3 of 3GPP TS 23.527 [24].

5.2.2.3.29 AMF indication of AMF Data Restoration resynchronization is initiated

The requirements specified in clause 5.2.2.3.1 shall apply with the following modifications.

1. Same as step 1 of Figure 5.2.2.3.1-1, with the following modifications.

   The POST request shall contain the amfResynchedInd for the affected UE.

The SMF shall check if for the received UE there is a Data Restoration resynchronization pending (as per former reception of Data Restoration Notification from the UDM without the indication that resynchronization is not required). If a Data Restoration resynchronization is pending for the received UE, the SMF performs this UE resynchronization at that moment. Otherwise, if a Data Restoration resynchronization is not pending, the SMF ignores the "amfResynchedInd" indication contained in the request. See clause 6.7.4 of 3GPP TS 23.527 [24].

5.2.2.4 Release SM Context service operation

5.2.2.4.1 General

The Release SM Context service operation shall be used to release the SM Context of a given PDU session, in the SMF, in the V-SMF for HR roaming scenarios, or in the I-SMF for a PDU session with an I-SMF, in the following procedures:

- Registration procedure with I-SMF/V-SMF change and removal (see clause 4.23.3 of 3GPP TS 23.502 [3] and clause 6.10.2.4 of 3GPP TS 23.548 [39]);
- UE Triggered Service Request with I-SMF change and removal or V-SMF change (see clause 4.23.4.3 of 3GPP TS 23.502 [3] and clause 6.10.2.4 of 3GPP TS 23.548 [39]);
- UE initiated Deregistration (see clause 4.2.2.3.2 of 3GPP TS 23.502 [3]);
- Network initiated Deregistration, e.g. AMF initiated deregistration (see clause 4.2.2.3.3 of 3GPP TS 23.502 [3]), UDM triggered deregistration by sending Deregistration notification with initial Registration indication (see clause 4.2.2.2.2 of 3GPP TS 23.502 [3]);
- Network requested PDU session release (see clause 4.3.4.2 of 3GPP TS 23.502 [3]), e.g. AMF initiated release:

- when there is a mismatch of the PDU session status between the UE and the AMF;
- when there is a change of the set of network slices for a UE where a network slice instance is no longer available (as described in clause 5.15.5.2.2 of 3GPP TS 23.501 [2] and in clause 4.2.2.2 of 3GPP TS 23.502 [3]) and the PDU session is not activated;
- when there is a PDU session rejected by the new AMF to the old AMF during Registration procedure (as described in clause 4.2.2.2.2 of 3GPP TS 23.502 [3]);
- due to Mobility or Access Restrictions (see clause 5.16.4.3 of 3GPP TS 23.501 [2]); or
- due to AF requested modification of set of network slice (see clause 5.15.5.2.2a of 3GPP TS 23.501 [2]).

- 5GS to EPS Idle mode mobility or handover, to release the SM context in the V-SMF only for a Home Routed PDU session or in the I-SMF only for a PDU session with an I-SMF (see clauses 4.23.12.2 and 4.23.12.6 of 3GPP TS 23.502 [3] and clause 6.10.2.4 of 3GPP TS 23.548 [39]), for the PDU sessions that are transferred to EPC;
- 5GS to EPS handover using N26 interface and 5GS to EPS Idle mode mobility using N26, to release the PDU session not transferred to EPC (see clauses 4.11.1.2.1 and 4.11.1.3.2 of 3GPP TS 23.502 [3]);
- Inter NG-RAN node Xn based handover and N2 based handover with I-SMF/V-SMF change and removal (see clauses 4.23.7.3 and 4.23.11 of 3GPP TS 23.502 [3] and clause 6.10.2.4 of 3GPP TS 23.548 [39]);
- 5G-SRVCC from NG-RAN to 3GPP UTRAN procedure (see clause 6.5.4 of 3GPP TS 23.216 [35]);
- 5G-RG Deregistration via W-5GAN (see clause 7.2.1.2 of 3GPP TS 23.316 [36]);
- FN-RG Deregistration via W-5GAN (see clause 7.2.1.4 of 3GPP TS 23.316 [36]);
- Non-5G capable device behind 5G-CRG and FN-CRG Deregistration via W-5GAN (see clause 4.10a of 3GPP TS 23.316 [36]);
- 5G-RG or Network requested PDU Session Release via W-5GAN (see clause 7.3.3 of 3GPP TS 23.316 [36]);
- FN-RG or Network Requested PDU Session Release via W-5GAN (see clause 7.3.7 of 3GPP TS 23.316 [36]);
- Non-5G capable device behind 5G-CRG and FN-CRG or Network Requested PDU Session Release via W-5GAN (see clause 4.10a of 3GPP TS 23.316 [36]);
- Mobility procedures with AMF changes (e.g. Registration / N2 based handover with AMF changes), to release the MA-PDU session if target AMF does not support MA-PDU session (see clause 4.22.9 of 3GPP TS 23.502 [3]);
- Inter V-SMF mobility registration update or N2-based handover with V-SMF change/removal in HR-SBO case (see clauses 6.7.2.6 and 6.7.2.7 of 3GPP TS 23.548 [39]);
- Xn Handover with V-SMF change in HR-SBO case (see clause 6.7.2.9 of 3GPP TS 23.548 [39]).

The SMF shall release the SM context without sending any signalling towards the 5G-AN and the UE.

The NF Service Consumer (e.g. AMF) shall release the SM Context of a given PDU session by using the HTTP "release" custom operation as shown in Figure 5.2.2.4.1-1.

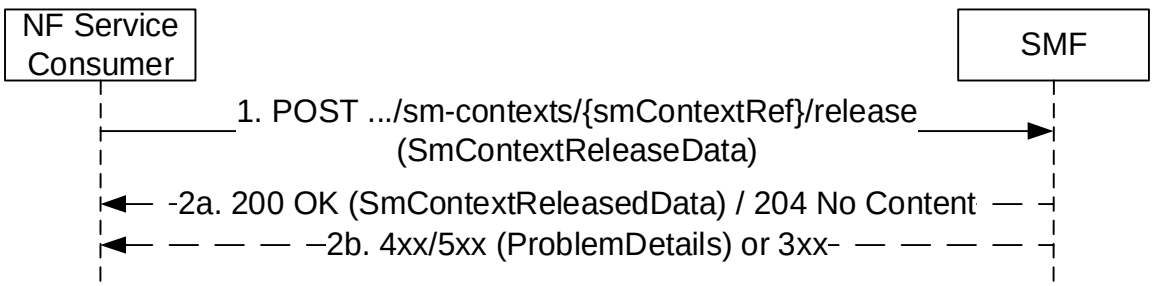

Figure 5.2.2.4.1-1: SM context release

1. The NF Service Consumer shall send a POST request to the resource representing the individual SM context to be deleted. The content of the POST request shall contain any data that needs to be passed to the SMF and/or N2 SM information (if Secondary RAT usage data needs to be reported).

   For a 5GS to EPS Idle mode mobility or handover, for a Home Routed PDU session associated with 3GPP access and with assigned EBI(s), the POST request shall contain the vsmfReleaseOnly indication; for a PDU session with an I-SMF and assigned EBI(s), the POST request shall contain the ismfReleaseOnly indication.

   For a 5GS to EPS Idle mode mobility or handover, for a Home Routed PDU session associated with 3GPP access and with no assigned EBI(s), the POST request shall not contain the vsmfReleaseOnly indication to release the PDU session in the V-SMF and H-SMF; for a PDU session with an I-SMF and with no assigned EBI(s), the POST request shall not contain the ismfReleaseOnly indication to release the PDU session in the I-SMF and SMF.

   For Registration, UE Triggered Service Request, Inter NG-RAN node Xn based handover and N2 based handover procedures with I-SMF change or removal, the POST request shall contain the ismfReleaseOnly indication; if with V-SMF change or removal, the POST request shall contain the vsmfReleaseOnly indication.

   For 5G-SRVCC from NG-RAN to 3GPP UTRAN, the POST request body shall contain the "cause" attribute with the value "REL_DUE_TO_PS_TO_CS_HO".

   For PDU Session release due to S-NSSAI is removed from Allowed NSSAI and no N2 interaction is needed (i.e. UP connection of the PDU Session is not active) as specified in clause 4.2.2.2.2 of 3GPP TS 23.502 [3], the POST request body shall contain the "cause" attribute with the value "REL_DUE_TO_SLICE_NOT_AVAILABLE".

   For PDU Session release due to AF requested modification of set of network slice as specified in clause 5.15.5.2.2a of 3GPP TS 23.501 [2], the POST request body shall contain the "cause" attribute with the value "REL_DUE_TO_AF_REQUESTED_SLICE_REPLACEMENT".

2a. On success, the SMF shall return a "200 OK" with message body containing the representation of the SmContextReleasedData when information needs to be returned to the NF Service Consumer, or a "204 No Content" response with an empty content in the POST response.

   If the POST request contains a vsmfReleaseOnly indication set to true (i.e. for a 5GS to EPS Idle mode mobility or handover, for a Home Routed PDU session with assigned EBI(s)), the V-SMF shall release its SM context and corresponding PDU session resource locally, i.e. without signalling towards the H-SMF.

   If the POST request contains an ismfReleaseOnly indication set to true (i.e. for a 5GS to EPS Idle mode mobility or handover, for a PDU session with an I-SMF and assigned EBI(s)), the I-SMF shall release its SM context and corresponding PDU session resource locally, i.e. without signalling towards the SMF.

   If the POST request body contains the "cause" attribute with the value "REL_DUE_TO_PS_TO_CS_HO", the SMF shall indicate to the PCF within SM Policy Association termination that the PDU session is released due to 5G-SRVCC, or the cause value shall be passed from the V-SMF to the H-SMF (for a HR PDU session) or from the I-SMF to the SMF (for a PDU session with an I-SMF) within the Release service operation.

2b. On failure or redirection, one of the HTTP status code listed in Table 6.1.3.3.4.3.2-2 shall be returned. For a 4xx/5xx response, the message body shall include a ProblemDetails structure with the "cause" attribute set to one of the application error listed in Table 6.1.3.3.4.3.2-2.

5.2.2.5 Notify SM Context Status service operation

5.2.2.5.1 General

The Notify SM Context Status service operation shall be used by the SMF to notify the NF Service Consumer about the status of an SM context related to a PDU session (e.g. when the SM context is released and the release is not triggered by a Release SM Context Request, or when the SM context is moved to another system, or when the control of the PDU session is taken over by another I-SMF/V-SMF/SMF in the same SMF set) in the SMF, or in the V-SMF for HR roaming scenarios, or in the I-SMF for a PDU session with an I-SMF.

The Notify SM Context Status service operation may also be used by the SMF to provide the SMF derived CN assisted RAN parameters tuning to the NF Service Consumer (e.g. AMF), if the NF Service Consumer has indicated support of the CARPT (CN Assisted RAN Parameters Tuning) feature.

The Notify SM Context Status service operation may also be used by the SMF to notify the DDN failure status.

The Notify SM Context Status service operation may also be used to inform the NF service consumer (e.g. AMF) that the V-SMF has created the PDU session towards an alternative H-SMF for a HR PDU session or the I-SMF has created the PDU session towards an alternative SMF for a PDU session with I-SMF, during the PDU session establishment procedure.

It is used in the following procedures:

- UE requested PDU Session Establishment procedure, when the PDU session establishment fails after the Create SM Context response or to provide the SMF derived CN assisted RAN parameters tuning, or when an alternative H-SMF is used by the V-SMF for a HR PDU session (see clause 4.3.2.2 of 3GPP TS 23.502 [3]), or when an alternative SMF is used by the I-SMF for a PDU session with an I-SMF (see clause 4.23.5.1 of 3GPP TS 23.502 [3]);
- UE or Network requested PDU session Modification (see clause 4.3.3.2 of 3GPP TS 23.502 [3]) to provide the SMF derived CN assisted RAN parameters tuning;
- UE or Network requested PDU session release (see clause 4.3.4.2 of 3GPP TS 23.502 [3]), e.g. SMF initiated release;
- Handover of a PDU Session procedure between untrusted non-3GPP to 3GPP access (see clauses 4.9.2.3.2, 4.9.2.4.2 and 4.23.16.2 of 3GPP TS 23.502 [3]);
- Interworking procedures without N26 interface, e.g. 5GS to EPS Mobility (see clause 4.11.2.2 of 3GPP TS 23.502 [3]);
- Handover from 5GC-N3IWF to EPS (see clause 4.11.3.2 of 3GPP TS 23.502 [3]);
- Handover from 5GS to EPC/ePDG (see clause 4.11.4.2 of 3GPP TS 23.502 [3]);
- I-SMF Context Transfer (see clause 4.26.5.2 of 3GPP TS 23.502 [3]);
- SMF Context Transfer procedure, LBO or no Roaming, no I-SMF (see clause 4.26.5.3 of 3GPP TS 23.502 [3]);
- Handover from W-5GAN/5GC to 3GPP access/EPS (see clause 7.6.4.2 of 3GPP TS 23.316 [36]);
- 5G-RG requested PDU Session Establishment via W-5GAN (see clause 7.3.1 of 3GPP TS 23.316 [36]);
- 5G-RG or Network requested PDU Session Modification via W-5GAN (see clause 7.3.2 of 3GPP TS 23.316 [36]);
- 5G-RG or Network requested PDU Session Release via W-5GAN (see clause 7.3.3 of 3GPP TS 23.316 [36])
- FN-RG related PDU Session Establishment via W-5GAN (see clause 7.3.4 of 3GPP TS 23.316 [36]);
- FN-RG or Network Requested PDU Session Modification via W-5GAN (see clause 7.3.6 of 3GPP TS 23.316 [36]);
- FN-RG or Network Requested PDU Session Release via W-5GAN (see clause 7.3.7 of 3GPP TS 23.316 [36]);
- Non-5G capable device behind 5G-CRG and FN-CRG requested PDU Session Establishment via W-5GAN (see clause 4.10a of 3GPP TS 23.316 [36]);
- Non-5G capable device behind 5G-CRG and FN-CRG or Network requested PDU Session Modification via W-5GAN (see clause 4.10a of 3GPP TS 23.316 [36]);
- Non-5G capable device behind 5G-CRG and FN-CRG or Network requested PDU Session Release via W-5GAN (see clause 4.10a of 3GPP TS 23.316 [36]);
- Handover between 3GPP access/5GC and W-5GAN access (see clause 7.6.3 of 3GPP TS 23.316 [36]);
- Handover from 3GPP access/EPS to W-5GAN/5GC (see clause 7.6.4.1 of 3GPP TS 23.316 [36]);

- Information flow for Availability after DDN Failure with SMF buffering (see clause 4.15.3.2.7 of 3GPP TS 23.502 [3]);
- Information flow for Availability after DDN Failure with UPF buffering (see clause 4.15.3.2.9 of 3GPP TS 23.502 [3]);
- The control of the PDU session is taken over by a new anchor SMF within the same SMF set (see clause 5.22 of 3GPP TS 29.244 [29]) or taken over by a new intermediate SMF (e.g. I-SMF or V-SMF) within the same SMF set, and the new SMF instance decides to notify the change of SMF;
- SMF triggered I-SMF selection or removal (see clause 4.23.5.4 of 3GPP TS 23.502 [3]);
- Change of SSC mode 2 PDU Session Anchor with different PDU Sessions (see clause 4.3.5.1 of 3GPP TS 23.502 [3]);
- Change of SSC mode 3 PDU Session Anchor with multiple PDU Sessions (see clause 4.3.5.2 of 3GPP TS 23.502 [3]);
- Network triggered EAS change in HR-SBO context (see clause 6.7.3.2 of 3GPP TS 23.548 [74]);
- Network slice usage behaviour control, i.e. SMF initiated PDU session release due to slice inactivity, see clause 5.15.15.3 of 3GPP TS 23.501 [2].

The SMF shall notify the NF Service Consumer by using the HTTP POST method as shown in Figure 5.2.2.5.1-1.

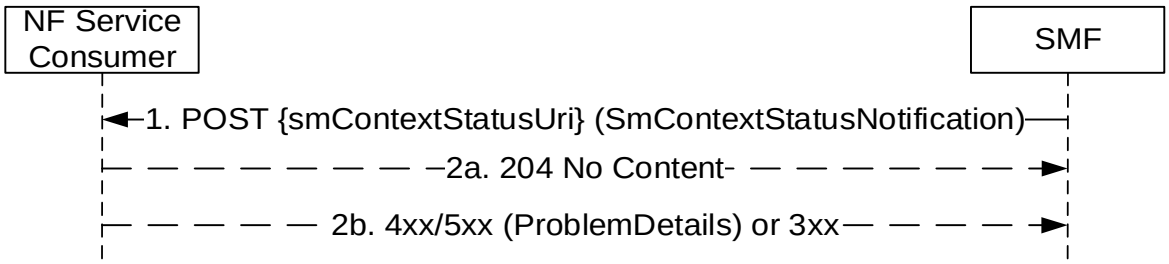

Figure 5.2.2.5.1-1: SM context status notification

1. The SMF shall send a POST request to the SM Context Status callback reference provided by the NF Service Consumer during the subscription to this notification. The content of the POST request shall contain the notification content.

   If the notification is triggered by PDU session handover to release resources of the PDU session in the source access, the notification content shall contain the resourceStatus IE with the value "RELEASED" and the cause IE with the value "PDU_SESSION_HANDED_OVER" as specified in clause 4.9.2.3.2 of 3GPP TS 23.502 [3].

   If the notification is triggered by PDU session handover to release only the SM Context with the I-SMF in the source access but without releasing the PDU session in the AMF, the notification content shall contain the resourceStatus IE with the value "UPDATED" and the cause IE with the value "PDU_SESSION_HANDED_OVER" as specified in clause 4.23.16.2 of 3GPP TS 23.502 [3]. If the notification is triggered by PDU session handover to release resources of the PDU session in the target access due to handover failure between 3GPP access and non-3GPP access, the notification content shall contain the resourceStatus IE with the value "RELEASED" and the cause IE with the value "PDU_SESSION_HAND_OVER_FAILURE".

   If the NF Service Consumer indicated support of the HOFAIL feature (see clause 6.1.8) and if the notification is triggered by PDU session handover to update the access type of the PDU session due to a handover failure between 3GPP access and non-3GPP access, the notification content shall contain the resourceStatus IE with the value "UPDATED", the anType IE with the value "3GPP" or "NON_3GPP" indicating the access type of the PDU session after the handover failure scenario and the cause IE with the value "PDU_SESSION_HAND_OVER_FAILURE".

   If the notification is triggered by the SMF derived CN assisted RAN parameters tuning, the notification content shall contain the resourceStatus IE with the value "UNCHANGED" and the cause IE with the value "CN_ASSISTED_RAN_PARAMETER_TUNING".

If the notification is triggered by SMF Context Transfer procedure, the notification content shall contain the cause IE with the value "ISMF_CONTEXT_TRANSFER" or "SMF_CONTEXT_TRANSFER".

If the notification is triggered by the report of the DDN failure, the notification content shall contain the resourceStatus IE with the value "UNCHANGED" and the cause IE with the value "DDN_FAILURE_STATUS".

If the notification is triggered to report that an alternative (H-)SMF has been used during a HR PDU session establishment or the establishment of a PDU session with an I-SMF, the notification content shall contain the resourceStatus IE with the value "ALT_ANCHOR_SMF". The notification content shall also include the altAnchorSmfUri IE containing the API URI of the alternative (H-)SMF used for the PDU session and if available the altAnchorSmfId IE containing the NF Instance Id of the alternative (H-)SMF. The Notification shall only be sent to the NF service consumer (e.g. AMF) supporting the AASN feature.

For a PDU session without an I-SMF or V-SMF, if upon a change of anchor SMF, the new anchor SMF instance decides to notify the change of anchor SMF, then the notification content shall contain the resourceStatus IE with the value "UPDATED" and the cause IE with the value "CHANGED_ANCHOR_SMF". In addition, the new anchor SMF shall include its SMF Instance ID in the notification content, and/or carry an updated binding indication in the HTTP headers to indicate the change of anchor SMF (as per step 6 of clause 6.5.3.3 of 3GPP TS 29.500 [4]).

For a PDU session with an I-SMF or V-SMF, if upon a change of intermediate SMF (e.g. I-SMF or V-SMF), the new intermediate SMF instance decides to notify the change of intermediate SMF, then the notification content shall contain the resourceStatus IE with the value "UPDATED" and the cause IE with the value "CHANGED_INTERMEDIATE_SMF". In addition, the new intermediate SMF shall include its SMF Instance ID in the notificationcontent, and/or carry an updated binding indication in the HTTP headers to indicate the change of intermediate SMF (as per step 6 of clause 6.5.3.3 of 3GPP TS 29.500 [4]).

For a PDU session with an I-SMF or V-SMF, if the notification is triggered by the change of the anchor SMF (e.g. the PDU session is taken over by a new SMF within the same SMF Set selected by the UPF), the notification content shall contain the resourceStatus IE with the value "UPDATED", the cause IE with the value "CHANGED_ANCHOR_SMF" and the SMF Instance ID of the new anchor SMF.

If the notification is triggered by SMF for I-SMF selection or removal or V-SMF selection for the current PDU session, or SMF selection during PDU Session re-establishment for SSC mode 2/3, the notification content shall contain the resourceStatus IE with the value "UNCHANGED", the cause IE with the value "TARGET_DNAI_NOTIFICATION" and the targetDnaiInfo IE. The targetDnai IE in the targetDnaiInfo IE shall be absent if the I-SMF removal is triggered due to the DNAI currently served by the I-SMF being no longer used for the PDU Session. If the notification is triggered for SMF selection during PDU Session re-establishment for SSC mode 3, the notification content may also contain the oldPduSessionRef IE received from the SMF or the oldSmContextRef IE as specified in clause 4.3.5.2 of 3GPP TS 23.502 [3].

If the notification is triggered by a PDU session release due to slice inactivity as specified in clause 5.15.15.3 of 3GPP TS 23.501 [2] and clause 5.11.2 of 3GPP TS 29.244 [29], the notification content shall contain the resourceStatus IE with the value "RELEASED" and the cause IE with the value "REL_DUE_TO_SLICE_INACTIVITY".

If the original AMF is unavailable and the notification is forwarded to a reselected AMF within the same AMF set, the notification should include the old GUAMI of the original AMF.

If the notification is triggered by a PDU session establishment rejection during a PDU session establishment due to insufficient resources at the SMF for specific slice and/or DNN, the notification content shall contain the resourceStatus IE with the value "RELEASED" and the cause IE with the value "REL_DUE_TO_INSUFFICIENT_RESOURCES_SLICE" or "REL_DUE_TO_INSUFFICIENT_RESOURCES_SLICE_DNN". The AMF should deprioritize the SMF instance for a short period for SMF selection when handling subsequent PDU session establishment requests towards the same slice and/or DNN.

2a. On success, "204 No Content" shall be returned and the content of the POST response shall be empty.

If the SMF indicated in the request that the SM context resource is released, the NF Service Consumer shall release its association with the SMF for the PDU session and release the EBI(s) that were assigned to the PDU session.

If the SMF indicated in the request that the SM context resource is updated with the anType IE, the NF Service Consumer shall change the access type of the PDU session with the value of anType IE.

If the notification request was triggered by PDU session handover to release only the SM Context with the I-SMF in the source access but without releasing the PDU session in the AMF, the AMF shall remove its resources associated to the SM context with the I-SMF, but the AMF shall not release the PDU session in the AMF, and the I-SMF shall remove its resources associated to the PDU session.

2b. On failure or redirection, one of the HTTP status code listed in Table 6.1.3.7.3.1-2 shall be returned. For a 4xx/5xx response, the message body shall contain a ProblemDetails structure with the "cause" attribute set to one of the application error listed in Table 6.1.3.7.3.1-2.

The NF Service Consumer (e.g. AMF) may reply with an HTTP "307 temporary redirect" or "308 Permanent Redirect" response pointing to the URI of another NF Service Consumer which may handle the Notification request.

If the SMF receives a "307 temporary redirect" or "308 Permanent Redirect" response, the SMF shall use this URI as Notification URI in subsequent communication and shall resend the notification to that URI.

If the SMF becomes aware that a new NF Service Consumer (e.g. AMF) is requiring notifications (e.g. via a specific error response or via Namf_Communication service AMFStatusChange Notifications, or via link level failures, see clause 6.5.2 of 3GPP TS 29.500 [4]), and the SMF knows alternate or backup Address(es) where to send Notifications (e.g. via the GUAMI and/or backupAmfInfo received when the SM context was established or via AMFStatusChange Notifications, or via the Nnrf_NFDiscovery service specified in 3GPP TS 29.510 [19] using the service name and GUAMI or backupAMFInfo obtained during the creation of the SM context, see clause 6.5.2.2 of 3GPP TS 29.500 [4]), the SMF shall exchange the authority part of the corresponding Notification URI with one of those addresses and shall use that URI in subsequent communication; the SMF shall resend the notification to that URI.

5.2.2.6 Retrieve SM Context service operation

5.2.2.6.1 General

The Retrieve SM Context service operation shall be used to retrieve an individual SM context, for a given PDU session, from the (H-)SMF, from the V-SMF during change or removal of V-SMF, or from the I-SMF during change or removal of I-SMF.

It is used in the following procedures:

- 5GS to EPS handover using N26 interface (see clause 4.11.1.2.1 of 3GPP TS 23.502 [3]), for PDU sessions associated with 3GPP access;
- 5GS to EPS Idle mode mobility using N26 interface (see clause 4.11.1.3.2 of 3GPP TS 23.502 [3]), for PDU sessions associated with 3GPP access;
- UE Triggered Service Request with I-SMF insertion/change/removal or with V-SMF insertion/change/removal (see clause 4.23.4.3 of of 3GPP TS 23.502 [3]);
- Xn based inter NG-RAN handover with insertion of intermediate SMF (see clause 4.23.11 of 3GPP TS 23.502 [3]), for PDU sessions associated with 3GPP access;
- Inter NG-RAN node N2 based handover, preparation phase, with I-SMF or V-SMF insertion/change (see clause 4.23.7.3.2 of 3GPP TS 23.502 [3]), for PDU sessions associated with 3GPP access;
- SMF Context Transfer procedure, LBO or no Roaming, no I-SMF (see clause 4.26.5.3 of 3GPP TS 23.502 [3]), for PDU sessions associated with 3GPP access;
- I-SMF selection per DNAI (see clause 4.23.5.4 of 3GPP TS 23.502 [3]);
- Change of SSC mode 3 PDU Session Anchor with multiple PDU Sessions (see clause 4.3.5.2 of 3GPP TS 23.502 [3]);
- Network triggered EAS change in HR-SBO context (see clause 6.7.3.2 of 3GPP TS 23.548 [74]);

- N2 Handover with V-SMF insertion/change/removal in HR-SBO case (see clause 6.7.2.6 of 3GPP TS 23.548 [39]);
- Inter V-SMF mobility registration update procedure in HR-SBO case (see clause 6.7.2.7 of 3GPP TS 23.548 [39]);
- Xn Handover with V-SMF change in HR-SBO case (see clause 6.7.2.9 of 3GPP TS 23.548 [39]).

The NF Service Consumer (e.g. AMF or SMF) shall retrieve an SM context by using the HTTP POST method (retrieve custom operation) as shown in Figure 5.2.2.6.1-1.

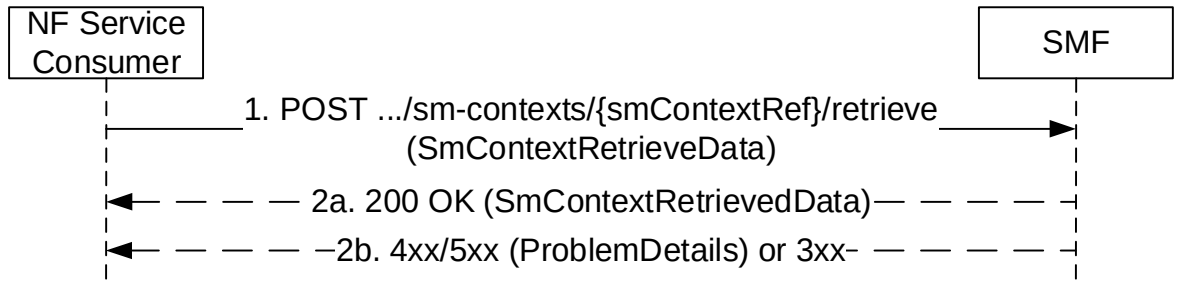

Figure 5.2.2.6.1-1: SM context retrieval

1. The NF Service Consumer shall send a POST request to the resource representing the individual SM context to be retrieved. The POST request may contain a content with the following parameters:
   - target MME capabilities, if available, to allow the SMF to determine whether to include EPS bearer contexts for Ethernet PDN Type, non-IP PDN type, or requiring UP integrity protection or not;
   - SM context type:
     - indicating that this is a request to retrieve the complete SM context (i.e. 5G SM context including EPS context information as defined in clause 6.1.6.2.39), during scenarios with an I-SMF or V-SMF insertion/change/removal or SMF Context Transfer procedure; or
     - indicating that this is a request to retrieve the AF Coordination Information as defined in clause 6.1.6.2.69, during the change of SSC mode 3 PDU Session Anchor with multiple PDU Sessions, if the runtime coordination between old SMF and AF is enabled.
   - serving core network operator PLMN ID of the new V-SMF, when the procedure is triggered by a new V-SMF, if the new V-SMF supports inter-PLMN V-SMF change or insertion. Or the serving core network operator PLMN ID of the new I-SMF during the procedure with an I-SMF insertion;
   - notToTransferEbiList IE, if the SM context type IE is absent or indicate a request to retrieve the EPS PDN connection, to request the SMF to not transfer EPS bearer context(s) corresponding to EBIs in the list, during an 5GS to EPS mobility when the target MME does not support 15 EPS bearers;
   - ranUnchangedInd IE, if the NG-RAN Tunnel info is required in scenario of I-SMF/V-SMF change/insertion during registration procedure after EPS to 5GS handover, I-SMF selection/removal per DNAI or V-SMF selection per DNAI, when the UE is in CM-CONNECTED state as specified in clauses 5.2.2.2.7 and 5.2.2.2.12;
   - the hrsboSupportInd IE set to true, if the procedure is triggered by a target V-SMF supporting the HR-SBO feature;
   - the storedOffloadIds IE, if the target V-SMF has a list of stored offload identifiers from the previous procedures for the HPLMN of the PDU session;
   - the ismfLomSupportInd IE set to true, if the procedure is triggered by a target I-SMF supporting the I-SMF Local Offloading Management feature; and/or
   - the storedOffloadIds IE, if the target I-SMF has a list of stored offload identifiers (for the PLMN of the PDU session), which are preconfigured at the target I-SMF or which were learned from anchor SMFs of the same PLMN during previous procedures.

2a. On success, "200 OK" shall be returned; the content of the POST response shall contain the mapped EPS bearer contexts if this is a request for the UE EPS PDN connection, or the complete SM context if this is a request for retrieving the complete SM context, or the AF Coordination Information if this is a request for retrieving the AF Coordination Information.

If this is a request for the UE EPS PDN connection and the target MME capabilities were provided in the request parameters:

- if the target MME supports the non-IP PDN type, the SMF shall return, for a PDU session with PDU session type "Unstructured", an EPS bearer context with the "non-IP" PDN type;
- if the target MME supports the Ethernet PDN type, the SMF shall return, for a PDU session with PDU session type "Ethernet", an EPS bearer context with the "Ethernet" PDN type;
- if the target MME does not support the Ethernet PDN type but supports the non-IP PDN type, the SMF shall return, for a PDU session with PDU session type "Ethernet", an EPS bearer context with the "non-IP" PDN type.

If the notToTransferEbiList IE was included in the request, the SMF shall not provide EPS bearer context(s) corresponding to EBIs in the list.

If this is a request for retrieving the complete SM context and there are downlink data packets buffered at I-UPF, the SMF shall include the "forwardingInd" attribute with value "true" in the response body to indicate downlink data packets are buffered at the I-UPF. The NF Service Consumer receiving the "forwardingInd" attribute with the value "true" shall setup a forwarding tunnel for receiving the buffered downlink data packets.

If this is a request for retrieving the complete SM context for an inter-PLMN V-SMF change, i.e. if the request contains the serving core network operator PLMN ID indicating a different PLMN than the PLMN of the SMF (acting as the old V-SMF), the latter shall not include the chargingInfo IE and the roamingChargingProfile IE in the SM context returned in the response.

During a procedure with an I-SMF or V-SMF insertion, the anchor SMF should use the servingNetwork IE received in the Retrieve SM Context Request to determine whether the inserted entity is an I-SMF or V-SMF, and if so, encode in the SM Context returned in the response the applicable set of attributes (e.g. hsmfUri, hSmfInstanceId, hSmfServiceInstanceId to a V-SMF, or smfUri, smfInstanceId, smfServiceInstanceId to an I-SMF) and the applicable URI in the pduSessionRef if different URIs are used for intra-PLMN and inter-PLMN signaling requests targeting the PDU session context.

NOTE 1: During an inter-PLMN procedure with an I-SMF or V-SMF change, the old V-SMF or I-SMF returns the attributes of the SM context as were received from the anchor SMF.

If the UE, target MME and AMF support User Plane integrity protection with EPS, the SMF shall include the UP Security Policy IE in the UE EPS PDN connection context if User Plane integrity protection has been enabled by the SMF as specified in clauses 4.11.1.2.1 and 4.11.1.3.2 of 3GPP TS 23.502 [3].

NOTE 2: During a 5GS to EPS handover, if User Plane Integrity Protection is used in 5GS and QoS flows are associated with EPS bearer IDs, the I-SMF/V-SMF considers that the UE supports User Plane Integrity Protection in EPS.

If this is a request for retrieving the complete SM context for an I-SMF or V-SMF insertion, and the smfUri IE or hSmfUri IE is provided by the AMF in the Create SM Context request and is different from the smfUri IE or hSmfUri IE in the SM context returned in the Retrieve SM Context response, the latter (i.e. the IEs received in the Retrieve SM Context response) shall prevail and be used by the I-SMF or V-SMF to trigger the create service operation to the (H-)SMF.

If the target V-SMF supports the HR-SBO feature, for a HR-SBO session, the content of the POST response message may also contain the HR-SBO related information, e.g., hrsboAuthResult, hDnsAddr, hPlmnAddr, vplmnOffloadingInfoList.

The source V-SMF shall determine if the target V-SMF has already received the corresponding VPLMN Offloading Information for an offload identifier based on the storedOffloadIds for the HPLMN of the PDU session provided by the target V-SMF in the Retrieve SM context request message for an intra PLMN V-SMF change. The source V-SMF shall then include:

- the Offload Identifier(s) only, if the Offload Identifier(s) are known by the target V-SMF, i.e., the Offload Identifier(s) are part of the storedOffloadIds; otherwise

- a list of vplmnOffloadingInfo attributes where each vplmnOffloadingInfo contains an offload identifier and the corresponding VPLMN Offloading Information.

The source I-SMF shall determine if the target I-SMF knows the Local Offloading Information for an offload identifier based on the storedOffloadIds provided by the target I-SMF in the Retrieve SM context request message; the source I-SMF shall then include:

- the Offload Identifier(s) only, if the Offload Identifier(s) are known by the target I-SMF, i.e., the Offload Identifier(s) are part of the storedOffloadIds; otherwise

- a list of LocalOffloadingManagementInfo attributes where each LocalOffloadingManagementInfo contains an offload identifier and the corresponding Local Offloading Management Information, for offload IDs which are not preconfigured at the source I-SMF.

If this is a request for retrieving the complete SM context during an I/V-SMF insertion or change procedures, and if the qosMonitoringInd is set to true, the target I/V-SMF shall:

- select an I/V-UPF supporting QoS Monitoring for packet delay for a QoS flow using GTP-U based solution, i.e. the selected I/V-UPF shall support the UP function feature for GPQM as specified in clause 5.24.5.1 of 3GPP TS 29.244 [29], if possible;

- instruct the selected I/V-UPF to activate GTP-U path monitoring as specified in clause 5.24.5.2 of 3GPP TS 29.244 [29] if the GTP-U path QoS monitoring towards the target NG-RAN has not been activated yet;

- instruct the selected I/V-UPF to activate GTP-U path based QoS monitoring for the QoS flow(s) of the PDU session indicated in the QosFlowSetupItem as specified in clause 5.24.5.3 of 3GPP TS 29.244 [29].

2b. On failure or redirection, one of the HTTP status code listed in Table 6.1.3.3.4.4.2-2 shall be returned. For a 4xx/5xx response, the message body shall contain a ProblemDetails structure with the "cause" attribute set to one of the application error listed in Table 6.1.3.3.4.4.2-2.

If the EBI value of the QoS Flow associated with the default QoS Rule is included in the notToTransferEbiList IE, the SMF shall set the "cause" attribute in the ProblemDetails structure to "DEFAULT_EBI_NOT_TRANSFERRED".

If a request for the UE EPS PDN connection is rejected due to the target MME not being capable to support the PDU session, e.g. if the PDU session requires UP integrity protection but the target MME does not support User Plane Integrity Protection with EPS, the SMF shall return a 403 Forbidden response with the "cause" attribute in the ProblemDetails structure set to " TARGET_MME_CAPABILITY".

5.2.2.7 Create service operation

5.2.2.7.1 General

The Create service operation shall be used to create an individual PDU session in the H-SMF for HR roaming scenarios, or in the SMF for PDU sessions involving an I-SMF.

It is used in the following procedures:

- UE requested PDU Session Establishment for home-routed roaming or with an I-SMF (see clauses 4.3.2.2.2 and 4.23.5.1 of 3GPP TS 23.502 [3] and clause 6.10.2.2 of 3GPP TS 23.548 [39]);

- when an I-SMF is inserted during the Registration, Service Request, Inter NG-RAN node N2 based handover, Xn based handover and Handover from non-3GPP to 3GPP access procedures (see clauses 4.23.3, 4.23.4, 4.23.7.3, 4.23.11.2 and 4.23.16 of 3GPP TS 23.502 [3] and clause 6.10.2.4 of 3GPP TS 23.548 [39]);

- when a V-SMF is inserted during the Registration and Inter NG-RAN node N2 based handover (see clauses 4.23.3 and 4.23.7.3 of 3GPP TS 23.502 [3]);

- EPS to 5GS Idle mode mobility or handover using N26 interface (see clauses 4.11, 4.23.12.3, 4.23.12.5 and 4.23.12.7 of 3GPP TS 23.502 [3]);
- EPS to 5GS mobility without N26 interface (see clause 4.11.2.3 of 3GPP TS 23.502 [3]);
- Handover of a PDU session between 3GPP access and non-3GPP access, when the target AMF does not know the SMF resource identifier of the SM context used by the source AMF, e.g. when the target AMF is not in the PLMN of the N3IWF (see clause 4.9.2.3.2 of 3GPP TS 23.502 [3]);
- Handover from EPS to 5GC-N3IWF (see clause 4.11.3.1 of 3GPP TS 23.502 [3]);
- Handover from EPC/ePDG to 5GS (see clause 4.11.4.1 of 3GPP TS 23.502 [3]);
- Support of Network Slice Replacement (see clause 5.15.19 of 3GPP TS 23.501 [2]);
- PDU Session establishment for supporting HR-SBO in VPLMN (see clause 6.7.2.2 of 3GPP TS 23.548 [39]).

The NF Service Consumer (e.g. V-SMF or I-SMF) shall create a PDU session in the SMF (i.e. H-SMF for a HR PDU session, or SMF for a PDU session involving an I-SMF) by using the HTTP POST method as shown in Figure 5.2.2.7.1-1.

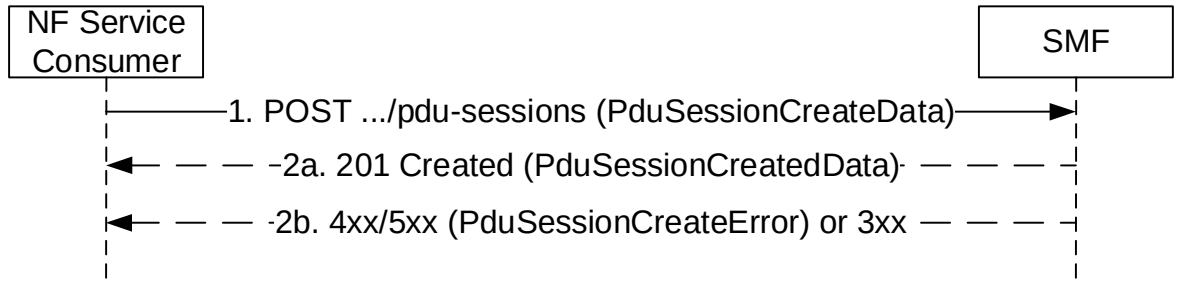

Figure 5.2.2.7.1-1: PDU session creation

1. The NF Service Consumer shall send a POST request to the resource representing the PDU sessions collection resource of the SMF. The content of the POST request shall contain:
   - a representation of the individual PDU session resource to be created;
   - the requestType IE, if the Request type IE is received from the UE for a single access PDU session and if the request refers to an existing PDU session or an existing Emergency PDU session; the requestType IE shall not be included for a MA-PDU session establishment request; it may be included otherwise;
   - the indication that a MA-PDU session is requested if a MA-PDU session is requested to be established by the UE, or the indication that the PDU session is allowed to be upgraded to a MA PDU session if the UE indicated so;
   - the vsmfId IE or ismfId IE identifying the V-SMF or I-SMF respectively;
   - the cpCiotEnabled IE with the value "True", if Control Plane CIoT 5GS Optimisation is enabled for this PDU session;
   - the cpOnlyInd IE with the value "True", if the PDU session shall only use Control Plane CIoT 5GS Optimisation;
   - the Invoke NEF indication with the value "True", if the cpCiotEnabled IE is set to "True" and data delivery via NEF is selected for the PDU session;
   - the vcnTunnelInfo IE or icnTunnelInfo IE with the DL N9 tunnel CN information of the UPF controlled by the V-SMF or I-SMF respectively, except for EPS to 5GS handover using N26 interface and when Control Plane CIoT 5GS Optimisation is enabled and data delivery via NEF is selected for this PDU session;
   - the additionalCnTunnelInfo IE with additional DL N9 tunnel CN information, if a MA PDU session is requested or if the PDU session is allowed to be upgraded to a MA PDU session, and if the UE is registered over both 3GPP and Non-3GPP accesses;

- the alternative S-NSSAI, if the NF service consumer and UE support the network slice replacement and it is requested to replace the S-NSSAI with the alternative S-NSSAI (see clause 5.15.19 of 3GPP TS 23.501 [2]);

NOTE 1: The alternative S-NSSAI is provided to the SMF together with the original S-NSSAI to be replaced. The SMF uses the original (H-PLMN) S-NSSAI to retrieve the session management subscription data from the UDM.

- the anType IE, indicating the access network type (3GPP or non-3GPP access) associated to the PDU session;

- the additionalAnType IE indicating an additional access network type associated to the PDU session, for a MA PDU session, if the UE is registered over both 3GPP and Non-3GPP accesses;

- the n9ForwardingTunnelInfo IE indicating the allocated N9 tunnel endpoints information for receiving the buffered downlink data packets, when downlink data packets are buffered at I-UPF controlled by the SMF during I-SMF insertion;

- a callback URI ({vsmfPduSessionUri} or {ismfPduSessionUri}) representing the PDU session resource in the V-SMF or I-SMF. The SMF shall construct the callback URIs based on the received {vsmfPduSessionUri} or {ismfPduSessionUri} as defined in clause 6.1, e.g. the callback URI "{vsmfPduSessionUri}/modify" to modify a PDU session in the V-SMF;

- the list of DNAIs supported by the I-SMF, for a PDU session with an I-SMF;

- the QoS constraints from the VPLMN for the QoS Flow associated with the default QoS rule and/or for the Session-AMBR if any, for the HR PDU session, if the VQOS feature is supported by the V-SMF;

- the upipSupported IE set to "true", if the UE supports User Plane Integrity Protection with EPS and if the AMF supports the related functionality.

The content of the POST request may further contain:

- the satelliteBackhaulCat IE indicating the category of the satellite backhaul used towards the 5G AN serving the UE, if the V-SMF/I-SMF received this information from the AMF;

- the disasterRoamingInd IE set to true during the PDU session establishment or a V-SMF insertion procedure when the V-SMF is indicated by the AMF that the UE is registered for Disaster Roaming service;

- the hrsboInfo IE including the HR-SBO information sent from the VPLMN when the V-SMF requests HR SBO authorization;

- the ecsAddrConfigInfos IE including the ECS Address Configuration information Parameters received from the NEF;

- the localOffloadMgtInfo IE including the information sent to the SMF for I-SMF based Local Offloading Management.

As specified in clause 4.3.2.2.2 of 3GPP TS 23.502 [3], the NF Service Consumer shall be able to receive an Update request before receiving the Create Response, e.g. for EPS bearer ID allocation (see clause 4.11.1.4.1 of 3GPP TS 23.502 [3]) or Secondary authorization/authentication (see clause 4.3.2.3 of 3GPP TS 23.502 [3]).

NOTE 2: If the H-SMF supports the VQOS feature, when QoS constraints are received from the VPLMN and PCF is deployed, the H-SMF provides the QoS constraints from the VPLMN to the PCF; otherwise, in case dynamic PCC is not deployed, the SMF takes them into account when generating the default QoS rule.

2a. On success, "201 Created" shall be returned, the content of the POST response shall contain:

- the representation describing the status of the request;

- the QoS flow(s) to establish for the PDU session, except when Control Plane CIoT 5GS Optimisation is enabled for this PDU session;

- the epsPdnCnxInfo IE and, for each EPS bearer, an epsBearerInfo IE, if the PDU session is associated to (or handed over to) the 3GPP access type and may be moved to EPS during its lifetime;

- a MA PDU Session Accepted indication, if a MA PDU session is established;

- the smallDataRateControlEnabled indication set to "true" if small data rate control is applicable on the PDU session;

- the "Location" header containing the URI of the created resource;

- the hcnTunnelInfo IE or cnTunnelInfo IE with the UL N9 Tunnel CN information of the UPF controlled by the H-SMF or SMF respectively, expect for when Control Plane CIoT 5GS Optimisation is enabled and data delivery via NEF is selected for this PDU session.

- the additionalCnTunnelInfo IE with additional UL N9 tunnel CN information of the UPF controlled by the H-SMF or SMF if a MA-PDU session is established for a UE registered over both 3GPP access and Non-3GPP access.

The content of the POST response may further contain:

- the pending update information list, indicating the information elements whose change(s) are not required to be updated in real-time to the (H-)SMF, i.e. the change(s) of the indicated information elements may be piggybacked in a subsequent update to the (H-)SMF together with other information elements;

- the localOffloadMgtInfo IE including the information sent to the I-SMF for I-SMF based Local Offloading Management;

- the uliChangeGranularity IE, indicating the needed ULI change granularity for ULI reporting, when the V-SMF or I-SMF sends an Update Request to the anchor SMF for the purpose of reporting immediately a ULI change (i.e. when the anchor SMF did not provide the pendingUpdateInfoList with "UE_LOCATION"), e.g. to report a ULI change upon a change of gNB or TAI instead of reporting every ULI change. See clause 5.51.2.2.2 of 3GPP TS 23.501 [2].

The content of the POST response may also contain the upSecurity, maxIntegrityProtectedDataRate and maxIntegrityProtectedDataRateDl IEs, if the PDU session is associated to (or handed over to) the 3GPP access type.

The SMF may provide alternative QoS profiles for each GBR QoS flow with Notification control enabled, to allow the NG-RAN to accept the setup of the QoS flow if the requested QoS parameters or at least one of the alternative QoS parameters sets can be fulfilled at the time of setup.

The authority and/or deployment-specific string of the apiRoot of the created resource URI may differ from the authority and/or deployment-specific string of the apiRoot of the request URI received in the POST request.

If an Update Request was sent to the NF Service Consumer before the Create Response, the URI in the "Location" header and in the hsmfPduSessionUri IE (carrying the PDU session resource URI of a HR PDU session or a PDU session with an I-SMF) of the SMF initiated Update Request shall be the same. If the requestType IE was received in the request and set to EXISTING_PDU_SESSION or EXISTING_EMERGENCY_PDU_SESSION (i.e. indicating that this is a UE request for an existing PDU session or an existing emergency PDU session), the SMF shall identify the existing PDU session or emergency PDU session based on the PDU Session ID; in this case, the SMF shall not create a new PDU session or emergency PDU session but instead update the existing PDU session or emergency PDU session and provide the representation of the updated PDU session or emergency PDU session in the response to the NF Service Consumer.

The POST request shall be considered as colliding with an existing PDU session context if:

- this is a request to establish a new PDU session, i.e.:

  - the RequestType IE is present in the request and set to INITIAL_REQUEST or INITIAL_EMERGENCY_REQUEST (e.g. single access PDU session establishment request);

  - the RequestType IE and the maRequestInd IE are both absent in the request (e.g. EPS to 5GS mobility); or

  - the maRequestInd IE is present in the request (i.e. MA-PDU session establishment request) and the access type indicated in the request corresponds to the access type of the existing PDU session context.

and either of the following conditions is met:

- this is a request to establish a non-emergency PDU session and the request includes the same SUPI and the same PDU Session ID as for an existing PDU session context; or

- this is a request to establish an emergency PDU session and the request includes the same SUPI, or PEI for an emergency registered UE without a UICC or without an authenticated SUPI, as for an existing PDU session context for an emergency PDU session.

A POST request that collides with an existing PDU session context shall be treated as a request for a new PDU session context. The SMF shall assign a new PDU session reference, i.e. {pduSessionRef} (see clause 6.1.3.6.2), which is different from the existing PDU session context. Before creating the new PDU session context, the SMF should delete the existing PDU session context locally and any associated resources in the UPF, PCF, CHF and UDM. See also clause 5.2.3.3.1 for the handling of requests which collide with an existing PDU session context. If the vsmfPduSessionUri or ismfPduSessionUri of the existing PDU session context differs from the vsmfPduSessionUri or ismfPduSessionUri received in the POST request, the SMF shall also send a status notification (see clause 5.2.2.10) targeting the vsmfPduSessionUri or ismfPduSessionUri of the existing PDU session context to notify the release of the existing PDU session context. The SMF should include a cause IE with value "REL_DUE_TO_DUPLICATE_SESSION_ID" in such a status notification. Upon receipt of such a status notification, the V-SMF or I-SMF shall not send SM context status notification to the AMF.

If the requestType IE was received in the request and indicates this is a request for a new PDU session (i.e. INITIAL_REQUEST) and if the Old PDU Session ID was also included in the request, the SMF shall identify the existing PDU session to be released and to which the new PDU session establishment relates, based on the Old PDU Session ID.

The NF Service Consumer shall store any epsPdnCnxInfo and EPS bearer information received from the SMF.

If the response received from the SMF contains the alwaysOnGranted attribute set to true, the NF Service Consumer shall check and determine whether the PDU session can be established as an always-on PDU session based on local policy.

If no GPSI IE is provided in the request, e.g. for a PDU session moved from another access or another system, and the SMF knows that a GPSI is already associated with the PDU session, the SMF shall include the GPSI in the response.

If one or more requested QoS flow(s) fail to be established, the V-SMF or I-SMF shall send an Update Request including the qosFlowsRelNotifyList attribute to report the failure to the H-SMF or SMF (see clause 5.2.2.8.2.2), or a Release Request to release the PDU session if no QoS flow can be established (see clause 5.2.2.9).

For UE mobility with I-SMF/V-SMF insertion procedure, if a requested functionality is not supported for a PDU session with an I-SMF/V-SMF, the SMF shall accept the POST request and release the PDU Session after the mobility procedure, as specified in clause 4.23.1 of 3GPP TS 23.502 [3].

For a HR-SBO session, the content of the POST response may also contain the hrsboInfo IE including the HR-SBO information sent from the HPLMN, e.g., hrsboAuthResult.

2b. On failure, or redirection during a UE requested PDU Session Establishment, one of the HTTP status code listed in Table 6.1.3.5.3.1-3 shall be returned. For a 4xx/5xx response, the message body shall contain a PduSessionCreateError structure, including:

- a ProblemDetails structure with the "cause" attribute set to one of the application error listed in Table 6.1.3.5.3.1-3. The application error shall be set to "NOT_SUPPORTED_WITH_ISMF" during a UE requested PDU Session Establishment, if a requested functionality is not supported for a PDU session with an I-SMF/V-SMF.

- the n1SmCause IE with the 5GSM cause that the SMF proposes the NF Service Consumer to return to the UE, if the request included n1SmInfoFromUe;

- n1SmInfoToUe with any information to be sent to the UE (in the PDU Session Establishment Reject).

5.2.2.7.2 EPS to 5GS Idle mode mobility

The requirements specified in clause 5.2.2.7.1 shall apply with the following modifications.

1. Same as step 1 of Figure 5.2.2.7.1-1, with the following additions.

The POST request shall contain:

- the list of EPS Bearer Ids received from the MME;
- the PGW S8-C F-TEID received from the MME;
- the epsBearerCtxStatus attribute, indicating the status of all the EPS bearer contexts in the UE, if corresponding information has been received in the Create SM Context request (see clause 5.2.2.2.2).

2a. Same as step 2 of Figure 5.2.2.7.1-1, with the following modifications.

If:

- the SMF finds a corresponding PDU session based on the EPS Bearer Ids and PGW S8-C F-TEID received in the request;
- the default EPS bearer context of the corresponding PDU session is not reported as inactive by the UE in the epsBearerCtxStatus attribute, if received; and
- the SMF can proceed with moving the PDN connection to 5GS,

then the SMF shall return a 201 Created response including the following additional information:

- PDU Session ID corresponding to the EPS PDN connection;
- other PDU session parameters, such as PDU Session Type, Session AMBR, QoS flows information.

If the epsBearerCtxStatus attribute is received in the request, the SMF shall check whether some EPS bearer(s) of the corresponding PDU session have been deleted by the UE but not notified to the EPS, and if so, the SMF shall release these EPS bearers, corresponding QoS rules and QoS flow level parameters locally, as specified in clause 4.11.1.3.3 of 3GPP TS 23.502 [3].

NOTE: The behaviour specified in this step also applies if the POST request collides with an existing PDU session context, i.e. if the POST request includes the same SUPI, or PEI for an emergency registered UE without a UICC or without an authenticated SUPI, and the received EPS bearer ID is the same as in the existing PDU session context.

2b. Same as step 2b of Figure 5.2.2.7.1-1, with the following additions.

If the SMF determines that seamless session continuity from EPS to 5GS is not supported for the PDU session, the SMF shall set the "cause" attribute in the ProblemDetails structure to "NO_EPS_5GS_CONTINUITY".

If the default EPS bearer context of the PDU session is reported as inactive by the UE in the epsBearerCtxStatus attribute, the SMF shall set the "cause" attribute in the ProblemDetails structure to "DEFAULT_EPS_BEARER_INACTIVE".

5.2.2.7.3 EPS to 5GS Handover Preparation

The requirements specified in clause 5.2.2.7.1 shall apply with the following modifications.

1. Same as step 1 of Figure 5.2.2.7.1-1, with the following modifications.

The POST request shall contain:

- the list of EPS Bearer Ids received from the MME;
- the PGW S8-C F-TEID received from the MME;
- the hoPreparationIndication IE set to "true", to indicate that a handover preparation is in progress and the PGW-C/SMF shall not switch the DL user plane of the PDU session yet.

2a. Same as step 2 of Figure 5.2.2.7.1-1, with the following modifications.

If the SMF finds a corresponding PDU session based on the EPS Bearer Ids and PGW S8-C F-TEID received in the request, and if it can proceed with the procedure, the SMF shall return a 201 Created response including the following information:

- PDU Session ID corresponding to the EPS PDN connection;
- other PDU session parameters, such as PDU Session Type, Session AMBR, QoS flows information;
- optional udmGroupId, containing the identity of the UDM group serving the UE, to facilitate the UDM selection at the target AMF. The V/I-SMF shall forward this IE in the SmContextCreatedData to the target AMF.
- optional pcfGroupId, containing the identity of the PCF group for Session Management Policy for the PDU session, to facilitate the PCF selection at the target AMF. The V/I-SMF shall forward this IE in the SmContextCreatedData to the target AMF.

The SMF shall not switch the DL user plane of the PDU session, if the hoPreparationIndication IE was set to "true" in the request.

NOTE: The behaviour specified in this step also applies if the POST request collides with an existing PDU session context, i.e. if the POST request includes the same SUPI, or PEI for an emergency registered UE without a UICC or without an authenticated SUPI, and the received EPS bearer ID is the same as in the existing PDU session context.

2b. Same as step 2b of Figure 5.2.2.7.1-1, with the following additions.

If the H-SMF determines that seamless session continuity from EPS to 5GS is not supported for the PDU session, the H-SMF shall set the "cause" attribute in the ProblemDetails structure to "NO_EPS_5GS_CONTINUITY".

5.2.2.7.4 N2 Handover Preparation with I-SMF Insertion

The requirements specified in clause 5.2.2.7.1 shall apply with the following modifications.

1. Same as step 1 of Figure 5.2.2.7.1-1, with the following modifications.

The POST request shall contain:

- the hoPreparationIndication IE set to "true", to indicate that a handover preparation is in progress and the SMF shall not switch the DL user plane of the PDU session yet.

2a. Same as step 2 of Figure 5.2.2.7.1-1, with the following modifications:

The SMF shall not switch the DL user plane of the PDU session, if the hoPreparationIndication IE was set to "true" in the request.

5.2.2.7.5 Xn Handover with I-SMF Insertion

The requirements specified in clause 5.2.2.7.1 shall apply with the following modifications.

1. Same as step 1 of Figure 5.2.2.7.1-1, with the following modifications.

The POST request shall contain:

- the upSecurityInfo IE, if received from the AMF.

2a. Same as step 2 of Figure 5.2.2.7.1-1, with the following modifications:

The SMF shall verify that the upSecurity IE included in the received upSecurityInfo IE is same as the security policy for integrity protection and encryption that the SMF has locally stored. If there is a mismatch, the SMF shall send its locally stored security policy for integrity protection and encryption in upSecurity IE to NG-RAN as specified in clause 6.6.1 of 3GPP TS 33.501 [17].

5.2.2.7.6 UE Triggered Service Request with I-SMF Insertion

The requirements specified in clause 5.2.2.7.1 shall apply with the following modifications.

1. Same as step 1 of Figure 5.2.2.7.1-1, with the following modifications.

The POST request shall additionally contain:

- the upCnxState IE set to ACTIVATING to indicate that User Plane resource for the PDU Session is going to be established by the I-SMF.

2a. Same as step 2 of Figure 5.2.2.7.1-1, with the following modifications:

The SMF shall behave as specified in clause 4.23.4.3 (step 8a) of 3GPP TS 23.502 [3].

The SMF handling of a subsequent Update request with the upCnxState IE set to ACTIVATED is specified in step 3 of clause 5.2.2.8.2.23.

NOTE: The upCnxState IE set to ACTIVATING implements the "Operation Type" parameter set to "UP Activate" specified in clause 4.23.4.3 (step 8a) in 3GPP TS 23.502 [3].

5.2.2.8 Update service operation

5.2.2.8.1 General

The Update service operation shall be used for HR PDU sessions or for PDU sessions involving an I-SMF to:

- update an individual PDU session in the H-SMF or SMF and/or provide the H-SMF or SMF with information received by the V-SMF or I-SMF in N1 SM signalling from the UE;
- update a MA PDU session to indicate an additional access type, if the UE requests establishment of MA PDU session via the other access after the UE is registered to both 3GPPP access and non-3GPP access and the MA PDU session was successfully established on the first access (see clause 4.22.2.2 of 3GPP TS 23.502 [3]);
- release a MA PDU session over a single access in the H-SMF or SMF;
- update an individual PDU session in the V-SMF or I-SMF and/or provide information necessary for the V-SMF or I-SMF to send N1 SM signalling to the UE.

It is invoked by the V-SMF or I-SMF in the following procedures:

- UE or network (e.g. V-SMF, I-SMF) requested PDU session modification (see clauses 4.3.3.3 and 4.23.5.3 of 3GPP TS 23.502 [3]);
- UE or network (e.g. AMF, V-SMF, I-SMF) requested PDU session release (see clause 4.3.4.3 of 3GPP TS 23.502 [3]);
- UE or network (e.g. AMF, V-SMF, I-SMF) initiated MA PDU session release over a single access (see clause 4.22 of 3GPP TS 23.502 [3]);
- EPS to 5GS handover execution using N26 interface (see clause 4.11 of 3GPP TS 23.502 [3]);
- Handover between 3GPP and untrusted or trusted non-3GPP access procedures (see clauses 4.9.2 and 4.9.3 of 3GPP TS 23.502 [3]), without AMF change or with target AMF in same PLMN;
- All procedures requiring to provide the H-SMF or SMF with information received by the V-SMF or I-SMF in N1 SM signalling from the UE to the H-SMF or SMF;
- Secondary RAT Usage Data Reporting (see clause 4.21 of 3GPP TS 23.502 [3]);
- UPF anchored Mobile Originated Data Transport in Control Plane CIoT 5GS Optimisation (see clause 4.24.1 of 3GPP TS 23.502 [3]);
- Connection Resume in CM-IDLE with Suspend procedure (see clause 4.8.2.3 of 3GPP TS 23.502 [3]);
- Reporting of satellite backhaul change to SMF (see clause 5.43.4 of 3GPP TS 23.501 [2]);
- UE Triggered Service Request without I-SMF/V-SMF change/removal (see clause 4.23.4.2 of 3GPP TS 23.502 [2]) or UE Triggered Service Request with I-SMF/V-SMF change or with I-SMF insertion (see clause 4.23.4.3 of 3GPP TS 23.502 [2] and clause 6.10.2.4 of 3GPP TS 23.548 [39]);

- Remote UE Report during 5G ProSe Communication via 5G ProSe Layer-3 UE-to-Network Relay without N3IWF (see clause 6.5.1.1 of 3GPP TS 23.304 [43];
- Support of Network Slice Replacement (see clause 5.15.19 of 3GPP TS 23.501 [2]);
- N2-based handover with V-SMF insertion/change or without V-SMF change in HR-SBO case (see clauses 6.7.2.6 and 6.7.2.8 of 3GPP TS 23.548 [39]);
- Inter V-SMF mobility registration update in HR-SBO (see clause 6.7.2.7 of 3GPP TS 23.548 [39]);
- Xn Handover with or without V-SMF change in HR-SBO case (see clauses 6.7.2.9 and 6.7.2.10 of 3GPP TS 23.548 [39]);
- AMF correlated UDM Re-Discovery for UDR Restoration during Subscription Data Migration (see clause 6.7.3 of 3GPP TS 23.527 [24]);
- Network triggered EAS rediscovery and edge relocation in HR-SBO context procedure (see clause 6.7.3.2 of 3GPP TS 23.548 [39]);
- AMF indication of AMF Data Restoration resynchronization is initiated (see clause 6.7.4 of 3GPP TS 23.527 [24]).

It is invoked by the I-SMF in the following procedures:

- Addition of PDU Session Anchor and Branching Point or UL CL controlled by I-SMF (see clause 4.23.9.1 of 3GPP TS 23.502 [3]);
- Removal of PDU Session Anchor and Branching Point or UL CL controlled by I-SMF (see clause 4.23.9.2 of 3GPP TS 23.502 [3]);
- Change of PDU Session Anchor for IPv6 multi-homing or UL CL controlled by I-SMF (see clause 4.23.9.3 of 3GPP TS 23.502 [3]);
- Sending by I-SMF of N4 notifications related with traffic usage reporting (see clause 5.34.6 of 3GPP TS 23.501 [2]);
- Simultaneous change of Branching Point or UL CL and additional PSA controlled by I-SMF (see clause 4.23.9.4 of 3GPP TS 23.502 [3]);
- Simultaneous change of Branching Points or UL CLs controlled by different I-SMFs (see clause 4.23.9.5 of 3GPP TS 23.502 [3]).

It is invoked by the H-SMF or SMF in the following procedures:

- Network (e.g. H-SMF, SMF) requested PDU session modification (see clauses 4.3.3.3 and 4.23.5.3 of 3GPP TS 23.502 [3]);
- Network (e.g. H-SMF, SMF) requested PDU session release (see clause 4.3.4.3 of 3GPP TS 23.502 [3]);
- Network (e.g. H-SMF, SMF) initiated MA PDU session release over a single access (see clause 4.22 of 3GPP TS 23.502 [3]);
- All procedures requiring to provide information necessary for the V-SMF or I-SMF to send N1 SM signalling to the UE;
- EPS Bearer ID allocation or revocation (see clauses 4.11.1.4.1 and 4.11.1.4.3 of 3GPP TS 23.502 [3]);
- Secondary authorization/authentication by an DN-AAA server (see clause 4.3.2.3 of of 3GPP TS 23.502 [3]);
- Network triggered EAS rediscovery and edge relocation in HR-SBO context procedure (see clause 6.7.3.2 of 3GPP TS 23.548 [39]).

It is invoked by the SMF in the following procedures:

- Addition of PDU Session Anchor and Branching Point or UL CL controlled by I-SMF (see clause 4.23.9.1 of 3GPP TS 23.502 [3]);

- Removal of PDU Session Anchor and Branching Point or UL CL controlled by I-SMF (see clause 4.23.9.2 of 3GPP TS 23.502 [3]);
- Change of PDU Session Anchor for IPv6 multi-homing or UL CL controlled by I-SMF (see clause 4.23.9.3 of 3GPP TS 23.502 [3]);
- Policy update procedures with an I-SMF (see clause 4.23.6.2 of 3GPP TS 23.502 [3]);
- Simultaneous change of Branching Point or UL CL and additional PSA controlled by I-SMF (see clause 4.23.9.4 of 3GPP TS 23.502 [3]);
- Simultaneous change of Branching Points or UL CLs controlled by different I-SMFs (see clause 4.23.9.5 of 3GPP TS 23.502 [3]).

5.2.2.8.2 Update service operation towards H-SMF or SMF

5.2.2.8.2.1 General

The NF Service Consumer (i.e. the V-SMF for a HR PDU session, or the I-SMF for a PDU session with an I-SMF) shall update a PDU session in the H-SMF or SMF and/or provide the H-SMF or SMF with information received by the NF Service Consumer in N1 SM signalling from the UE, by using the HTTP POST method (modify custom operation) as shown in Figure 5.2.2.8.2-1.

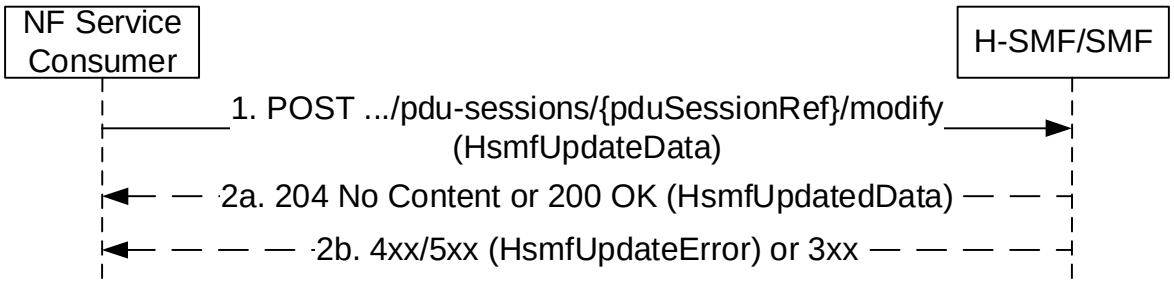

Figure 5.2.2.8.2-1: PDU session update towards H-SMF or SMF

1. The NF Service Consumer shall send a POST request to the resource representing the individual PDU session resource in the H-SMF or SMF. The content of the POST request shall contain:

   - the requestIndication IE indicating the request type. Unless specified otherwise in clause 5.2.2.8.2, the value of the requestIndication IE shall be set to NW_REQ_PDU_SES_MOD;
   - the modification instructions and/or the information received by the NF Service Consumer in N1 signalling from the UE.

   The NF service consumer shall not include the hoPreparationIndication IE with the value "false" in procedures other than handover execution, cancel and failure procedures.

   If the pending update information list was previously received from the (H-)SMF, the NF service consumer should not send a request to the (H-)SMF including only the information elements indicated by the pending update information list. The change(s) of the indicated information elements may be piggybacked in a subsequent update to the (H-)SMF together with other information elements.

   For a HR-SBO session, the content of the POST request may further contain:

   - the hrsboInfo IE including the HR-SRO information sent from the VPLMN when the V-SMF requests HR SBO authorization.
   - the ecsAddrConfigInfos IE including the ECS Address Configuration information if the information is modified by the NEF.

   For a PDU session with an I-SMF, the content of the POST request may further contain:

   - the localOffloadMgtInfo IE including the information sent to the SMF for I-SMF based Local Offloading Management.

2a. On success, "204 No Content" or "200 OK" shall be returned; in the latter case, the content of the POST response shall contain the representation describing the status of the request and/or information necessary for the NF Service Consumer to send N1 SM signalling to the UE. If the PDU session may be moved to EPS with N26 and the EPS PDN Connection Context information of the PDU session is changed, e.g. due to a new anchor SMF is reselected, the content shall include the "epsPdnCnxInfo" IE including the updated EPS PDN Connection Context information. The NF Service consumer shall overwrite the locally stored EPS PDN Connection Context information with the new one if received.

For a HR-SBO session, the content of the POST response may also contain the hrsboInfo IE including the HR-SBO information sent from the HPLMN, e.g., hrsboAuthResult.

For a PDU session with an I-SMF, the content of the POST response may also contain the localOffloadMgtInfo IE including the information sent to the I-SMF for I-SMF based Local Offloading Management.

2b. On failure or redirection, one of the HTTP status codes listed in Table 6.1.3.6.4.2.2-2 shall be returned. For a 4xx/5xx response, the message body shall contain an HsmfUpdateError structure, including:

- a ProblemDetails structure with the "cause" attribute set to one of the application errors listed in Table 6.1.3.6.4.2.2-2;
- the n1SmCause IE with the 5GSM cause the H-SMF or SMF proposes the NF Service Consumer to return to the UE, if the request included n1SmInfoFromUe;
- n1SmInfoToUe binary data, if the H-SMF or SMF needs to return NAS SM information which the NF Service Consumer does not need to interpret;
- the procedure transaction id that was received in the request, if this is a response sent to a UE requested PDU session modification.

If the H-SMF or SMF receives the hoPreparationIndciation IE set to "false" value in step 1, while it did not receive the hoPreparationIndication IE set to "true" value in previous steps (see clauses 5.2.2.7.3 and 5.2.2.7.4), the H-SMF or SMF shall ignore the hoPreparationIndication IE with "false" value and proceed with the processing of the request.

5.2.2.8.2.2 UE or network (e.g. AMF, V-SMF, I-SMF) requested PDU session modification

The requirements specified in clause 5.2.2.8.2.1 shall apply with the following modifications.

1. Same as step 1 of Figure 5.2.2.8.2-1, with the following modifications.

   The POST request shall contain:

   - the requestIndication set to UE_REQ_PDU_SES_MOD, and the modifications requested by the UE, e.g. UE requested QoS rules or UE requested Qos flow descriptions, in an N1 SM container IE as specified in clause 5.2.3.1, or indication that the PDU session is allowed to be upgraded to a MA PDU session as specified in clause 6.4.2.2 of 3GPP TS 24.501 [7], for a UE requested PDU session modification; or
   - the requestIndication set to NW_REQ_PDU_SES_MOD, and the modifications requested by the visited network or the notifications initiated by the visited network, for a visited network requested PDU session modification, e.g. to:
     - report the release of QoS flow(s);
     - notify QoS flow(s) whose QoS targets are no longer fulfilled or can again be fulfilled:
       - For Notification control without Alternative QoS Profiles (see clause 5.7.2.4.1a of 3GPP TS 23.501 [2]), the V-SMF/I-SMF shall report that QoS targets are no longer fulfilled by setting the notificationCause IE in QosFlowNotifyItem to QOS_NOT_FULFILLED, QOS_NOT_FULFILLED_DL or QOS_NOT_FULFILLED_UL as indicated by the NG-RAN;
       - For Notification control with Alternative QoS Profiles (see clause 5.7.2.4.1b of 3GPP TS 23.501 [2]), the V-SMF/I-SMF shall report that QoS targets are no longer fulfilled by setting the notificationCause IE in QosFlowNotifyItem to QOS_NOT_FULFILLED as indicated by the NG-RAN; in this case, the V-SMF/I-SMF may also report an alternative QoS profile which the NG-RAN can currently fulfil in

the currentQosProfileIndex IE or report that the NG-RAN cannot even fulfil the lowest alternative QoS profile by setting the nullQoSProfileIndex IE to "true" for the corresponding Qos flow(s);

- the V-SMF/I-SMF shall report that QoS targets can again be fulfilled by setting the notificationCause IE in QosFlowNotifyItem to QOS_FULFILLED as indicated by the NG-RAN.

- report that the user plane security enforcement with a value Preferred is not fulfilled or is fulfilled again, in the NotifyList IE and the securityResult IE, if the new security status is received from NG-RAN;

- report that access type of the PDU session can be changed; in this case, the anTypeCanBeChanged attribute shall be set to "true";

- report the "MO Exception Data Counter";

- request for QoS modification initiated by VPLMN, if the H-SMF supports the VPLMN QoS (VQOS) feature; and/or

- report the QoS flow(s) that are rejected by the RAN or rejected by the V-SMF, during PDU session establishment procedure; in the latter case, the V-SMF may also include the qosFlowsVsmfRejectedList IE with the QoS flow(s) that are rejected by the V-SMF.

If the update is performed to transfer the PDU Session from non-3gpp access to 3gpp access by setting the attribute anTypeCanBeChanged to "true", the SMF may perform Network Slice Admission Control before the PDU Session is moved to 3GPP access (i,e, before N3/N9 tunnel for the PDU Session is established).

5.2.2.8.2.3 UE requested PDU session release

The requirements specified in clause 5.2.2.8.2.1 shall apply with the following modifications.

1. Same as step 1 of Figure 5.2.2.8.2-1, with the following modifications.

   The POST request shall contain:

   - the requestIndication set to UE_REQ_PDU_SES_REL.

5.2.2.8.2.4 EPS to 5GS Handover Execution

The requirements specified in clause 5.2.2.8.2.1 shall apply with the following modifications.

1. Same as step 1 of Figure 5.2.2.8.2-1, with the following modifications.

   The POST request shall contain:

   - the requestIndication set to PDU_SES_MOB;

   - the list of EPS Bearer Ids successfully handed over to 5GS;

   - the vcnTunnelInfo IE or icnTunnelInfo IE with the DL N9 tunnel CN information of the UPF controlled by the V-SMF or I-SMF respectively;

   - the hoPreparationIndication IE set to "false", to indicate that there is no handover preparation in progress anymore and that the PGW-C/SMF shall switch the DL user plane of the PDU session;

   - one or more SecondaryRatUsageDataReportContainer(s) if it received the same in the SmContextUpdateData from the AMF.

2. Same as step 2 of Figure 5.2.2.8.2-1, with the following modifications.

   The H-SMF or SMF shall return a 200 OK response. The H-SMF or SMF shall switch the DL user plane of the PDU session using the N9 tunnel information that has been received in the vcnTunnelInfo or icnTunnelInfo, if the hoPreparationIndication IE was set to "false" in the request.

If the handover preparation failed (e.g. the target 5G-AN failed to establish resources for the PDU session), the requirements specified in clause 5.2.2.8.2.1 shall apply with the following modifications.

1. Same as step 1 of Figure 5.2.2.8.2-1, with the following modifications.

The POST request shall contain:

- the requestIndication set to PDU_SES_MOB;
- the cause attribute set to "HO_FAILURE";
- an empty list of EPS Bearer Ids;
- the vcnTunnelInfo IE or icnTunnelInfo IE with the DL N9 tunnel CN information of the UPF controlled by the V-SMF or I-SMF respectively;
- the NotifyList IE with the cause set to "UP_SEC_NOT_FULFILLED", if the PDU Session was rejected by the Target NG-RAN because the User Plane Security Enforcement is not supported in the Target NG-RAN and the User Plane Enforcement Policy indicates "Required"; and
- the hoPreparationIndication IE set to "false", to indicate that there is no handover preparation in progress anymore.

2. Same as step 2 of Figure 5.2.2.8.2-1, with the following modifications.

   The H-SMF or SMF shall return a 200 OK response. If the H-SMF or SMF decides to keep the PDU session, the H-SMF or SMF shall switch the DL user plane of the PDU session using the N9 tunnel information that has been received in the vcnTunnelInfo or icnTunnelInfo; otherwise the H-SMF or SMF should trigger the PDU session release as specified in clause 5.2.2.8.3.3.

5.2.2.8.2.5 Handover between 3GPP access and untrusted or trusted non-3GPP access

For Handover between 3GPP access and untrusted or trusted non-3GPP access procedures, without AMF change or with the target AMF in the same PLMN, the requirements specified in clause 5.2.2.8.2.1 shall apply with the following modifications.

1. Same as step 1 of Figure 5.2.2.8.2-1, with the following modifications.

   The POST request shall contain the anType set to the target access type, i.e. to 3GPP_ACCESS or NON_3GPP_ACCESS.

   The requestIndication IE shall be set to PDU_SES_MOB.

   For a handover from non-3GPP access to 3GPP access with a V-SMF change, the requirements specified in step 1 of clause 5.2.2.8.2.10, other than how to set the requestIndication, shall also apply.

2a. Same as step 2a of Figure 5.2.2.8.2-1, with the following modifications.

   The content of the POST response shall include:

   - all QoS information for the QoS Flow(s) applicable to the PDU Session for the target access type, so that when sending the PDU Session Establishment Accept, the V-SMF or I-SMF can include all QoS information (e.g. QoS Rule(s) in N1 SM container, QFI(s) and QoS Profile(s) in N2 SM information) for the QoS Flow(s) (acceptable according to VPLMN policies for a HR PDU session); and
   - the epsPdnCnxInfo IE and, for each EPS bearer, an epsBearerInfo IE, if the PDU session may be moved to EPS during its lifetime, for a handover from non-3GPP access to 3GPP access.

   The content of the POST response may also contain the upSecurity, maxIntegrityProtectedDataRateUl and maxIntegrityProtectedDataRateDl IEs during a handover from non-3GPP access to 3GPP access.

   For a handover from non-3GPP access to 3GPP access with a V-SMF change, the requirements specified in step 2 of clause 5.2.2.8.2.10 shall also apply.

   Upon receipt of the 200 OK response, the V-SMF or I-SMF shall delete any above information received earlier for the source access type and use the new information received for the target access type (see clause 6.1.6.2.12).

NOTE: As specified in clause 4.11.1.4.3 of 3GPP TS 23.502 [3], the AMF, the SMF and the UE release locally the EBI(s) allocated to a PDU Session handed over from 3GPP access to non-3GPP access.

For a handover from non-3GPP access to 3GPP access, if the PDU session may be moved to EPS during its lifetime, the H-SMF or SMF may send an Update Request towards the V-SMF or I-SMF to request the allocation of EBIs prior to step 2a.

If one or more requested QoS flow(s) fail to be established in the target access type, the V-SMF or I-SMF shall send an Update Request including the qosFlowsRelNotifyList attribute to report the failure to the H-SMF or SMF (see clause 5.2.2.8.2.2), or a Release Request to release the PDU session if no QoS flow can be established (see clause 5.2.2.9).

The SMF may perform Network Slice Admission Control for the target access and reject the request when the NSAC has failed for the target access.

5.2.2.8.2.6 P-CSCF Restoration Procedure via AMF

The requirements specified in clause 5.2.2.8.2.1 shall apply with the following modifications.

1. Same as step 1 of Figure 5.2.2.8.2-1, with the following modifications:

   The POST request shall contain:

   - the requestIndication IE set to NW_REQ_PDU_SES_REL;
   - the cause IE set to REL_DUE_TO_REACTIVATION.

5.2.2.8.2.7 Addition of PSA and BP or UL CL controlled by I-SMF

This clause applies only in case of non-roaming or LBO roaming as control of an UL CL or BP in VPLMN is not supported in HR roaming case (see clause 5.34.4 of 3GPP TS 23.501 [2]).

An I-SMF and I-UPF have already been inserted for the PDU session.

The requirements specified in clause 5.2.2.8.2.1 shall apply with the following modifications.

1. Same as step 1 of Figure 5.2.2.8.2-1, with the following modifications:

   The POST request shall contain:

   - the requestIndication IE set to NW_REQ_PDU_SES_MOD;
   - the indication that an UL CL or BP has been inserted into the data path of the PDU session;
   - the list of DNAIs supported by the inserted PSA;
   - the new UE IPv6 prefix at the PSA, assigned by the I-SMF or by the UPF supporting the PSA, if IPv6 multi-homing applies to the PDU session;
   - the icnTunnelInfo with the N9 tunnel information of the UL CL or BP for the downlink traffic, if a UPF different from the earlier I-UPF is selected for the UL CL or BP.

2a. Same as step 2a of Figure 5.2.2.8.2-1.

5.2.2.8.2.8 Removal of PSA and BP or UL CL controlled by I-SMF

This clause applies only in case of non-roaming or LBO roaming as control of an UL CL or BP in VPLMN is not supported in HR roaming case (see clause 5.34.4 of 3GPP TS 23.501 [2]).

The requirements specified in clause 5.2.2.8.2.1 shall apply with the following modifications.

1. Same as step 1 of Figure 5.2.2.8.2-1, with the following modifications:

   The POST request shall contain:

   - the requestIndication IE set to NW_REQ_PDU_SES_MOD;
   - the indication that an UL CL or BP has been removed from the data path of the PDU session;

- the removed UE IPv6 prefix at the PSA, if IPv6 multi-homing applies to the PDU session;
- the list of DNAIs supported by the removed PSA;
- the icnTunnelInfo with the N9 tunnel information of the I-UPF for the downlink traffic.

2a. Same as step 2a of Figure 5.2.2.8.2-1.

5.2.2.8.2.9 Change of PSA for IPv6 multi-homing or UL CL controlled by I-SMF

This clause applies only in case of non-roaming or LBO roaming as control of an UL CL or BP in VPLMN is not supported in HR roaming case (see clause 5.34.4 of 3GPP TS 23.501 [2]).

The requirements specified in clause 5.2.2.8.2.1 shall apply with the following modifications.

1. Same as step 1 of Figure 5.2.2.8.2-1, with the following modifications:

   The POST request shall contain:

   - the requestIndication IE set to NW_REQ_PDU_SES_MOD;
   - the indication that a PSA is removed and another PSA is inserted;
   - the list of DNAIs supported by the inserted PSA;
   - the new UE IPv6 prefix at the inserted PSA, assigned by the I-SMF or by the UPF supporting the PSA, if IPv6 multi-homing applies to the PDU session;
   - the removed UE IPv6 prefix at the removed PSA, if IPv6 multi-homing applies to the PDU session;
   - the list of DNAIs supported by the removed PSA.

2a. Same as step 2a of Figure 5.2.2.8.2-1.

5.2.2.8.2.10 PDU Session modification with I-SMF or V-SMF change

During PDU Session modification with I-SMF or V-SMF change, the NF Service Consumer (i.e. the new V-SMF for a HR PDU session, or the new I-SMF for a PDU session with an I-SMF) shall update the PDU session in the H-SMF or SMF and provide the information of the new I-SMF or V-SMF.

The requirements specified in clause 5.2.2.8.2.1 shall apply with the following modifications.

1. Same as step 1 of Figure 5.2.2.8.2-1, with the following additions:

   The POST request shall contain:

   - the requestIndication set to NW_REQ_PDU_SES_MOD or UE_REQ_PDU_SES_MOD for network requested or UE requested PDU session modification respectively;
   - the ismfPduSessionUri or vsmfPduSessionUri IE containing the callback URI ({vsmfPduSessionUri} or {ismfPduSessionUri}) representing the PDU session in the new I-SMF or new V-SMF. The H-SMF or SMF shall construct the callback URIs based on the received {vsmfPduSessionUri} or {ismfPduSessionUri} as defined in clause 6.1, e.g. the callback URI "{vsmfPduSessionUri}/modify" to modify a PDU session in the V-SMF;
   - the ismfId or vsmfId IE containing the identifier of the new I-SMF or new V-SMF;
   - optionally the iSmfServiceInstanceId or vSmfServiceInstanceId IE containing the serviceInstanceId of the new I-SMF or new V-SMF service instance serving the PDU session;
   - the disasterRoamingInd IE set to true if the V-SMF is indicated by the AMF that the UE is registered for Disaster Roaming service;
   - the supportedFeatures IE indicating the features the NF Service Consumer supports, if at least one feature defined in clause 6.1.8 is supported.

2. Same as step 1 of Figure 5.2.2.8.2-1, the SMF shall replace the corresponding information for the old I-SMF or old V-SMF stored locally with the received information. In addition, the SMF shall include the supportedFeatures IE in the response, if the supportedFeatures IE was received in the request and at least one feature defined in clause 6.1.8 is supported by the updated PDU session resource.

5.2.2.8.2.11 Sending by I-SMF of N4 notifications related with traffic usage reporting

This clause applies only in case of non-roaming or LBO roaming as control of an UL CL or BP in VPLMN is not supported in HR roaming case (see clause 5.34.4 of 3GPP TS 23.501 [2]).

The requirements specified in clause 5.2.2.8.2.1 shall apply with the following modifications.

1. Same as step 1 of Figure 5.2.2.8.2-1, with the following modifications:

   The POST request shall contain:

   - the requestIndication IE set to NW_REQ_PDU_SES_MOD;

   - N4 information related with traffic usage reporting (i.e. PFCP Session Report Request, see Annex D of 3GPP TS 29.244 [29]);

   - the DNAI related to the N4 information if the latter relates to a local PSA;

2a. Same as step 2a of Figure 5.2.2.8.2-1, with the following modifications:

   The content of the POST response shall contain:

   - N4 response information (i.e. PFCP Session Report Response);

   - the DNAI related to the N4 information if the latter relates to a local PSA.

5.2.2.8.2.12 N2 Handover Execution with I-SMF Insertion

The requirements specified in clause 5.2.2.8.2.1 shall apply with the following modifications.

1. Same as step 1 of Figure 5.2.2.8.2-1, with the following modifications.

   The POST request shall contain:

   - the requestIndication set to NW_REQ_PDU_SES_MOD;

   - the hoPreparationIndication IE set to "false", to indicate that there is no handover preparation in progress anymore and that the SMF shall switch the DL user plane of the PDU session;

   - the qosFlowsRelNotifyList IE indicating the failed QoS flow(s), if one or more QoS flow(s) cannot be established at the target RAN.

2. Same as step 2 of Figure 5.2.2.8.2-1, with the following modifications.

   The SMF shall return a 200 OK response. The SMF shall switch the DL user plane of the PDU session using the N9 tunnel information that has been received in the icnTunnelInfo, if the hoPreparationIndication IE was set to "false" in the request.

If the handover preparation failed (e.g. the target 5G-AN failed to establish resources for the PDU session), the requirements specified in clause 5.2.2.8.2.1 shall apply with the following modifications.

1. Same as step 1 of Figure 5.2.2.8.2-1, with the following modifications.

   The POST request shall contain:

   - the requestIndication set to NW_REQ_PDU_SES_MOD;

   - the cause attribute set to "HO_FAILURE";

- the NotifyList IE with the cause set to "UP_SEC_NOT_FULFILLED", if the PDU Session was rejected by the Target NG-RAN because the User Plane Security Enforcement is not supported in the Target NG-RAN and the User Plane Enforcement Policy indicates "Required"; and
- the hoPreparationIndication IE set to "false", to indicate that there is no handover preparation in progress anymore.

2. Same as step 2 of Figure 5.2.2.8.2-1, with the following modifications.

   The SMF shall return a 200 OK response or a 204 No Content response. If the SMF decides to keep the PDU session, the SMF shall switch the DL user plane of the PDU session using the N9 tunnel information that has been received in the icnTunnelInfo during the handover preparation; otherwise the SMF should trigger the PDU session release as specified in clause 5.2.2.8.3.3.

5.2.2.8.2.13 N2 Handover Cancellation with I-SMF Insertion

For handover cancellation, the requirements specified in clause 5.2.2.8.2.1 shall apply with the following modifications.

1. Same as step 1 of Figure 5.2.2.8.2-1, with the following modifications.

   The POST request shall contain:

   - the requestIndication set to NW_REQ_PDU_SES_MOD;
   - the cause attribute set to "HO_CANCEL";
   - the hoPreparationIndication IE set to "false", to indicate that there is no handover preparation in progress anymore.

2. Same as step 2 of Figure 5.2.2.8.2-1, with the following modifications.

   The SMF shall return a 200 OK response or a 204 No Content response. The SMF shall release the resources prepared for the handover.

5.2.2.8.2.14 EPS to 5GS Handover Cancellation

If the handover cancellation, the requirements specified in clause 5.2.2.8.2.1 shall apply with the following modifications.

1. Same as step 1 of Figure 5.2.2.8.2-1, with the following modifications.

   The POST request shall contain:

   - the requestIndication set to PDU_SES_MOB;
   - the cause attribute set to "HO_CANCEL";
   - an empty list of EPS Bearer Ids;
   - the hoPreparationIndication IE set to "false", to indicate that there is no handover preparation in progress anymore.

2. Same as step 2 of Figure 5.2.2.8.2-1, with the following modifications.

   The H-SMF or SMF shall return a 200 OK response or a 204 No Content response. The H-SMF or SMF shall release the resources prepared for the handover. The combined PGW-C+SMF shall not release the PDN connection that was attempted to be handed over.

5.2.2.8.2.15 5G-AN requested PDU session resource release

This clause applies only in case of 5G-AN requested PDU session resource release by sending the NGAP PDU SESSION RESOURCE NOTIFY to the AMF case (see step 1d in clause 4.3.4.3 of 3GPP TS 23.502 [3]).

The requirements specified in clause 5.2.2.8.2.1 shall apply with the following modifications.

1. Same as step 1 of Figure 5.2.2.8.2-1, with the following modifications.

The POST request shall contain:

- the requestIndication set to REL_DUE_TO_5G_AN_REQUEST to indicate that the PDU session resource has been released by the 5G-AN.

After receving the request, the SMF may decide to keep the PDU Session (with user plane connection deactivated) or release the PDU Session. If the SMF decides to keep the PDU Session, it shall return "200 OK" not including *n1SmInfoToUe*. If the SMF decides to release the PDU Session, it shall return "200 OK" including *n1SmInfoToUe* binary data containing the Message Type "PDU Session Release Command" and possibly PCO and cause information.

5.2.2.8.2.16 Xn Handover with or without I-SMF or V-SMF Change

The requirements specified in clause 5.2.2.8.2.1 shall apply with the following modifications.

1. Same as step 1 of Figure 5.2.2.8.2-1, with the following modifications.

   The POST request shall contain:

   - the upSecurityInfo IE, if received from the NG-RAN;
   - the qosFlowsRelNotifyList IE indicating the failed QoS flow(s), if one or more QoS flow(s) cannot be established at the target RAN.

   For an Xn handover with an I-SMF or V-SMF change, the requirements specified in step 1 of clause 5.2.2.8.2.10, other than how to set the requestIndication, shall also apply.

2. Same as step 2 of Figure 5.2.2.8.2-1, with the following modifications.

   The SMF shall verify that the upSecurity IE included in the received upSecurityInfo IE is same as the security policy for integrity protection and encryption that the SMF has locally stored. If there is a mismatch, the SMF shall send its locally stored security policy for integrity protection and encryption in upSecurity IE to NG-RAN as specified in clause 6.6.1 of 3GPP TS 33.501 [17].

   For an Xn handover with an I-SMF or V-SMF change, the requirements specified in step 2 of clause 5.2.2.8.2.10 shall also apply.

5.2.2.8.2.17 EPS to 5GS Handover Failure

If the handover to 5GS failed, e.g. rejected by the target NG-RAN, the requirements specified in clause 5.2.2.8.2.1 shall apply with the following modifications.

1. Same as step 1 of Figure 5.2.2.8.2-1, with the following modifications.

   The POST request shall contain:

   - the requestIndication set to PDU_SES_MOB;
   - the cause attribute set to "HO_FAILURE";
   - an empty list of EPS Bearer Ids;
   - the hoPreparationIndication IE set to "false", to indicate that there is no handover preparation in progress anymore.

2. Same as step 2 of Figure 5.2.2.8.2-1, with the following modifications.

   The H-SMF or SMF shall return a 200 OK response or a 204 No Content response. The H-SMF or SMF shall release the resources prepared for the handover. The combined PGW-C+SMF shall not release the PDN connection that was attempted to be handed over.

5.2.2.8.2.18 EPS Bearer ID revocation

When the AMF decides to revoke some EBI(s) and the I-SMF or V-SMF receives the request from AMF, the requirements specified in clause 5.2.2.8.2.1 shall apply with the following modifications.

1. Same as step 1 of Figure 5.2.2.8.2-1, with the following modifications.

   The POST request shall contain:

   The requestIndication shall be set to EBI_ASSIGNMENT_REQ.

   The NF Service Consumer shall include the revokeEbiList IE to request the SMF to release some EBI(s). The SMF shall disassociate the EBI(s) with the QFI(s) with which they are associated.

5.2.2.8.2.19 Network requested PDU session release

The requirements specified in clause 5.2.2.8.2.1 shall apply with the following modifications.

1. Same as step 1 of Figure 5.2.2.8.2-1, with the following modifications.

   The POST request shall contain:

   - the requestIndication set to NW_REQ_PDU_SES_REL.

5.2.2.8.2.20 N2 Handover Execution with or without I-SMF or V-SMF Change

The requirements specified in clause 5.2.2.8.2.1 shall apply with the following modifications.

1. Same as step 1 of Figure 5.2.2.8.2-1, with the following modifications.

   The POST request shall contain:

   - the qosFlowsRelNotifyList IE indicating the failed QoS flow(s), if one or more QoS flow(s) cannot be established at the target RAN.

   For an N2 handover with an I-SMF or V-SMF change, the requirements specified in step 1 of clause 5.2.2.8.2.10, other than how to set the requestIndication, shall also apply.

2. Same as step 2 of Figure 5.2.2.8.2-1, with the following modifications.

   For an N2 handover with an I-SMF or V-SMF change, the requirements specified in step 2 of clause 5.2.2.8.2.10 shall also apply.

5.2.2.8.2.21 Reporting of satellite backhaul change to (H-)SMF

If the V-SMF/I-SMF and the anchor SMF support the 5GSAT feature (see clause 6.1.8), the V-SMF/I-SMF shall report a change of the satellite backhaul category used towards the 5G AN currently serving the UE if:

- the satelliteBackhaulCat IE has been received from the AMF and there is a change of the satelliteBackhaulCat IE compared to what has been signalled earlier to the (H-)SMF (as determined from the SmContext); or

- upon inter-AMF mobility (when a target AMF is taking over the control of the PDU session), the new AMF does not include the satelliteBackhaulCat IE and a satellite backhaul category had been signalled to the SMF (as determined from the SmContext).

To report a change of the satellite backhaul category, the requirements specified in clause 5.2.2.8.2.1 shall apply with the following modifications.

1. Same as step 1 of Figure 5.2.2.8.2-1, with the following modifications.

   The POST request shall contain:

   - the requestIndication IE set to NW_REQ_PDU_SES_MOD, unless specified otherwise in clause 5.2.2.8. if the change of the satelliteBackhaulCat IE is detected during a procedure for which it is requested to report a different requestIndication value; and

   - the satelliteBackhaulCat IE set to the value received from the AMF or, in the latter case, set to the value "NON_SATELLITE" to indicate that there is no longer any satellite backhaul towards the new 5G AN serving the UE.

5.2.2.8.2.22 Simultaneous change of PSA and BP or UL CL controlled by I-SMF

This clause applies only in case of non-roaming or LBO roaming as control of an UL CL or BP in VPLMN is not supported in HR roaming case (see clause 5.34.4 of 3GPP TS 23.501 [2]).

The requirements specified in clause 5.2.2.8.2.1 shall apply with the following modifications.

1. Same as step 1 of Figure 5.2.2.8.2-1, with the following modifications:

   The POST request shall contain:

   - the requestIndication IE set to NW_REQ_PDU_SES_MOD;
   - a PsaInformation corresponding to the new PSA:
     - a PsaIndication set to "PSA_INSERTED";
     - the list of DNAIs supported by the inserted PSA;
     - the new UE IPv6 prefix at the inserted PSA, assigned by the I-SMF or by the UPF supporting the PSA, if IPv6 multi-homing applies to the PDU session;
     - the NF Instance Id of the inserted PSA;
   - a UlclBpInformation corresponding to the new UL CL or BP if it separate from the new PSA:
     - the NF Instance Id of the inserted UL CL or BP;
   - a PsaInformation corresponding to the removed PSA, if either the I-SMF or the SMF does not support the "N9FSC" feature:
     - a PsaIndication set to "PSA_REMOVED";
     - the removed UE IPv6 prefix at the removed PSA, if IPv6 multi-homing applies to the PDU session;
     - the list of DNAIs supported by the removed PSA.

   NOTE: The I-SMF only includes the PsaInformation corresponding to the new PSA and the UlclBpInformation corresponding to the new UL CL or BP during simultaneous change of PSA and BP or UL CL as specified in clause D.2.7 of 3GPP TS 29.244 [29], if both the I-SMF and SMF support the "N9FSC" feature. This enables the SMF to possibly request the I-SMF to apply data forwarding between the old and the new UL CL/BP, in which case the I-SMF later informs the SMF that it has removed the old UL CL/BP and local PSA upon user plane inactivity of the N9 data forwarding tunnel.

2a. Same as step 2a of Figure 5.2.2.8.2-1.

5.2.2.8.2.23 Service Request without I-SMF/V-SMF Change or with I-SMF/V-SMF Change or with I-SMF Insertion

During a Service Request without I-SMF/V-SMF Change or with I-SMF/V-SMF Change or with I-SMF Insertion, the NF Service Consumer (i.e. the V-SMF for a HR PDU session, or the I-SMF for a PDU session with an I-SMF) shall update the PDU session in the H-SMF or SMF as follows:

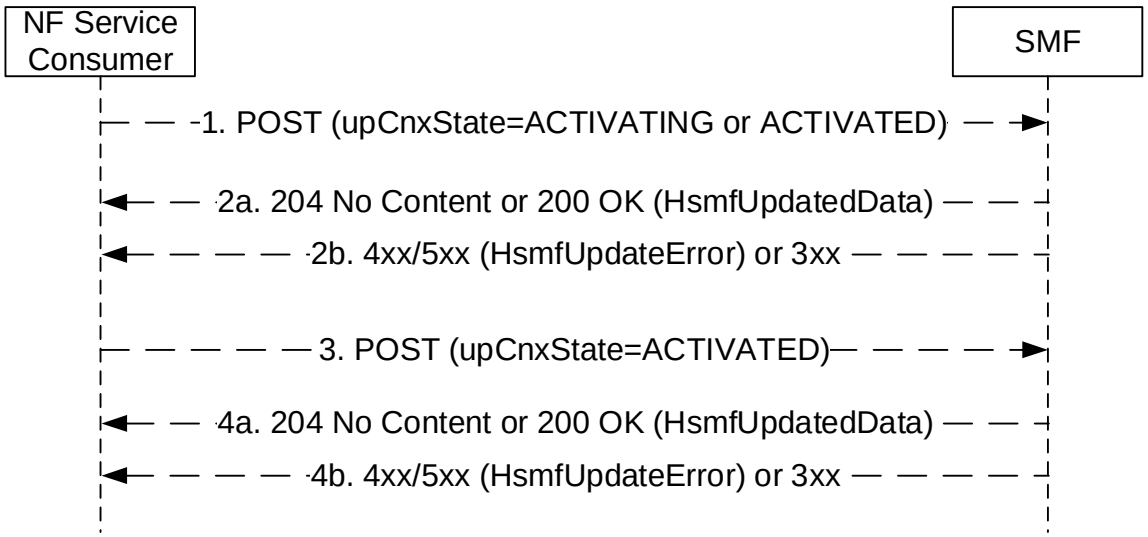

Figure 5.2.2.8.2.23-1: PDU session update towards H-SMF or SMF during Service Request

The requirements specified in clause 5.2.2.8.2.1 shall apply with the following modifications.

1. Same as step 1 of Figure 5.2.2.8.2-1, with the following modifications.

   The POST request shall additionally contain:

   - the upCnxState IE set to ACTIVATING if the User Plane resource for the PDU Session is going to be established by the I-SMF/V-SMF, or set to ACTIVATED if the User Plane resource for the PDU session has been established and the I-SMF/V-SMF has marked that the status of one or more QoS Flow(s) is to be deleted in the 5GC and synchronized with the UE (see clause 4.2.3.2 of 3GPP TS 23.502 [3]).

2a. Same as step 2a of Figure 5.2.2.8.2-1, with the following modifications.

   The SMF shall behave as specified in clauses 4.3.3.3, 4.23.4.2 (step 7a) and 4.23.4.3 (step 8a) of 3GPP TS 23.502 [3].

2b. Same as step 2b of Figure 5.2.2.8.2-1.

3. Same as step 1 of Figure 5.2.2.8.2-1, with the following modifications.

   The POST request shall additionally contain:

   - the upCnxState IE set to ACTIVATED when User Plane resource has been established, if the upCnxState IE with the value ACTIVATING was previously provided to the SMF in the procedure, via a previous Update operation (step 1) or via Create operation for I-SMF/V-SMF insertion (see clause 5.2.2.7.6).

4a. Same as step 2a of Figure 5.2.2.8.2-1, with the following modifications.

   The SMF shall behave as specified in clause as specified in clause 4.23.4.2 (step 16) and clause 4.23.4.3 (step 20a) of 3GPP TS 23.502 [3].

4b. Same as step 2b of Figure 5.2.2.8.2-1.

NOTE: The upCnxState IE set to ACTIVATING or ACTIVATED implements the "Operation Type" parameter set to "UP Activate" or "UP Activated" (respectively) specified in clauses 4.2.3.2, 4.23.4.2 (step 7a, 16) and 4.23.4.3 (step 8a, 20a) in 3GPP TS 23.502 [3].

5.2.2.8.2.24 Remote UE Report during 5G ProSe Communication via 5G ProSe Layer-3 UE-to-Network Relay without N3IWF

The requirements specified in clause 5.2.2.8.2.1 shall apply with the following modifications.

1. Same as step 1 of Figure 5.2.2.8.2-1, with the following modifications.

   The POST request shall contain:

   - the n1SmInfoFromUe IE containing "Remote UE context connected" and/or "Remote UE context disconnected" NAS IE.

5.2.2.8.2.25 AMF correlated UDM Re-Discovery for UDR Restoration during Subscription Data Migration

The requirements specified in clause 5.2.2.8.2.1 shall apply with the following modifications.

1. Same as step 1 of Figure 5.2.2.8.2-1, with the following modifications.

   The POST request shall contain:

   - the new UDM group ID associated to the UE.

If the UDM group ID locally stored is different from the one received for this UE, then the SMF shall overwrite it and use it for the UDM selection. See clause 6.7.3 of 3GPP TS 23.527 [24].

5.2.2.8.2.26 AMF indication of AMF Data Restoration resynchronization is initiated

The requirements specified in clause 5.2.2.8.2.1 shall apply with the following modifications.

1. Same as step 1 of Figure 5.2.2.8.2-1, with the following modifications.

   The POST request shall contain the amfResynchedInd for the affected UE.

The SMF shall check if for the received UE there is a Data Restoration resynchronization pending (as per former reception of Data Restoration Notification from the UDM without the indication that resynchronization is not required). If a Data Restoration resynchronization is pending for the received UE, the SMF performs this UE resynchronization at that moment. Otherwise, if a Data Restoration resynchronization is not pending, the SMF ignores the "amfResynchedInd" indication contained in the request. See clause 6.7.4 of 3GPP TS 23.527 [24].

5.2.2.8.2.27 Update of PDU Session with Non-3GPP Device Connection Information

During a PDU session update where the Non-3GPP device connection information needs to be conveyed, the NF Service Consumer (i.e. the V-SMF for a HR PDU session, or the I-SMF for a PDU session with an I-SMF) shall update the PDU session in the H-SMF or SMF as follows:

The requirements specified in clause 5.2.2.8.2.1 shall apply with the following modifications.

1. Same as step 1 of Figure 5.2.2.8.2-1, with the following addition.

   - The POST request shall additionally contain the Non-3GPP device connection information in n1SmInfoFromUe IE.

The received Non-3GPP device connection information shall overwrite the locally stored one.

5.2.2.8.2.28 Reporting of UpCnxState change to (H-)SMF

If QoS Monitoring for packet delay per QoS flow has been activated for at least one QoS flow of the PDU session and the noQosMonPdWoN3DlTeid IE is set to true for at least one of the QoS flow(s) to be monitored, the I/V-SMF shall invoke the Update service operation and include the UpCnxState IE to report to the (H-)SMF when:

- the corresponding PDU session resource in the NG-RAN has been released, i.e. no N3 NG-RAN DL F-TEID available for transferring DL packets; or

- the corresponding PDU session resource in the NG-RAN has been established, i.e. N3 NG-RAN DL F-TEID is available for transferring DL packets.

So, the (H-)SMF may decide to stop or restart the QoS Monitoring for packet delay in the PSA UPF.

1. Same as step 1 of Figure 5.2.2.8.2-1, with the following modifications.

The POST request shall contain:

- the requestIndication IE set to NW_REQ_PDU_SES_MOD; and
- the upCnxState IE set to "DEACTIVATED" or "ACTIVATED".

5.2.2.8.3 Update service operation towards V-SMF or I-SMF

5.2.2.8.3.1 General

The NF Service Consumer (i.e. the H-SMF for a HR PDU session, or the SMF for a PDU session with an I-SMF) shall update a PDU session in the V-SMF or I-SMF and/or provide information necessary for the V-SMF or I-SMF to send N1 SM signalling to the UE, or request to allocate or revoke EPS Bearer ID(s) for the PDU session, by using the HTTP "modify" custom operation as shown in Figure 5.2.2.8.3.1-1.

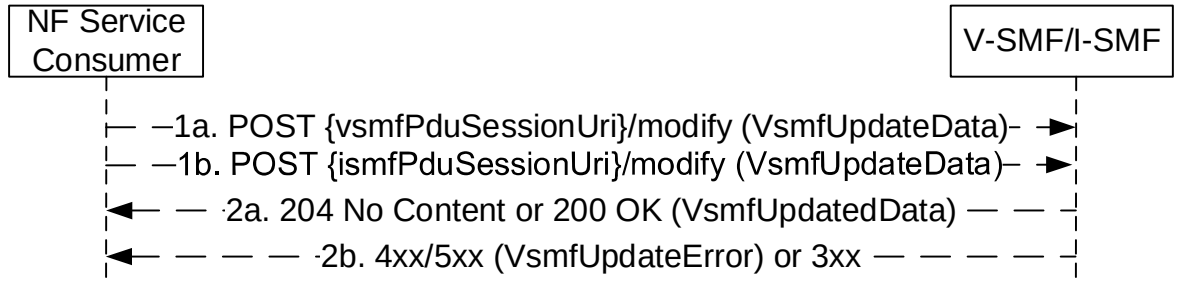

Figure 5.2.2.8.3.1-1: PDU session update towards V-SMF or I-SMF

1. The NF Service Consumer shall send a POST request to the resource representing the individual PDU session resource in the V-SMF or I-SMF. The content of the POST request shall contain:

   - the requestIndication IE indicating the request type, which is set to NW_REQ_PDU_SES_MOD;
   - the modification instructions and/or the information necessary for the V-SMF or I-SMF to send N1 SM signalling to the UE;
   - the hsmfPduSessionUri IE if the Update Request is sent to the V-SMF or I-SMF before the Create Response, and the H-SMF or SMF PDU session resource URI has not been previously provided to the V-SMF or I-SMF; in this case, the supportedFeatures IE shall also be included if at least one feature defined in clause 6.1.8 is supported.

   The content of the POST request may further contain:

   - the (updated) pending update information list.

   If the PDU session may be moved to EPS with N26 and the EPS PDN Connection Context information of the PDU session is changed, e.g. due to a new anchor SMF is reselected, the content shall include the "epsPdnCnxInfo" IE including the updated EPS PDN Connection Context information. The NF Service consumer shall overwrite the locally stored EPS PDN Connection Context information with the new one if received.

   If the service operation is invoked after the reselection of the anchor SMF and the change of anchor SMF has not been signalled to the V-SMF or I-SMF previously, the request may carry the SMF Instance ID of the new anchor SMF and the updated PDU session resource URI in the HTTP content, and/or carry an updated binding indication in the HTTP headers to indicate the change of anchor SMF (as per step 6 of clause 6.5.3.3 of 3GPP TS 29.500 [4]).

   For a HR-SBO session, the content of the POST request may also contain the hrsboInfo IE including the HR-SBO information sent from the HPLMN, e.g., due to a change of the user subscription data or policy information. If the VPLMN Specific Offloading Information for a given Offload Identifier is changed, for each V-SMF service instance using the Offload Identifier, the H-SMF shall choose one existing HR-SBO PDU Session served by the V-SMF service instance and using the Offload Identifier to update VPLMN Specific Offloading Information and corresponding Offload Identifier to the V-SMF service instance.

For a PDU session with an I-SMF, the content of the POST request may also contain the localOffloadMgtInfo IE including the information sent to the I-SMF for I-SMF based Local Offloading Management, e.g., due to a change of the policy information. If the Local Offloading Information for a given Offload Identifier is changed, for each I-SMF service instance using the Offload Identifier, the SMF shall choose one existing PDU Session with an I-SMF served by the I-SMF service instance and using the Offload Identifier to update Local Offloading Information and corresponding Offload Identifier to the I-SMF service instance.

2a. On success, "204 No Content" or "200 OK" shall be returned; in the latter case, the content of the POST response shall contain the representation describing the status of the request and/or information received by the V-SMF or I-SMF in N1 signalling from the UE.

2b. On failure or redirection, one of the HTTP status code listed in Table 6.1.3.7.4.2.2-1 shall be returned. For a 4xx/5xx response, the message body shall contain a VsmfUpdateError structure, including:

- a ProblemDetails structure with the "cause" attribute set to one of the application error listed in Table 6.1.3.7.4.2.2-1;
- the n1SmCause IE with the 5GSM cause returned by the UE, if available;
- n1SmInfoFromUe and/or unknownN1SmInfo binary data, if NAS SM information has been received from the UE that needs to be transferred to the H-SMF or SMF, or that the V-SMF or I-SMF does not comprehend;
- the procedure transaction id received from the UE, if available.

5.2.2.8.3.2 Network (e.g. H-SMF, SMF) requested PDU session modification

The requirements specified in clause 5.2.2.8.3.1 shall apply with the following modifications.

1. Same as step 1 of Figure 5.2.2.8.3.1-1, with the following modifications.

   The requestIndication shall be set to NW_REQ_PDU_SES_MOD.

   As part of the modification instructions, the NF Service Consumer may request to modify QoS parameters applicable at the PDU session level (e.g. modify the authorized Session AMBR values) or at the QoS flow level (e.g. modify the MFBR of a particular QoS flow).

   The NF Service Consumer may request to establish, modify and/or release QoS flows by including the qosFlowsAddModRequestList IE and/or the qosFlowsRelRequestList IE in the content.

   The H-SMF or SMF may provide alternative QoS profiles for each GBR QoS flow with Notification control enabled, to allow the NG-RAN to accept the setup of the QoS flow if the requested QoS parameters or at least one of the alternative QoS parameters sets can be fulfilled at the time of setup. If the H-SMF or SMF provides a new list of alternative QoS profile(s) for a given GBR Qos flow, the V-SMF or I-SMF shall replace any previously stored list for this Qos flow with it.

   The NF Service Consumer may include epsBearerInfo IE(s), if the PDU session may be moved to EPS during its lifetime and the EPS Bearer(s) information has changed (e.g. a new EBI has been assigned or the mapped EPS bearer QoS for an existing EBI has changed).

   The NF Service Consumer may include the modifiedEbiList IE if the PDU session modification procedure resulted in the change of ARP for a QoS flow that has already been allocated an EBI.

   The NF Service Consumer may include the revokeEbiList IE to request the V-SMF or I-SMF to release some EBI(s) and delete any corresponding EPS bearer context stored in the V-SMF or I-SMF. The V-SMF or I-SMF shall disassociate the EBI(s) with the QFI(s) with which they are associated.

   The H-SMF may include the hrsboInfo IE if the V-SMF supports the HR-SBO feature and if the H-SMF needs to update the HR-SBO information towards the V-SMF, e.g. due to a change of the user subscription data or policy information. When doing so, H-SMF shall include the complete information for HR-SBO and the V-SMF shall replace any earlier received HR-SBO information by the new HR-SBO information.

2. Same as step 2 of Figure 5.2.2.8.3.1-1, with the following modifications.

The V-SMF or I-SMF may accept all or only a subset of the QoS flows requested to be created or modified within the request.

The list of QoS flows which have been successfully setup or modified, and those which failed to be so, if any, shall be included in the qosFlowsAddModList IE and/or the qosFlowsFailedtoAddModList IE respectively. If any QoS flow(s) are failed to be setup or modified due to rejection by the V-SMF, the V-SMF may also include the qosFlowsVsmfRejectedAddModList IE with the QoS flow(s) that are rejected by the V-SMF.

The V-SMF or I-SMF may report an alternative QoS profile which the NG-RAN currently fulfils in the currentQosProfileIndex IE of the corresponding Qos flow in the qosFlowsAddModList IE, or report that the NG-RAN cannot even fulfil the lowest alternative QoS profile by setting the nullQoSProfileIndex IE to "true" for the corresponding Qos flow in the qosFlowsAddModList IE.

If the NG-RAN rejects the establishment of a voice QoS flow due to EPS Fallback for IMS voice (see clause 4.13 of 3GPP TS 23.502 [3]), the V-SMF or I-SMF shall return the cause indicating that "mobility due to EPS fallback for IMS voice is on-going" for the corresponding flow in the qosFlowsFailedtoAddModList IE.

The list of QoS flows which have been successfully released, and those which failed to be so, if any, shall be included in the qosFlowsRelList and/or qosFlowsFailedtoRelList IE respectively.

For a QoS flow which failed to be modified, the V-SMF or I-SMF shall fall back to the configuration of the QoS flow as it was configured prior to the reception of the PDU session update request from the NF Service Consumer.

The V-SMF or I-SMF shall store any EPS bearer information received from the H-SMF or SMF. If the revokeEbiList IE is present in the request, the V-SMF or I-SMF shall request delete the corresponding EPS bearer contexts and request the AMF to release the EBIs listed in this IE. If the modifiedEbiList IE is present in the request, the V-SMF or I-SMF shall request the AMF to update the mapping of EBI and ARP if the EAEA feature is supported by both the AMF and the V-SMF (or I-SMF), otherwise the V-SMF (or I-SMF) should indicate in the response that the modifiedEbiList was not delivered to the AMF.

If the request received from the H-SMF or SMF contains the alwaysOnGranted attribute set to true, the V-SMF or I-SMF shall check and determine whether the PDU session can be established as an always-on PDU session based on local policy.

If the V/I-SMF returns the VsmfUpdateError with a cause e.g., set to "UNABLE_TO_PAGE_UE" or "UE_NOT_RESPONDING" together with a retryAfter IE or maxWaitingTime IE, the (H-)SMF may retry the same modification procedure when it knows the UE becomes reachable.

NOTE: The (H-)SMF can retrieve the serving AMF NF instance Id via invoking the Nudm_SDM service the UE Context In AMF Data Retrieval procedure as specified in clause 5.2.2.2.20 of 3GPP TS 29.503 [46], and then perform a NRF based service discovery using the AMF NF Instance Id, to find AMF event exposure service and create AMF event subscription for the UE reachability state. See also clause 5.34.7.1 of 3GPP TS 23.501 [2].

5.2.2.8.3.3 Network (e.g. H-SMF, SMF) or UE requested PDU session release

The requirements specified in clause 5.2.2.8.3.1 shall apply with the following modifications.

1. Same as step 1 of Figure 5.2.2.8.3.1-1, with the following modifications.

   The requestIndication shall be set to NW_REQ_PDU_SES_REL or UE_REQ_PDU_SES_REL for a Network requested PDU session release or UE requested PDU session release respectively.

2. Same as step 2 of Figure 5.2.2.8.3.1-1, with the following modifications.

   If the requestIndication in the request is set to NW_REQ_PDU_SES_REL or UE_REQ_PDU_SES_REL, the V-SMF or I-SMF shall initiate the release of RAN resources allocated for the PDU session if any and shall send a PDU session release command to the UE.

   The V-SMF or I-SMF shall not release the SM context for the PDU session.

NOTE: The SM context will be released when receiving Status notification from the H-SMF or SMF indicating the PDU session is released in the H-SMF or SMF.

5.2.2.8.3.4 Handover between 3GPP and untrusted non-3GPP access, from 5GC-N3IWF to EPS or from 5GS to EPC/ePDG

The requirements specified in clause 5.2.2.8.3.1 shall apply with the following modifications.

1. Same as step 1 of Figure 5.2.2.8.3.1-1, with the following modifications.

   The NF Service Consumer shall request the source V-SMF or I-SMF to release the resources in the VPLMN without sending a PDU session release command to the UE, by setting the requestIndication IE to NW_REQ_PDU_SES_REL and the Cause IE indicating "Release due to Handover", in the following scenarios:

   - Handover of a PDU session between 3GPP and untrusted non-3GPP access, when the UE is roaming and the selected N3IWF is in the HPLMN (see clause 4.9.2.4.2 of 3GPP TS 23.502 [3]);
   - Handover from 5GC-N3IWF to EPS (see clause 4.11.3.2 of 3GPP TS 23.502 [3]);
   - Handover from 5GS to EPC/ePDG (see clause 4.11.4.2 of 3GPP TS 23.502 [3]).

2. Same as step 2 of Figure 5.2.2.8.3.1-1, with the following modifications.

   If the requestIndication in the request is set to NW_REQ_PDU_SES_REL and if the Cause IE indicates "Release due to Handover", the V-SMF or I-SMF shall initiate the release of RAN resources reserved for the PDU session if any but shall not send a PDU session release command to the UE.

   The V-SMF or I-SMF shall not release the SM context for the PDU session.

NOTE: The SM context will be released when receiving Status notification from the H-SMF or SMF indicating the PDU session is released in the H-SMF or SMF.

5.2.2.8.3.5 EPS Bearer ID assignment

The requirements specified in clause 5.2.2.8.3.1 shall apply with the following modifications.

1. Same as step 1 of Figure 5.2.2.8.3.1-1, with the following modifications.

   The requestIndication shall be set to EBI_ASSIGNMENT_REQ.

   The NF Service Consumer may include the assignEbiList IE to request the allocation of EBI(s). The NF Service Consumer may include the revokeEbiList IE to request the V-SMF or I-SMF to release some EBI(s) and delete any corresponding EPS bearer context stored in the V-SMF or I-SMF. The V-SMF or I-SMF shall disassociate the EBI(s) with the QFI(s) with which they are associated.

NOTE: The SMF does not request EBI allocation when MA PDU Session is established only over non-3GPP access. For MA PDU Session with both 3GPP and non-3GPP accesses, the SMF does not allocate EBI(s) for GBR QoS Flow(s) that are only allowed over non-3GPP access.

   Upon receipt of this request, the V-SMF or I-SMF shall request the AMF to assign (and release if required) EBIs (see clause 5.2.2.6 of 3GPP TS 29.518 [20].

2a. Same as step 2a of Figure 5.2.2.8.3.1-1, with the following modifications.

   If the AMF has successfully assigned all or part of the requested EBIs, the V-SMF or I-SMF shall respond with the status code 200 OK, and include the list of EBIs successfully allocated, those which failed to be so if any, and the list of EBIs released for this PDU session at AMF if any, in the assignedEbiList IE, the failedtoAssignEbiList IE and/or the releasedEbiList IE respectively.

2b. Same as step 2b of Figure 5.2.2.8.3.1-1, with the following modifications.

   For a 4xx/5xx response, the message body shall contain a VsmfUpdateError structure, including the list of EBIs which failed to be allocated in the failedtoAssignEbiList IE.

5.2.2.8.3.6 Addition of PSA and BP or UL CL controlled by I-SMF

The requirements specified in clause 5.2.2.8.3.1 shall apply with the following modifications.

1. Same as step 1 of Figure 5.2.2.8.3.1-1, with the following modifications.

The requestIndication shall be set to NW_REQ_PDU_SES_MOD.

The content of the POST request shall contain:

- N4 information for the handling of the local traffic that is offloaded at the PSA (see Annex D of 3GPP TS 29.244 [29]);
- N4 information for the local offload rules at the UL CL/BP (see Annex D of 3GPP TS 29.244 [29]);
- the DNAI related to N4 information targeting the local PSA;
- the indication that the DNAI shall not change, if applicable;
- the indication that the local PSA shall not change, if applicable.

For the Simultaneous change of Branching Points or UL CLs controlled by different I-SMFs (see clause 4.23.9.5 of 3GPP TS 23.502 [3]), the POST request may also contain:

- n9DataForwardingInd set to true, if the N9 Forwarding Tunnel establishment between Branching Points or UL CLs to support the EAS session continuity is required;
- n9UlPdrIdList pointing to the UL PDR(s) included in the N4 information for UL N9 forwarding in the target Branching Point or UL CL to support the EAS session continuity;
- n9InactivityTimer to detect the end of activity on the N9 forwarding tunnel to support the EAS session continuity.

2a. Same as step 2a of Figure 5.2.2.8.3.1-1, with the following modifications.

The content of the POST response shall contain:

- N4 response information;
- the DNAI related to the N4 information if the latter relates to a local PSA.

2b. Same as step 2b of Figure 5.2.2.8.3.1-1, with the following modifications.

For a 4xx/5xx response, the message body shall contain a VsmfUpdateError structure, including N4 response information if available (e.g. PFCP Session Establishment Response with a rejection cause).

5.2.2.8.3.7 Removal of PSA and BP or UL CL controlled by I-SMF

The requirements specified in clause 5.2.2.8.3.1 shall apply with the following modifications.

1. Same as step 1 of Figure 5.2.2.8.3.1-1, with the following modifications.

The requestIndication shall be set to NW_REQ_PDU_SES_MOD.

The content of the POST request shall contain:

- N4 information for the removal of the local offload rules at the UL CL/BP and PSA (see Annex D of 3GPP TS 29.244 [29]);
- the DNAI related to N4 information targeting the local PSA.

2a. Same as step 2a of Figure 5.2.2.8.3.1-1, with the following modifications.

The content of the POST response shall contain:

- N4 response information;
- the DNAI related to the N4 information if the latter relates to a local PSA.

2b. Same as step 2b of Figure 5.2.2.8.3.1-1, with the following modifications.

For a 4xx/5xx response, the message body shall contain a VsmfUpdateError structure, including N4 response information if available (e.g. PFCP Session Deletion Response with a rejection cause).

5.2.2.8.3.8 Change of PSA for IPv6 multi-homing or UL CL controlled by I-SMF

The requirements specified in clause 5.2.2.8.3.1 shall apply with the following modifications.

1. Same as step 1 of Figure 5.2.2.8.3.1-1, with the following modifications.

   The requestIndication shall be set to NW_REQ_PDU_SES_MOD.

   The content of the POST request shall contain:

   - N4 information for the removal of the local offload rules at the removed PSA (see Annex D of 3GPP TS 29.244 [29]);
   - N4 information for the handling of the local traffic that is offloaded at the inserted PSA (see Annex D of 3GPP TS 29.244 [29]);
   - N4 information for the updating of the local offload rules at the UL CL/BP (see Annex D of 3GPP TS 29.244 [29]);
   - the DNAIs related to N4 information targeting the removed or inserted PSA.

2a. Same as step 2a of Figure 5.2.2.8.3.1-1, with the following modifications.

   The content of the POST response shall contain:

   - N4 response information;
   - the DNAI related to the N4 information if the latter relates to a local PSA.

2b. Same as step 2b of Figure 5.2.2.8.3.1-1, with the following modifications.

   For a 4xx/5xx response, the message body shall contain a VsmfUpdateError structure, including N4 response information if available (e.g. PFCP Session Establishment Response with a rejection cause).

5.2.2.8.3.9 Policy update procedures with an I-SMF

The requirements specified in clause 5.2.2.8.3.1 shall apply with the following modifications.

1. Same as step 1 of Figure 5.2.2.8.3.1-1, with the following modifications.

   The requestIndication shall be set to NW_REQ_PDU_SES_MOD.

   The content of the POST request may contain:

   - N4 information updating local offload rules at the I-SMF (see Annex D of 3GPP TS 29.244 [29]);
   - the DNAI related to the N4 information if the latter relates to a local PSA;
   - an updated list of DNAI(s) of interest for the PDU Session.

2a. Same as step 2a of Figure 5.2.2.8.3.1-1, with the following modifications.

   The content of the POST response shall contain:

   - N4 response information, if N4 information was received in the request;
   - the DNAI related to the N4 information if the latter relates to a local PSA.

2b. Same as step 2b of Figure 5.2.2.8.3.1-1, with the following modifications.

   For a 4xx/5xx response, the message body shall contain a VsmfUpdateError structure, including N4 response information if available (e.g. PFCP Session Modification Response with a rejection cause).

5.2.2.8.3.10 Simultaneous change of PSA and BP or UL CL controlled by I-SMF

The requirements specified in clause 5.2.2.8.3.1 shall apply with the following modifications.

1. Same as step 1 of Figure 5.2.2.8.3.1-1, with the following modifications.

   The requestIndication shall be set to NW_REQ_PDU_SES_MOD.

   The content of the POST request shall contain:

   - N4 information for the removal of the local offload rules at the removed PSA (see Annex D of 3GPP TS 29.244 [29]);
   - N4 information for the handling of the local traffic that is offloaded at the inserted PSA (see Annex D of 3GPP TS 29.244 [29]);
   - N4 information for the removal of the local offload rules at the removed UL CL/BP (see Annex D of 3GPP TS 29.244 [29]);
   - N4 information for the creation of the local offload rules at the inserted UL CL/BP (see Annex D of 3GPP TS 29.244 [29]);
   - the DNAIs related to N4 information targeting the removed or inserted PSA.

   The content of the POST request may contain:

   - n9DataForwardingInd set to true, if the N9 Forwarding Tunnel establishment between Branching Points or UL CLs to support the EAS session continuity is required;
   - n9UlPdrIdList pointing to the UL PDR(s) included in the N4 information for UL N9 forwarding in the target Branching Point or UL CL to support the EAS session continuity;
   - n9InactivityTimer to detect the end of activity on the N9 forwarding tunnel to support the EAS session continuity.

The SMF may only include the N4 information for the inserted PSA and the inserted UL CL/BP as specified in clause D.2.7 of 3GPP TS 29.244 [29], if the I-SMF only includes the PsaInformation corresponding to the new PSA and the UlclBpInformation corresponding to the new UL CL or BP during simultaneous change of PSA and BP or UL CL and data forwarding between the new and old UL CL/BPs for EAS session continuity is required.

2a. Same as step 2a of Figure 5.2.2.8.3.1-1, with the following modifications.

   The content of the POST response shall contain:

   - N4 response information;
   - the DNAI related to the N4 information if the latter relates to a local PSA.

2b. Same as step 2b of Figure 5.2.2.8.3.1-1, with the following modifications.

   For a 4xx/5xx response, the message body shall contain a VsmfUpdateError structure, including N4 response information if available (e.g. PFCP Session Establishment Response with a rejection cause).

5.2.2.8.3.11 Network (e.g. AMF) triggered network slice replacement with PDU session retained

During network slice replacement procedure, for HR PDU session, if the H-SMF determines to retain the PDU session for the alternative HPLMN S-NSSAI, the H-SMF shall use this procedure to instruct the V-SMF that the PDU session is retained for the alternative HPLMN S-NSSAI (see clause 4.3.3.3 of 3GPP TS 23.502 [3]).

The requirements specified in clause 5.2.2.8.3.1 shall apply with the following modifications.

1. Same as step 1 of Figure 5.2.2.8.3.1-1, with the following modifications.

   The requestIndication shall be set to NW_REQ_PDU_SES_MOD.

   The content of the POST request shall contain:

   - an altHplmnSnssai IE to indicate the alternative HPLMN S-NSSAI applied to the PDU session;
   - a pduSessionRetainInd IE to indicate the PDU session is retained;

2a. Same as step 2a of Figure 5.2.2.8.3.1-1.

5.2.2.8.3.12 NetLoc Information Retrieval over N16/N16a

For a HR PDU session or a PDU session with I-SMF, if the (H-)SMF is configured to report the NetLoc information by the PCF, (H-)SMF shall use this procedure to retrieve the NetLoc information (UE Location and Time Zone) via V-SMF or I-SMF.

The requirements specified in clause 5.2.2.8.3.1 shall apply with the following modifications.

1. Same as step 1 of Figure 5.2.2.8.3.1-1, with the following modifications.

   The content of the POST request shall contain:

   - a netLocInfoReqInd IE set to the value "true".

2a. Same as step 2a of Figure 5.2.2.8.3.1-1. The V-SMF or I-SMF shall subscribe to the AMF events with one time report type to obtain the current UE Location and Time Zone. The V-SMF or I-SMF shall include the UE Location and Time Zone in the content of the POST response.

5.2.2.9 Release service operation

5.2.2.9.1 General

The Release service operation shall be used to request an immediate and unconditional deletion of an invidual PDU session resource in the SMF (i.e. in the H-SMF for a HR PDU session, or in the SMF for a PDU session with an I-SMF).

It is invoked by the NF Service Consumer (i.e. V-SMF or I-SMF) in the following procedures:

- UE initiated Deregistration (see clause 4.2.2.3.2 of 3GPP TS 23.502 [3]);
- Network initiated Deregistration (see clause 4.2.2.3.2 of 3GPP TS 23.502 [3]), e.g. AMF initiated deregistration;
- visited network requested PDU Session release (see clause 4.3.4.3 of 3GPP TS 23.502 [3]), e.g. AMF initiated release in the following cases:
  - when there is a mismatch of the PDU session status between the UE and the AMF;
  - when a network slice is no longer available;
  - when the PDU session is rejected by the new AMF to the old AMF during Registration procedure (as described in clause 4.2.2.2.2 of 3GPP TS 23.502 [3]); or
  - due to Mobility or Access Restrictions (see clause 5.16.4.3 of 3GPP TS 23.501 [2]).
- 5GS to EPS handover using N26 interface and 5GS to EPS Idle mode mobility using N26, to release the PDU session not transferred to EPC (see clauses 4.11.1.2.1 and 4.11.1.3.2 of 3GPP TS 23.502 [3]);
- PDU session release procedure, for a PDU session with an I-SMF (see clause 4.23.5.2 of 3GPP TS 23.502 [3]);
- 5G-SRVCC from NG-RAN to 3GPP UTRAN procedure (see clause 6.5.4 of 3GPP TS 23.216 [35]).

The SMF shall release the PDU session context without triggering any signalling towards the 5G-AN and the UE.

The NF Service Consumer shall release a PDU session in the SMF by using the HTTP "release" custom operation as shown in Figure 5.2.2.9.1-1.

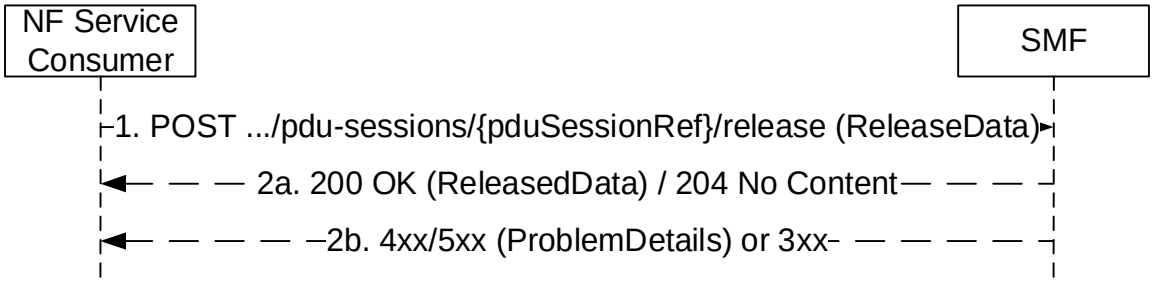

Figure 5.2.2.9.1-1: Pdu session release

1. The NF Service Consumer shall send a POST request to the resource representing the individual PDU session resource in the SMF. The content of the POST request shall contain any data that needs to be passed to the SMF.

   If an UL CL/BP was inserted in the data path of the PDU session and traffic usage measurements need to be reported to the SMF, the POST request shall contain:

   - N4 information related with traffic usage reporting (i.e. PFCP Session Report Request, see Annex D of 3GPP TS 29.244 [29]);

   - the DNAI related to the N4 information if the latter relates to a local PSA.

   If VPLMN QoS constraints are required for the PDU session and the H-SMF provides QoS parameters not complying with VPLMN QoS required by the V-SMF, the V-SMF may release the PDU session with the "cause" attribute set to "REL_DUE_TO_VPLMN_QOS_FAILURE".

2a. On success, the SMF shall return a "200 OK" with message body containing the representation of the ReleasedData when information needs to be returned to the NF Service Consumer, or a "204 No Content" response with an empty content in the POST response.

   If N4 information was received in the request, the POST response shall contain:

   - N4 response information (i.e. PFCP Session Report Response);

   - the DNAI related to the N4 information if the latter relates to a local PSA.

   If the request body contains the "cause" attribute with the value "REL_DUE_TO_PS_TO_CS_HO", the (H-) SMF shall indicate to the PCF within SM Policy Association termination that the PDU session is released due to 5G-SRVCC.

2b. On failure or redirection, one of the HTTP status code listed in Table 6.1.3.6.4.3.2-2 shall be returned. For a 4xx/5xx response, the message body shall contain a ProblemDetails structure with the "cause" attribute set to one of the application errors listed in Table 6.1.3.6.4.3.2-2.

5.2.2.10 Notify Status service operation

5.2.2.10.1 General

The Notify Status service operation shall be used to notify the NF Service Consumer about status changes of a PDU session (e.g. when the PDU session is released and the release is not triggered by a Release Request, or when the PDU session is moved to another system, or when the control of the PDU session is taken over by another anchor SMF), for a HR PDU session or a PDU session involving an I-SMF.

It is used in the following procedures:

- Home network requested PDU Session release (see clause 4.3.4.3 of 3GPP TS 23.502 [3]), e.g. H-SMF initiated release;

- SMF requested PDU session release, for a PDU session involving an I-SMF (see clause 4.23 of 3GPP TS 23.502 [3]);

- Handover of a PDU Session procedure from 3GPP to untrusted non-3GPP access (see clauses 4.9.2.4.2 and 4.23.16.2 of 3GPP TS 23.502 [3]);

- Interworking procedures without N26 interface, e.g. 5GS to EPS Mobility (see clause 4.11.2.2 of 3GPP TS 23.502 [3]);
- Handover from 5GC-N3IWF to EPS (see clause 4.11.3.2 of 3GPP TS 23.502 [3]);
- Handover from 5GS to EPC/ePDG (see clause 4.11.4.2 of 3GPP TS 23.502 [3]);
- The control of PDU session is taken over by a new anchor SMF within the same SMF set (see clause 5.22 of 3GPP TS 29.244 [29]), and the new SMF instance decides to notify the change of SMF;
- SMF triggered I-SMF selection or removal (see clause 4.23.5.4 of 3GPP TS 23.502 [3]);
- Change of SSC mode 2 PDU Session Anchor with different PDU Sessions (see clause 4.3.5.1 of 3GPP TS 23.502 [3]);
- Change of SSC mode 3 PDU Session Anchor with multiple PDU Sessions (see clause 4.3.5.2 of 3GPP TS 23.502 [3]);
- Network slice usage behaviour control, i.e. SMF initiated PDU session release due to slice inactivity, see clause 5.15.15.3 of 3GPP TS 23.501 [2].

The SMF (i.e. H-SMF for a HR PDU session, or SMF for a PDU session involving an I-SMF) shall notify the NF Service Consumer (i.e. V-SMF for a HR PDU session, or I-SMF for a PDU session involving an I-SMF) by using the HTTP POST method as shown in Figure 5.2.2.10-1.

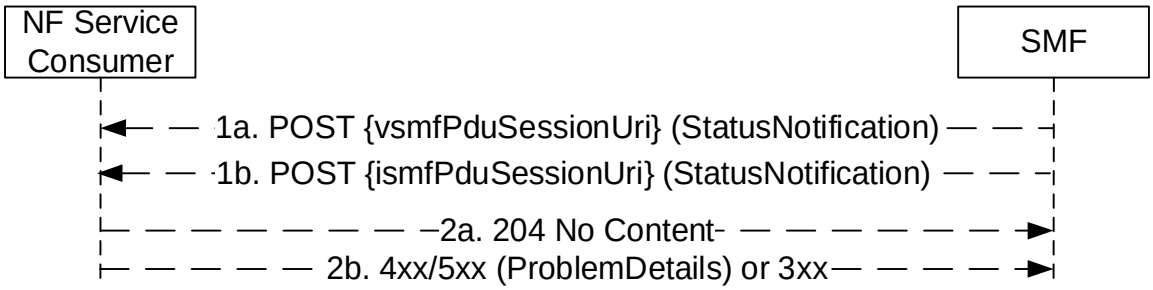

Figure 5.2.2.10-1: PDU session status notification

1. The SMF shall send a POST request to the resource representing the individual PDU session resource in the NF Service Consumer. The content of the POST request shall contain the notification content, with the status information.

   If the notification is triggered by PDU session handover to release resources of the PDU Session in the source access, the notification content shall contain the resourceStatus IE with the value "RELEASED" and the Cause IE with value "PDU_SESSION_HANDED_OVER" as specified in clause 4.2.9.4.2 of 3GPP TS 23.502 [3].

   If the notification is triggered by PDU session handover to release only the SM Context with the I-SMF in the source access but without releasing the PDU session in the AMF, the notification content shall contain the resourceStatus IE with the value "UPDATED" and the Cause IE with the value "PDU_SESSION_HANDED_OVER" as specified in clause 4.23.16.2 of 3GPP TS 23.502 [3].

   If the notification is triggered by SMF for I-SMF selection or removal for the current PDU session, or SMF selection during PDU Session re-establishment for SSC mode 2/3, the notification content shall contain the resourceStatus IE with the value "UNCHANGED", the Cause IE with the value "TARGET_DNAI_NOTIFICATION" and the targetDnaiInfo IE. The targetDnai IE in the targetDnaiInfo IE shall be absent if the I-SMF removal is triggered due to the DNAI currently served by the I-SMF being no longer used for the PDU Session. If the notification is triggered for SMF selection during PDU Session re-establishment for SSC mode 3, the notification content may also contain the oldPduSessionRef IE as specified in clause 4.3.5.2 of 3GPP TS 23.502 [3].

   If the notification is triggered by PDU session handover to release resources of the PDU Session in the target access due to handover failure between 3GPP access and non-3GPP access, the notification content shall contain the resourceStatus IE with the value "RELEASED" and the Cause IE with the value "PDU_SESSION_HAND_OVER_FAILURE".

If the NF Service Consumer indicated support of the HOFAIL feature (see clause 6.1.8) and if the notification is triggered by PDU session handover to update access type of the PDU Session due to handover failure between 3GPP access and non-3GPP access, the notification content shall contain the resourceStatus IE with the value "UPDATED", the anType IE with the value "3GPP" or "NON_3GPP" indicating the access type of the PDU session after the handover failure scenario and the Cause IE with the value "PDU_SESSION_HAND_OVER_FAILURE".

If upon a change of anchor SMF, the new anchor SMF instance decides to notify the change of anchor SMF, then the notification content shall contain the resourceStatus IE with the value "UPDATED" and the Cause IE with the value "CHANGED_ANCHOR_SMF". In addition, the new anchor SMF instance shall include its SMF Instance ID in the notification content, and/or carry an updated binding indication in the HTTP headers to indicate the change of anchor SMF (as per step 6 of clause 6.5.3.3 of 3GPP TS 29.500 [4]). If the PDU session may be moved to EPS with N26 and the EPS PDN Connection Context information of the PDU session on the new anchor SMF is different from the one on the old anchor SMF, the content shall also include the "epsPdnCnxInfo" IE including the updated EPS PDN Connection Context information. The NF Service consumer shall overwrite the locally stored EPS PDN Connection Context information with the new one if received.

If the notification is triggered by a PDU session release due to slice inactivity as specified in clause 5.15.15.3 of 3GPP TS 23.501 [2] and clause 5.11.2 of 3GPP TS 29.244 [29], the notification content shall contain the resourceStatus IE with the value "RELEASED" and the Cause IE with the value "REL_DUE_TO_SLICE_INACTIVITY".

If the notification is triggered by duplicated PDU session detected during Create operation (see clause 5.2.2.7.1) or SMF deregistration from UDM due to duplicated pdu sessions (see clause 5.3.2.3 of 3GPP TS 29.503 [46]), the request body shall include the cause IE with the value "REL_DUE_TO_DUPLICATE_SESSION_ID". Upon receipt of such a status notification, the V-SMF or I-SMF shall not send SM context status notification to the AMF.

If the notification is triggered by a SMF deregistration from UDM due to a new PDU session being established with an identical PDU session Id from another anchor SMF via an ePDG (see clause 5.3.2.3 of 3GPP TS 29.503 [46]), the request body shall include the cause IE with the value "REL_DUE_TO_DUPLICATE_SESSION_EPDG". Upon receipt of such a status notification, the V-SMF or I-SMF shall release the PDU session and also clean up the PDU session resources in AMF and RAN (if needed), but shall not release the PDU session in the UE.

2a. On success, "204 No Content" shall be returned and the content of the POST response shall be empty.

If the SMF indicated in the request that the PDU session in the SMF is released, the NF Service Consumer shall release the SM context for the PDU session.

If the SMF indicated in the request that the SM context resource is updated with the anType IE, the NF Service Consumer shall change the access type of the PDU session with the value of anType IE.

2b. On failure or redirection, one of the HTTP status code listed in Table 6.1.3.7.3.1-2 shall be returned. For a 4xx/5xx response, the message body shall contain a ProblemDetails structure with the "cause" attribute set to one of the application errors listed in Table 6.1.3.7.3.1-2.

5.2.2.11 Send MO Data service operation

5.2.2.11.1 General

The Send MO Data service operation shall be used to send mobile originated data received over NAS, for a given PDU session, towards the SMF, or the V-SMF for HR roaming scenarios, or the I-SMF for a PDU session with an I-SMF.

It is used in the following procedures:

- UPF anchored Mobile Originated Data Transport in Control Plane CIoT 5GS Optimisation (see clause 4.24.1 of 3GPP TS 23.502 [3]);

- NEF anchored Mobile Originated Data Transport (see clause 4.25.4 of 3GPP TS 23.502 [3]).

The NF Service Consumer (e.g. AMF) shall send mobile originated data to the SMF by using the HTTP POST method (send-mo-data custom operation) as shown in Figure 5.2.2.11.1-1.

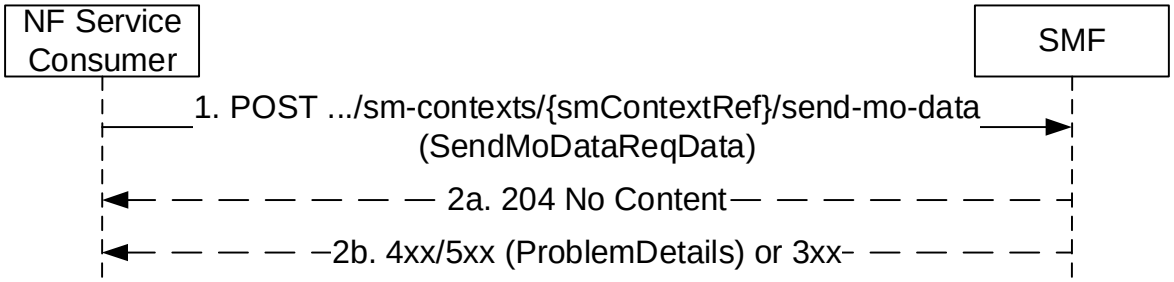

Figure 5.2.2.11.1-1: Send MO Data

1. The NF Service Consumer shall send a POST request to the resource representing the individual SM context resource in the SMF. The content of the POST request shall contain the mobile originated data to send.

   The request body may include the "MO Exception Data Counter", which indicates that the UE has accessed the network by using "MO exception data" RRC establishment, if Small Data Rate Control is enabled for the PDU session and the UE is accessing via the NB-IoT RAT.

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

   For UPF anchored Mobile Originated Data Transport in Control Plane CIoT 5GS Optimisation, if the "MO Exception Data Counter" is included in the request then:

   - for HR PDU session, the V-SMF shall update the H-SMF (see clause 5.2.2.8.2.2);
   - for PDU session with I-SMF, the I-SMF shall update the SMF (see clause 5.2.2.8.2.2).

2b. On failure or redirection, one of the HTTP status codes listed in Table 6.1.3.3.4.5.2-2 shall be returned. For a 4xx/5xx response, the message body shall contain a ProblemDetails, with the "cause" attribute indicating the cause of the failure.

5.2.2.12 Transfer MO Data service operation

5.2.2.12.1 General

The Transfer MO Data service operation shall be used to transfer NEF anchored mobile originated data received from AMF, for a given PDU session, towards the H-SMF for HR roaming scenarios, or the SMF for a PDU session with an I-SMF.

It is used in the following procedures:

- NEF anchored Mobile Originated Data Transport (see clause 4.25.4 of 3GPP TS 23.502 [3]).

The NF Service Consumer (e.g. V-SMF or I-SMF) shall transfer NEF anchored mobile originated data to the SMF by using the HTTP POST method (transfer-mo-data custom operation) as shown in Figure 5.2.2.12.1-1.

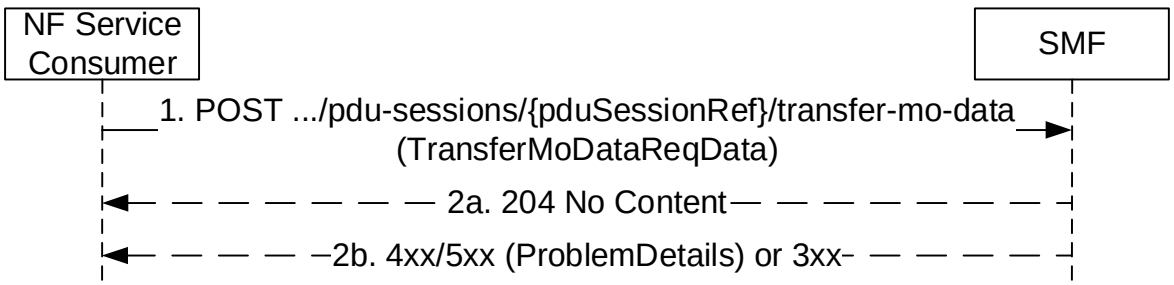

Figure 5.2.2.12.1-1: Transfer MO Data

1. The NF Service Consumer shall send a POST request to the URI of Transfer MO Data custom operation on an individual PDU Session resource in the SMF. The content of the POST request shall contain the mobile originated data to be transferred.

The content shall also contain the MO Exception Data Counter, if received from AMF.

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

2b. On failure or redirection, one of the HTTP status code listed in Table 6.1.3.6.4.4.2-2 shall be returned. For a 4xx/5xx response, the message body may contain a ProblemDetails, with the "cause" attribute indicating the cause of the failure.

5.2.2.13 Transfer MT Data service operation

5.2.2.13.1 General

The Transfer MT Data service operation shall be used to transfer NEF anchored mobile terminated data received from NEF, for a given PDU session, towards the V-SMF for HR roaming scenarios, or the I-SMF for a PDU session with an I-SMF.

It is used in the following procedures:

- NEF anchored Mobile Terminated Data Transport (see clause 4.25.5 of 3GPP TS 23.502 [3]).

The NF Service Consumer (e.g. H-SMF or SMF) shall transfer NEF anchored mobile terminated data to the SMF by using the HTTP POST method (transfer-mt-data custom operation) as shown in Figure 5.2.2.13.1-1.

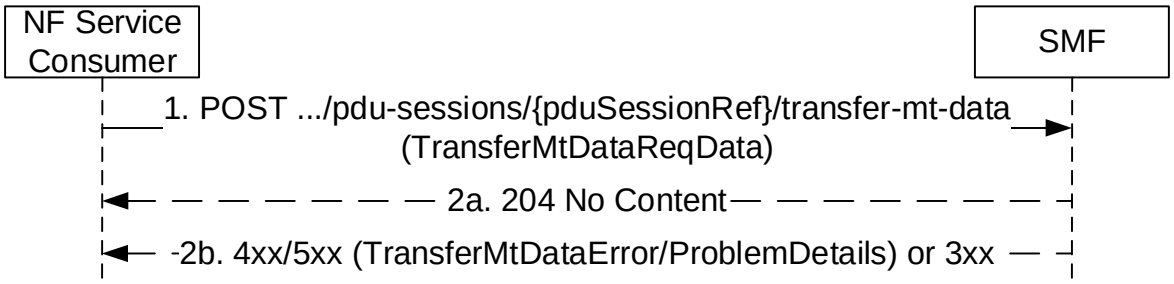

Figure 5.2.2.13.1-1: Transfer MT Data

1. The NF Service Consumer shall send a POST request to the URI of Transfer MT Data custom operation on an individual PDU Session resource in the SMF. The content of the POST request shall contain the mobile terminated data to be transferred.

   The SMF shall forward the mobile terminated data to AMF. If SMF determines Extended Buffering is allowed by local policy and the NEF supports Extended Buffering, the SMF indicate the Extending Buffering support to AMF.

   If AMF responds that it is attempting to reach the UE, the SMF shall wait for potential failure notification from AMF before responding to the NF consumer.

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

2b. On failure or redirection, one of the HTTP status code listed in Table 6.1.3.7.4.3.2-2 shall be returned. For a 4xx/5xx response, the message body may contain a TransferMtDataError or ProblemDetails object, with the "cause" attribute indicating the cause of the failure. If Estimated Maximum Waiting Time is received from AMF, the SMF shall include it in the message body.

5.2.2.14 Retrieve service operation

5.2.2.14.1 General

The Retrieve service operation shall be used to retrieve information from a PDU session context from the H-SMF for a HR PDU session, or from the SMF for a PDU session with an I-SMF.

It is used in the following procedures:

- 5GS to EPS handover using N26 interface and 5GS to EPS Idle mode mobility using N26 interface (see clauses 4.11.1.2.1 and 4.11.1.2.3 of 3GPP TS 23.502 [3]), for PDU sessions associated with 3GPP access and for which small data rate control is applicable.

- Change of SSC mode 3 PDU Session Anchor with multiple PDU Sessions (see clause 4.3.5.2 of 3GPP TS 23.502 [3]).

The NF Service Consumer (e.g. V-SMF or I-SMF) shall retrieve information from a PDU session context by using the HTTP POST method (retrieve custom operation) as shown in Figure 5.2.2.14.1-1.

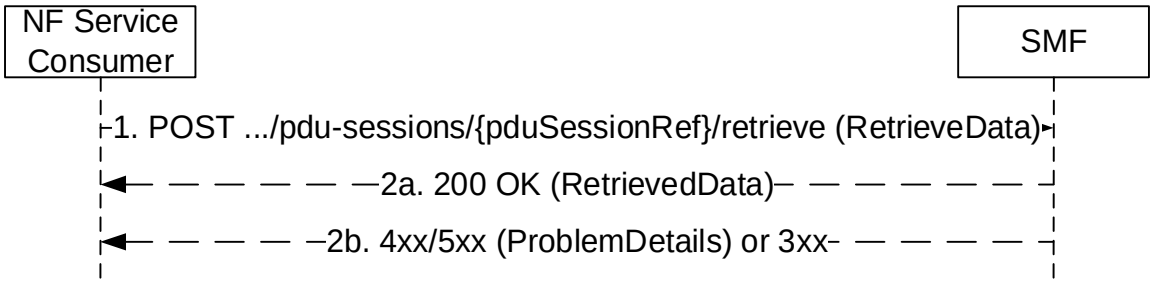

Figure 5.2.2.14.1-1: Retrieval of information from a PDU session context

1. The NF Service Consumer shall send a POST request to the resource representing the individual PDU session context for which information needs to be retrieved. The POST request may contain a content with the following parameters:

   - smallDataRateStatusReq set to "true" to indicate a request to retrieve the small data rate control status of the PDU session, if small data rate control is applicable on the PDU session.

   - pduSessionContextType indicates that this is a request to retrieve the AF Coordination Information as defined in clause 6.1.6.2.69, during the change of SSC mode 3 PDU Session Anchor with multiple PDU Sessions, if the runtime coordination between old SMF and AF is enabled.

2a. On success, "200 OK" shall be returned and the content of the POST response shall contain the small data rate control status if this is a request for retrieving the small data rate control status.

2b. On failure or redirection, one of the HTTP status code listed in Table 6.1.3.6.4.5.2-2 shall be returned. For a 4xx/5xx response, the message body may contain a ProblemDetails structure with the "cause" attribute set to one of the application error listed in Table 6.1.3.6.4.5.2-2.

5.2.3 General procedures

5.2.3.1 Transfer of NAS SM information between UE and H-SMF for Home Routed PDU sessions

5.2.3.1.1 General

As specified in clause 4.3.1 of 3GPP TS 23.502 [3], for Home Routed PDU sessions, there is NAS SM information that the V-SMF and H-SMF need to interpret, and NAS SM information that the V-SMF only needs to transfer between the UE and H-SMF but which it does not need to interpret.

NAS SM information that only needs to be transferred between the UE and H-SMF by the V-SMF can be extended in later versions or releases of the NAS specification, e.g. defining new fields or values within existing IEs, and the extensions should not impact the V-SMF.

Besides, in HR roaming scenarios, the V-SMF and H-SMF can comply to different versions or releases of the NAS specification. It should be possible to support new SM features only requiring support from the H-SMF without impacting the V-SMF, when the H-SMF complies with a more recent release than the V-SMF, e.g. defining new NAS SM IEs in signalling from the UE to the H-SMF and/or signalling from the H-SMF to the UE.

5.2.3.1.2 V-SMF Behaviour

The V-SMF shall transfer NAS SM information that it only needs to transfer to the H-SMF (i.e. known IEs, and IEs that have an unknown value not set to "reserved" according to the release to which the V-SMF complies, that only need to be forwarded by the V-SMF) in n1SmInfoFromUe binary data within the HTTP content. This carries N1 SM IE(s), encoded as specified in 3GPP TS 24.501 [7], including the Type field and, for TLV or TLV-E IEs, the Length field.

NOTE 1: N1 SM IEs defined without a Type field need to be defined over N16/N16a as specific IEs.

The V-SMF shall transfer NAS SM information that it does not comprehend (i.e. unknown IEs, or known IEs to be interpreted by the V-SMF that have an unknown value not set to "reserved" according to the release to which the V-SMF complies) in unknownN1SmInfo binary data within the HTTP content. This carries N1 SM IE(s), encoded as specified in 3GPP TS 24.501 [7], including the Type field and, for TLV or TLV-E IEs, the Length field.

When receiving n1SmInfoToUe binary data in the HTTP contentfrom the H-SMF, the V-SMF shall parse all the N1 SM IEs received in the binary data and construct the NAS SM message to the UE according to 3GPP TS 24.501 [7]. The V-SMF shall append unknown NAS SM IEs received in the binary data at the end of the NAS SM message it sends to the UE.

NOTE 2: The V-SMF can infer the length of an unknown IE based on the IEI value. See clause 11.2.4 of 3GPP TS 24.007 [8].

The V-SMF shall comprehend and be able to encode at their right place in a given NAS message, all the IEs of the version of the NAS specification it implements that do not need to be interpreted by the V-SMF and which precede the last interpreted IE that the V-SMF implements in a NAS message.

NOTE 3: The V-SMF encodes comprehended IEs at their right place in the NAS SM message

5.2.3.1.3 H-SMF Behaviour

When receiving unknownN1SmInfo binary data in the HTTP content from the V-SMF, the H-SMF shall process any N1 SM IE received in this binary data that do not require to be interpreted by the V-SMF. Other N1 SM IEs shall be dropped, e.g. IEs that the H-SMF comprehends but which require to be interpreted by the V-SMF.

The H-SMF shall transfer NAS SM information which the V-SMF does not need to interpret (i.e. that it only needs to transfer to the UE) in n1SmInfoToUe binary data within the HTTP content. This carries N1 SM IE(s), encoded as specified in 3GPP TS 24.501 [7], including the Type field and, for TLV or TLV-E IEs, the Length field.

NOTE 1: N1 SM IEs defined without a Type field need to be defined over N16/N16a as specific IEs.

The NAS SM IEs in n1SmInfoToUe binary data shall be encoded in the same order as specified in 3GPP TS 24.501 [7].

N1 SM information which does not require to be interpreted by the V-SMF is information that is not defined as specific IEs over N16.

5.2.3.2 Transfer of NAS SM information between UE and SMF for PDU sessions with an I-SMF

5.2.3.2.1 General

The requirements specified in clause 5.2.3.1 shall also apply for the transfer of NAS SM information between the UE and the SMF for PDU sessions with an I-SMF, whereby the I-SMF and SMF shall take the role of the V-SMF and H-SMF respectively.

5.2.3.3 Detection and handling of late arriving requests

5.2.3.3.1 Handling of requests which collide with an existing SM context or PDU session context

5.2.3.3.1.1 General

This procedure enables an SMF, which receives a request colliding with an existing SM context or PDU session context, to know the time at which the new request and the existing PDU session were originated, and to accept the new request only if it is more recent than the existing PDU session.

The originating entities within the PLMN (i.e. AMFs) shall be NTP synchronized.

5.2.3.3.1.2 Principles

The following principles shall apply if this procedure is supported and enabled by operator policy.

An AMF originating a Create SM Context request shall include in the message the Origination Time Stamp indicating the absolute time at which the request is initiated.

The V-SMF or I-SMF shall forward this header to the H-SMF or SMF, if it is received from the AMF.

Upon receipt of a Create SM Context request or a Create request which collides with an existing SM context or PDU session context, the SMF shall accept the new PDU session establishment request only if it contains a more recent time stamp than the time stamp stored for the existing PDU session. An incoming PDU session establishment request shall be considered as more recent than an existing PDU session and be accepted if no Origination Time Stamp information was provided for at least one of the two PDU sessions. The SMF shall reject an incoming request whose time stamp is less recent than the time stamp of the existing PDU session with the HTTP status code "403 Forbidden" and the application error "LATE_OVERLAPPING_REQUEST".

3GPP TS 29.512 [30] further specify:

- the SMF requirements regarding the forwarding of the Origination Time Stamp towards the PCF, when received from the AMF;
- the handling of the Origination Time Stamp parameter by the PCF for an incoming request colliding with an existing Individual SM Policy Association.

5.2.3.3.2 Detection and handling of requests which have timed out at the HTTP client

5.2.3.3.2.1 General

The procedure specified in clause 6.11.2 of 3GPP TS 29.500 [4] shall apply with the following additions.

An HTTP request may include the 3gpp-Sbi-Origination-Timestamp and the 3gpp-Sbi-Max-Rsp-Time headers, with or without the 3gpp-Sbi-Sender-Timestamp header.

The 3gpp-Sbi-Max-Rsp-Time header shall indicate the duration expressed in milliseconds since the absolute time indicated in the 3gpp-Sbi-Sender-Timestamp header, if this header is present, or indicated in the 3gpp-Sbi-Origination-Timestamp header otherwise.

The intermediate NF, e.g. the V/I-SMF, may include a 3gpp-Sbi-Sender-Timestamp header set to the time when it sends the request message and the corresponding 3gpp-Sbi-Max-Rsp-Time header; if so, the V/I-SMF shall set the 3gpp-Sbi-Max-Rsp-Time header with a value smaller than the one it received from the AMF.

NOTE: The AMF does not need to include the 3gpp-Sbi-Sender-Timestamp if it includes the 3gpp-Sbi-Origination-Timestamp. A V-SMF or I-SMF forwards the 3gpp-Sbi-Origination-Timestamp over N16 or N16a, if received, and can include a 3gpp-Sbi-Sender-Timestamp header set to the time when it sends the Create request, in which case the 3gpp-Sbi-Max-Rsp-Time header contains the response time with respect to the 3gpp-Sbi-Sender-Timestamp header.

5.2.3.4 UE Location Information

When attributes with the UserLocation data type (as defined in clause 5.4.4.7 of 3GPP TS 29.571 [13]) are included in the messages (as specified in clause 6) to report the UE location information to the SMF, the following information shall be included in these attributes:

- the TAI and NCGI for NR user location; or
- the TAI and ECGI for E-UTRA user location; or
- the TAI, UE local IP address, Port if NAT is detected, and optionally n3Iwid if available, for untrusted non-3GPP access; or
- the TAI and TNAP Id/TWAP Id for trusted non-3GPP access; or
- the TAI and GLI and optionally LineType if available, or the TAI and hfcNodeId, or the TAI and GCI, for wireline network access.

6 API Definitions

6.1 Nsmf_PDUSession Service API

6.1.1 API URI

The Nsmf_PDUSession service shall use the Nsmf_PDUSession API.

The API URI of the Nsmf_PDUSession API shall be:

{apiRoot}/<apiName>/<apiVersion>

The request URIs used in HTTP requests from the NF service consumer towards the NF service producer shall have the Resource URI 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 "nsmf-pdusession".
- The <apiVersion> shall be "v1".
- 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 9113 [14], 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 Nsmf_PDUSession service shall comply with the OpenAPI [15] specification contained in Annex A.

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:

- the JSON format (IETF RFC 8259 [11]). The use of the JSON format shall be signalled by the content type "application/json". See also clause 5.4 of 3GPP TS 29.500 [4].
- the Problem Details JSON Object (IETF RFC 9457 [23]). The use of the Problem Details JSON object in a HTTP response body shall be signalled by the content type "application/problem+json".

NOTE: "application/json" is used in a response that includes a content containing an application-specific data structure, see clause 4.8 of 3GPP TS 29.501 [5].

Multipart messages shall also be supported (see clause 6.1.2.4) using the content type "multipart/related", comprising:

- one JSON body part with the "application/json" content type; and
- one or two binary body parts with 3gpp vendor specific content subtypes.

The 3gpp vendor specific content subtypes defined in Table 6.1.2.2.2-1 shall be supported.

Table 6.1.2.2.2-1: 3GPP vendor specific content subtypes

content subtype	Description
vnd.3gpp.ngap	Binary encoded content, encoding NG Application Protocol (NGAP) IEs, as specified in clause 9.3 of 3GPP TS 38.413 [9] (ASN.1 encoded).
vnd.3gpp.5gnas	Binary encoded content, encoding a 5GS NAS message or 5G NAS IEs, as specified in 3GPP TS 24.501 [7].
vnd.3gpp.pfcp	Binary encoded content, encoding a PFCP message, as specified in 3GPP TS 29.244 [29]. (NOTE 2)
NOTE 1: Using 3GPP vendor content subtypes allows to describe the nature of the opaque content (e.g. NGAP or 5GS NAS information) without having to rely on metadata in the JSONcontent. NOTE 2: Binary encoded content in vnd.3gpp.pfcp content subtype shall include application layer headers for PFCP and shall not include transport layer headers, i.e. IP and UDP.	

See clause 6.1.2.4 for the binary contents supported in the binary content part of multipart messages.

6.1.2.3 HTTP custom headers

6.1.2.3.1 General

For 3GPP specific HTTP custom headers used across all service based interfaces, see clause 5.2.3 of 3GPP TS 29.500 [4].

Additional HTTP custom headers applicable to the Nsmf_PDUSession service are specified in the following clauses.

6.1.2.3.2 3gpp-Sbi-Origination-Timestamp

The header contains the date and time (with a millisecond granularity) when the originating entity initiated the request.

The encoding of the header follows the ABNF as defined in IETF RFC 9110 [32].

```
Sbi-Origination-Timestamp-Header = "3gpp-Sbi-Origination-Timestamp:" OWS day-name "," SP date1 SP
time-of-day "." milliseconds SP "GMT" OWS

milliseconds = 3DIGIT
```

day-name, date1, time-of-day shall comply with the definition in clause 5.6.7 of IETF RFC 9110 [32].

NOTE: This is the same format as the Date header of clause 5.6.7 of IETF RFC 9110 [32], but with the time expressed with a millisecond granularity.

EXAMPLE: 3gpp-Sbi-Origination-Timestamp: Sun, 04 Aug 2019 08:49:37.845 GMT

6.1.2.4 HTTP multipart messages

HTTP multipart messages shall be supported, to transfer opaque N1 and/or N2 SMpayloads or N4 information, in the following service operations (and HTTP messages):

- Create SM Context Request and Response (POST);
- Update SM Context Request and Response (POST);
- Release SM Context Request (POST);
- Create Request and Response (POST);
- Update Request and Response (POST (modify)).

HTTP multipart messages shall include one JSON body part and one or two binary body parts comprising:

- an N1 SM payload, an N2 SM payload or both, over N11 (see clause 6.1.6.4);
- one or two N1 SM payloads, over N16 (see clause 6.1.6.4);
- one or two N2 SM payloads over N11 (see clause 5.2.2.3.3);
- one, two or three N4 payloads over N16a (see clause 6.1.6.4.5).

The JSON body part shall be the "root" body part of the multipart message. It shall be encoded as the first body part of the multipart message. The "Start" parameter does not need to be included.

The multipart message shall include a "type" parameter (see IETF RFC 2387 [10]) specifying the media type of the root body part, i.e. "application/json".

NOTE: The "root" body part (or "root" object) is the first body part the application processes when receiving a multipart/related message, see IETF RFC 2387 [10]. The default root is the first body within the multipart/related message. The "Start" parameter indicates the root body part, e.g. when this is not the first body part in the message.

For each binary body part in a HTTP multipart message, the binary body part shall include a Content-ID header (see IETF RFC 2045 [12]), and the JSON body part shall include an attribute, defined with the RefToBinaryData type, that contains the value of the Content-ID header field of the referenced binary body part.

Examples of multipart/related messages can be found in Annex B.

6.1.2.5 HTTP/2 request retries

The principles specified in clause 5.2.8 of 3GPP TS 29.500 [4] shall be applied with the following modifications.

The NF Service Consumer of Nsmf_PDUSession service, e.g. the AMF, shall retry the same HTTP request in the following scenarios through a new TCP connection towards an (alternative) service endpoint pertaining to the same NF (Service) instance or set if the corresponding procedure triggering the service request allows such retries, e.g. before the timeout of the corresponding N1 or N2 procedure:

- If the stream for the service request has not been processed in the SMF as specified in clause 5.2.8 of 3GPP TS 29.500 [4];
- if the request is rejected by a HTTP status code indicating a temporary failure in the SMF, e.g. the status code 429, 500 and 503, as specified in clause 5.2.7 of 3GPP TS 29.500 [4];
- if the request is timeout (i.e. the NF Service consumer doesn't receive any response after an implementation specific timer expires).

The NF Service Consumer shall determine an alternative service instance as specified in clause 6.5 of 3GPP TS 23.527 [24], i.e. using Binding Indication if supported/available or the NF (service) set or service persistency info from NF profile. The NF Service Consumer should also consider the Load control Information and the Overload Control Information if available as specified in clauses 6.3 and 6.4 in 3GPP TS 29.500 [4] when reselecting an alternative NF service instance.

When the AMF retries the same HTTP request, it shall set the 3gpp-Sbi-Origination-Timestamp and the 3gpp-Sbi-Sender-Timestamp header (if included) to the time when the request message is sent, i.e., these timestamps shall be different from the one when the request was originally sent.

The SMF shall support handling repeated retries successfully.

NOTE: See clauses 5.2.2.2 and 5.2.2.7 for the handling by the SMF of an HTTP POST request that would have already been processed by the SMF and that would be retried by the NF Service Consumer.

HTTP conditional requests are not supported by the Nsmf_PDUSession service in this version of the API.

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 describes the resource URI structure of the Nsmf_PDUSession API.

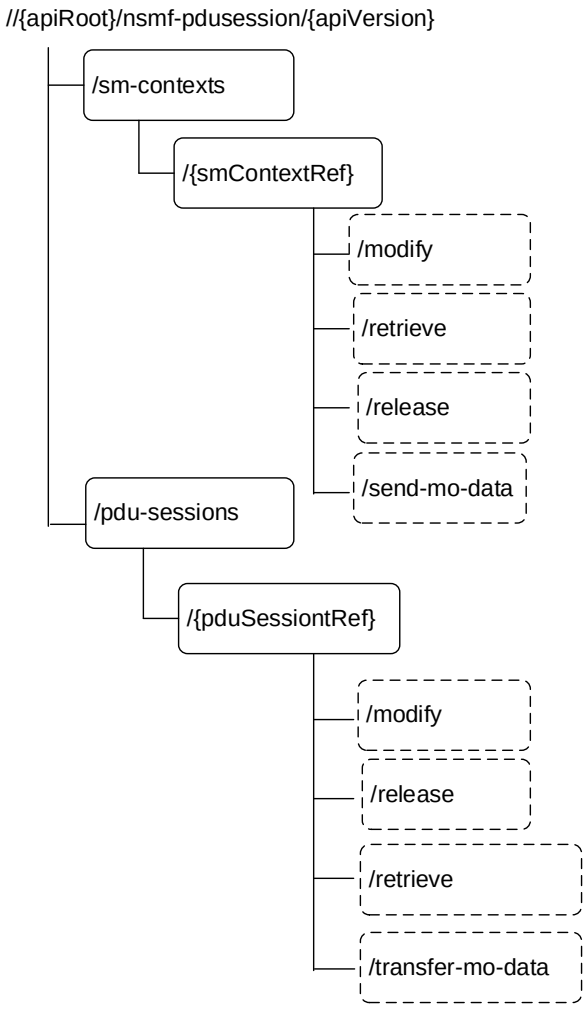

Figure 6.1.3.1-1: Resource URI structure of the Nsmf_PDUSession API

NOTE: The sm-contexts and pdu-sessions collection resources can be distributed on different processing instances or hosts. Thus, the authority and/or deployment-specific string of the apiRoot of the created individual sm context and pdu-session resources' URIs can differ from the authority and/or deployment-specific string of the apiRoot of the sm-contexts and pdu-sessions distributed collections' URIs.

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	Resource URI	HTTP method or custom operation	Description (service operation)
SM contexts collection	/sm-contexts	POST	Create SM Context
Individual SM context	/sm-contexts/{smContextRef}/retrieve	retrieve (POST)	Retrieve SM Context
	/sm-contexts/{smContextRef}/modify	modify (POST)	Update SM Context
	/sm-contexts/{smContextRef}/release	release (POST)	Release SM Context
	/sm-contexts/{smContextRef}/send-mo-data	send-mo-data (POST)	Send MO Data
PDU sessions collection (H-SMF or SMF)	/pdu-sessions	POST	Create
Individual PDU session (H-SMF or SMF)	/pdu-sessions/{pduSessionRef}/modify	modify (POST)	Update (initiated by V-SMF or I-SMF)
	/pdu-sessions/{pduSessionRef}/release	release (POST)	Release
	/pdu-sessions/{pduSessionRef}/retrieve	retrieve (POST)	Retrieve
	/pdu-sessions/{pduSessionRef}/transfer-mo-data	transfer-mo-data (POST)	Transfer MO Data
Individual PDU session (V-SMF or I-SMF)	{vsmfPduSessionUri}/modify or {ismfPduSessionUri}/modify	modify (POST)	Update (initiated by H-SMF or SMF)
	{vsmfPduSessionUri} or {ismfPduSessionUri}	POST	Notify Status
	{vsmfPduSessionUri}/transfer-mt-data or {ismfPduSessionUri}/ transfer-mt-data	transfer-mt-data (POST)	Transfer MT Data

6.1.3.2 Resource: SM contexts collection

6.1.3.2.1 Description

This resource represents the collection of the individual SM contexts created in the SMF.

This resource is modelled with the Collection resource archetype (see clause C.2 of 3GPP TS 29.501 [5]).

6.1.3.2.2 Resource Definition

Resource URI: **{apiRoot}/nsmf-pdusession/<apiVersion>/sm-contexts**

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.

6.1.3.2.3 Resource Standard Methods

6.1.3.2.3.1 POST

This method creates an individual SM context resource in the SMF, or in V-SMF in HR roaming scenarios.

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 POST method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 6.1.3.2.3.1-2 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 POST Request Body on this resource

Data type	P	Cardinality	Description
SmContextCreate Data	M	1	Representation of the SM context to be created in the SMF.

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

Data type	P	Cardinality	Response codes	Description
SmContextCreated Data	M	1	201 Created	Successful creation of an SM context.
RedirectResponse	O	0..1	307 Temporary Redirect	Temporary redirection. (NOTE 2)
RedirectResponse	O	0..1	308 Permanent Redirect	Permanent redirection. (NOTE 2)
SmContextCreateError	M	1	400 Bad Request	The "cause" attribute shall be set to one of the errors defined in Table 5.2.7.2-1 of 3GPP TS 29.500 [4].
ProblemDetails	O	0..1	400 Bad Request	This error shall only be returned by an SCP for errors it originates. As an exception, this error may also be returned by an SMF, with an empty content, for a protocol error other than those specified for the SMF PDUSession service logic (e.g. protocol error found by the HTTP stack).
SmContextCreateError	M	1	403 Forbidden	The "cause" attribute shall be set to one of the following application errors: - N1_SM_ERROR - N2_SM_ERROR - SNSSAI_DENIED - DNN_DENIED - PDUTYPE_DENIED - SSC_DENIED - SUBSCRIPTION_DENIED - DNN_NOT_SUPPORTED - PDUTYPE_NOT_SUPPORTED - SSC_NOT_SUPPORTED - HOME_ROUTED_ROAMING_REQUIRED - OUT_OF_LADN_SERVICE_AREA - NO_EPS_5GS_CONTINUITY - INTEGRITY_PROTECTED_MDR_NOT_ACCEPTABLE - DEFAULT_EPS_BEARER_INACTIVE - NOT_SUPPORTED_WITH_ISMF - SERVICE_NOT_AUTHORIZED_BY_NEXT_HOP - EXCEEDED_UE_SLICE_DATA_RATE - EXCEEDED_SLICE_DATA_RATE See table 6.1.7.3-1 for the description of these errors.
ProblemDetails	O	0..1	403 Forbidden	This error shall only be returned by an SCP for errors it originates. As an exception, this error may also be returned by an SMF, with an empty content, for a protocol error other than those specified for the SMF PDUSession service logic (e.g. protocol error found by the HTTP stack).
SmContextCreateError	M	1	404 Not Found	The "cause" attribute shall be set to one of the following application error: - CONTEXT_NOT_FOUND See table 6.1.7.3-1 for the description of these errors.
ExtProblemDetails	O	0..1	413 Content Too Large	
ExtProblemDetails	O	0..1	415 Unsupported Media Type	
ExtProblemDetails	O	0..1	429 Too Many Requests	
SmContextCreateError	M	1	500 Internal Server Error	The "cause" attribute shall be set to one of the errors defined in Table 5.2.7.2-1 of 3GPP TS 29.500 [4] or to one of the following application errors: - INSUFFICIENT_RESOURCES_SLICE - INSUFFICIENT_RESOURCES_SLICE_DNN See table 6.1.7.3-1 for the description of these errors. (NOTE 3)
ProblemDetails	O	0..1	500 Internal Server Error	This error shall only be returned by an SCP for errors it originates. As an exception, this error may also be returned by an SMF, with an empty content, for a general server error other than those specified for the SMF PDUSession service logic.

SmContextCreateError	C	0..1	502 Bad Gateway	This error shall only be returned when the AMF supports N1N2BGER feature and there are N1/N2 information to be returned to the AMF in the response. The "cause" attribute shall be set to one of the errors defined in Table 5.2.7.2-1 of 3GPP TS 29.500 [4].
ExtProblemDetails	C	0..1	502 Bad Gateway	This error shall be returned by an SMF if the AMF does not support N1N2BGER feature. This error may also be returned by an SCP for errors it originates. The "cause" attribute shall be set to one of the errors defined in Table 5.2.7.2-1 of 3GPP TS 29.500 [4].
SmContextCreateError	M	1	503 Service Unavailable	The "cause" attribute shall be set to one of the errors defined in Table 5.2.7.2-1 of 3GPP TS 29.500 [4] or to one of the following application errors: - DNN_CONGESTION - S_NSSAI_CONGESTION See table 6.1.7.3-1 for the description of these errors.
ProblemDetails	O	0..1	503 Service Unavailable	This error shall only be returned by an SCP for errors it originates. As an exception, this error may also be returned by an SMF, with an empty content, for a general server error other than those specified for the SMF PDUSession service logic.
SmContextCreateError	M	1	504 Gateway Timeout	The "cause" attribute shall be set to one of the following application errors: - PEER_NOT_RESPONDING - NETWORK_FAILURE See table 6.1.7.3-1 for the description of these errors.
ProblemDetails	O	0..1	504 Gateway Timeout	This error shall only be returned by an SCP for errors it originates.
NOTE 1: The mandatory HTTP error status codes for the POST method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] other than those specified in the table above also apply, with a ProblemDetails data type (see clause 5.2.7 of 3GPP TS 29.500 [4]). NOTE 2: RedirectResponse may be inserted by an SCP, see clause 6.10.9.1 of 3GPP TS 29.500 [4]. NOTE 3: If the "cause" attribute was set to the application error "INSUFFICIENT_RESOURCES_SLICE" or "INSUFFICIENT_RESOURCES_SLICE_DNN", the AMF should deprioritize the SMF instance for a short period for SMF selection when handling subsequent PDU session establishment requests towards the same slice and/or DNN.				

Table 6.1.3.2.3.1-4: Headers supported by the 201 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains the URI of the newly created resource, according to the structure: {apiRoot}/nsmf-pdusession/<apiVersion>/sm-contexts/{smContextRef}

Table 6.1.3.2.3.1-5: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located on an alternative service instance within the same SMF or SMF (service) set. For the case when a request is redirected to the same target resource via a different SCP, see clause 6.10.9.1 in 3GPP TS 29.500 [4].
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target SMF (service) instance ID towards which the request is redirected

Table 6.1.3.2.3.1-6: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located on an alternative service instance within the same SMF or SMF (service) set. For the case when a request is redirected to the same target resource via a different SCP, see clause 6.10.9.1 in 3GPP TS 29.500 [4].
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target SMF (service) instance ID towards which the request is redirected

6.1.3.2.4 Resource Custom Operations

None.

6.1.3.3 Resource: Individual SM context

6.1.3.3.1 Description

This resource represents an individual SM context created in the SMF.

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

6.1.3.3.2 Resource Definition

Resource URI: **{apiRoot}/nsmf-pdusession/<apiVersion>/sm-contexts/{smContextRef}**

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.
smContextRef	string	SM context reference assigned by the SMF during the Create SM Context service operation.

6.1.3.3.3 Resource Standard Methods

None.

6.1.3.3.4 Resource Custom Operations

6.1.3.3.4.1 Overview

Table 6.1.3.3.4.1-1: Custom operations

Operation Name	Custom operation URI	Mapped HTTP method	Description
modify	{resourceUri}/modify	POST	Update SM Context service operation
release	{resourceUri}/release	POST	Release SM Context service operation
retrieve	{resourceUri}/retrieve	POST	Retrieve SM Context service operation
send-mo-data	{resourceUri}/send-mo-data	POST	Send MO Data service operation

6.1.3.3.4.2 Operation: modify

6.1.3.3.4.2.1 Description

6.1.3.3.4.2.2 Operation Definition

This custom operation updates an individual SM context resource and/or provide N1 or N2 SM information received from the UE or the AN, for a given PDU session, towards the SMF, or in V-SMF in HR roaming scenario.

This operation shall support the request data structures specified in table 6.1.3.3.4.2.2-1 and the response data structure and response codes specified in table 6.1.3.3.4.2.2-2.

Table 6.1.3.3.4.2.2-1: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
SmContextUpdateData	M	1	Representation of the updates to apply to the SM context.

Table 6.1.3.3.4.2.2-2: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
SmContextUpdatedData	C	0..1	200 OK	Successful update of the SM context, when the SMF needs to return information in the response.
n/a			204 No Content	Successful update of the SM context, when the SMF does not need to return information in the response.
RedirectResponse	O	0..1	307 Temporary Redirect	Temporary redirection. (NOTE 2)
RedirectResponse	O	0..1	308 Permanent Redirect	Permanent redirection. (NOTE 2)
SmContextUpdateError	M	1	400 Bad Request	The "cause" attribute shall be set to one of the errors defined in Table 5.2.7.2-1 of 3GPP TS 29.500 [4].
ProblemDetails	O	0..1	400 Bad Request	This error shall only be returned by an SCP for errors it originates. As an exception, this error may also be returned by an SMF, with an empty content, for a protocol error other than those specified for the SMF PDUSession service logic (e.g. protocol error found by the HTTP stack).
SmContextUpdateError	M	1	403 Forbidden	The "cause" attribute shall be set to one of the following application errors: - N1_SM_ERROR - N2_SM_ERROR - SUBSCRIPTION_DENIED - OUT_OF_LADN_SERVICE_AREA - PRIORITIZED_SERVICES_ONLY - PDU_SESSION_ANCHOR_CHANGE - NO_DATA_FORWARDING - S_NSSAI_UNAVAILABLE_DUE_TO_NSAC See table 6.1.7.3-1 for the description of these errors.
ProblemDetails	O	0..1	403 Forbidden	This error shall only be returned by an SCP for errors it originates. As an exception, this error may also be returned by an SMF, with an empty content, for a protocol error other than those specified for the SMF PDUSession service logic (e.g. protocol error found by the HTTP stack).
SmContextUpdateError	M	1	404 Not Found	The "cause" attribute shall be set to one of the following application error: - CONTEXT_NOT_FOUND See table 6.1.7.3-1 for the description of these errors.
ExtProblemDetails	O	0..1	413 Content Too Large	
ExtProblemDetails	O	0..1	415 Unsupported Media Type	
ExtProblemDetails	O	0..1	429 Too Many Requests	
SmContextUpdateError	M	1	500 Internal Server Error	The "cause" attribute shall be set to one of the errors defined in Table 5.2.7.2-1 of 3GPP TS 29.500 [4].
ProblemDetails	O	0..1	500 Internal Server Error	This error shall only be returned by an SCP for errors it originates. As an exception, this error may also be returned by an SMF, with an empty content, for a general server error other than those specified for the SMF PDUSession service logic.
SmContextUpdateError	O	0..1	502 Bad Gateway	This error shall only be returned when the AMF supports N1N2BGER feature and there are N1/N2 information to be returned to the AMF in the response. The "cause" attribute shall be set to one of the errors defined in Table 5.2.7.2-1 of 3GPP TS 29.500 [4].

ExtProblemDetails	O	0..1	502 Bad Gateway	This error shall be returned by an SMF if the AMF does not support N1N2BGER feature. This error may also be returned by an SCP for errors it originates. The "cause" attribute shall be set to one of the errors defined in Table 5.2.7.2-1 of 3GPP TS 29.500 [4].
SmContextUpdateError	M	1	503 Service Unavailable	The "cause" attribute shall be set to one of the errors defined in Table 5.2.7.2-1 of 3GPP TS 29.500 [4] or to one of the following application errors: - DNN_CONGESTION - S_NSSAI_CONGESTION See table 6.1.7.3-1 for the description of these errors.
ProblemDetails	O	0..1	503 Service Unavailable	This error shall only be returned by an SCP for errors it originates. As an exception, this error may also be returned by an SMF, with an empty content, for a general server error other than those specified for the SMF PDUSession service logic.
SmContextUpdateError	M	1	504 Gateway Timeout	The "cause" attribute shall be set to one of the following application error: - UPF_NOT_RESPONDING See table 6.1.7.3-1 for the description of these errors.
ProblemDetails	O	0..1	504 Gateway Timeout	This error shall only be returned by an SCP for errors it originates. As an exception, this error may also be returned by an SMF, with an empty content, for a general server error other than those specified for the SMF PDUSession service logic.
NOTE 1: The mandatory HTTP error status codes for the POST method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] other than those specified in the table above also apply, with a ProblemDetails data type (see clause 5.2.7 of 3GPP TS 29.500 [4]). NOTE 2: RedirectResponse may be inserted by an SCP, see clause 6.10.9.1 of 3GPP TS 29.500 [4].				

Table 6.1.3.3.4.2.2-3: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located on an alternative service instance within the same SMF or SMF (service) set. For the case when a request is redirected to the same target resource via a different SCP, see clause 6.10.9.1 in 3GPP TS 29.500 [4].
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target SMF (service) instance ID towards which the request is redirected

Table 6.1.3.3.4.2.2-4: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located on an alternative service instance within the same SMF or SMF (service) set. For the case when a request is redirected to the same target resource via a different SCP, see clause 6.10.9.1 in 3GPP TS 29.500 [4].
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target SMF (service) instance ID towards which the request is redirected

6.1.3.3.4.3 Operation: release

6.1.3.3.4.3.1 Description

6.1.3.3.4.3.2 Operation Definition

This custom operation releases an individual SM context resource in the SMF, or in V-SMF in HR roaming scenario

This operation shall support the request data structures specified in table 6.1.3.3.4.3.2-1 and the response data structure and response codes specified in table 6.1.3.3.4.3.2-2.

Table 6.1.3.3.4.3.2-1: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
SmContextReleaseData	C	0..1	Representation of the data to be sent to the SMF when releasing the SM context.

Table 6.1.3.3.4.3.2-2: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
SmContextReleasedData	M	1	200 OK	Successful release of an SM context, when information needs to be returned to the NF Service Consumer (NOTE 2).
n/a			204 No Content	Successful release of an SM context.
RedirectResponse	O	0..1	307 Temporary Redirect	Temporary redirection. (NOTE 3)
RedirectResponse	O	0..1	308 Permanent Redirect	Permanent redirection. (NOTE 3)
NOTE 1: The mandatory HTTP error status codes for the POST method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] other than those specified in the table above also apply, with a ProblemDetails data type (see clause 5.2.7 of 3GPP TS 29.500 [4]). NOTE 2: The support for 200 OK shall be dependent on the support of the indicated feature. NOTE 3: RedirectResponse may be inserted by an SCP, see clause 6.10.9.1 of 3GPP TS 29.500 [4].				

Table 6.1.3.3.4.3.2-3: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located on an alternative service instance within the same SMF or SMF (service) set. For the case when a request is redirected to the same target resource via a different SCP, see clause 6.10.9.1 in 3GPP TS 29.500 [4].
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target SMF (service) instance ID towards which the request is redirected

Table 6.1.3.3.4.3.2-4: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located on an alternative service instance within the same SMF or SMF (service) set. For the case when a request is redirected to the same target resource via a different SCP, see clause 6.10.9.1 in 3GPP TS 29.500 [4].
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target SMF (service) instance ID towards which the request is redirected

6.1.3.3.4.4 Operation: retrieve

6.1.3.3.4.4.1 Description

6.1.3.3.4.4.2 Operation Definition

This custom operation retrieves an individual SM context resource from the SMF, from the V-SMF in HR roaming scenario or from the I-SMF.

This operation shall support the request data structures specified in table 6.1.3.3.4.4.2-1 and the response data structure and response codes specified in table 6.1.3.3.4.4.2-2.

Table 6.1.3.3.4.4.2-1: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
SmContextRetrieveData	O	0..1	Optional parameters used to retrieve the SM context, e.g. target MME capabilities, SM context type.

Table 6.1.3.3.4.4.2-2: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
SmContextRetrievedData	M	1	200 OK	Successful retrieval of the SM context.
RedirectResponse	O	0..1	307 Temporary Redirect	Temporary redirection. (NOTE 2)
RedirectResponse	O	0..1	308 Permanent Redirect	Permanent redirection. (NOTE 2)
ProblemDetails	M	1	403 Forbidden	The "cause" attribute shall be set to one of the following application error: - TARGET_MME_CAPABILITY - DEFAULT_EBI_NOT_TRANSFERRED See table 6.1.7.3-1 for the description of these errors.
ProblemDetails	O	0..1	504 Gateway Timeout	The "cause" attribute may be set to one of the following application errors: - UPF_NOT_RESPONDING See table 6.1.7.3-1 for the description of these errors.
NOTE 1: The mandatory HTTP error status codes for the POST method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] other than those specified in the table above also apply, with a ProblemDetails data type (see clause 5.2.7 of 3GPP TS 29.500 [4]). NOTE 2: RedirectResponse may be inserted by an SCP or SEPP, see clause 6.10.9.1 of 3GPP TS 29.500 [4].				

Table 6.1.3.3.4.4.2-3: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located on an alternative service instance within the same SMF or SMF (service) set. For the case when a request is redirected to the same target resource via a different SCP or SEPP, see clause 6.10.9.1 in 3GPP TS 29.500 [4].
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target SMF (service) instance ID towards which the request is redirected

Table 6.1.3.3.4.4.2-4: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located on an alternative service instance within the same SMF or SMF (service) set. For the case when a request is redirected to the same target resource via a different SCP or SEPP, see clause 6.10.9.1 in 3GPP TS 29.500 [4].
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target SMF (service) instance ID towards which the request is redirected

6.1.3.3.4.5 Operation: send-mo-data

6.1.3.3.4.5.1 Description

6.1.3.3.4.5.2 Operation Definition

This custom operation enables to send mobile originated data received over NAS, for a given PDU session, towards the SMF, or the V-SMF for HR roaming scenarios, or the I-SMF for a PDU session with an I-SMF.

This operation shall support the request data structures specified in table 6.1.3.3.4.5.2-1 and the response data structure and response codes specified in table 6.1.3.3.4.5.2-2.

Table 6.1.3.3.4.5.2-1: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
SendMoDataReq Data	M	1	Representation of the content of a Send MO Data Request

Table 6.1.3.3.4.5.2-2: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	Successful MO data transfer
RedirectResponse	O	0..1	307 Temporary Redirect	Temporary redirection. (NOTE 2)
RedirectResponse	O	0..1	308 Permanent Redirect	Permanent redirection. (NOTE 2)
ExtProblemDetails	O	0..1	400 Bad Request	
ExtProblemDetails	O	0..1	401 Unauthorized	
ExtProblemDetails	O	0..1	403 Forbidden	
ExtProblemDetails	O	0..1	404 Not Found	
ExtProblemDetails	O	0..1	413 Content Too Large	
ExtProblemDetails	O	0..1	415 Unsupported Media Type	
ExtProblemDetails	O	0..1	429 Too Many Requests	
ExtProblemDetails	O	0..1	500 Internal Server Error	
ExtProblemDetails	O	0..1	503 Service Unavailable	
NOTE 1: The mandatory HTTP error status codes for the POST method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] other than those specified in the table above also apply, with a ProblemDetails data type (see clause 5.2.7 of 3GPP TS 29.500 [4]). NOTE 2: RedirectResponse may be inserted by an SCP, see clause 6.10.9.1 of 3GPP TS 29.500 [4].				

Table 6.1.3.3.4.5.2-3: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located on an alternative service instance within the same SMF or SMF (service) set. For the case when a request is redirected to the same target resource via a different SCP, see clause 6.10.9.1 in 3GPP TS 29.500 [4].
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target SMF (service) instance ID towards which the request is redirected

Table 6.1.3.3.4.5.2-4: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located on an alternative service instance within the same SMF or SMF (service) set. For the case when a request is redirected to the same target resource via a different SCP, see clause 6.10.9.1 in 3GPP TS 29.500 [4].
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target SMF (service) instance ID towards which the request is redirected

6.1.3.4 Void

6.1.3.5 Resource: PDU sessions collection (H-SMF or SMF)

6.1.3.5.1 Description

This resource represents the collection of the individual PDU sessions created in the H-SMF for HR PDU sessions or in the SMF for PDU sessions with an I-SMF.

This resource is modelled with the Collection resource archetype (see clause C.2 of 3GPP TS 29.501 [5]).

6.1.3.5.2 Resource Definition

Resource URI: **{apiRoot}/nsmf-pdusession/<apiVersion>/pdu-sessions**

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.

6.1.3.5.3 Resource Standard Methods

6.1.3.5.3.1 POST

This method creates an individual PDU session resource in the H-SMF or SMF.

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 POST method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 6.1.3.5.3.1-2 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 POST Request Body on this resource

Data type	P	Cardinality	Description
PduSessionCreateData	M	1	Representation of the PDU session to be created in the H-SMF or SMF.

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

Data type	P	Cardinality	Response codes	Description
PduSessionCreatedData	M	1	201 Created	Successful creation of a PDU session.
RedirectResponse	O	0..1	307 Temporary Redirect	Temporary redirection. (NOTE 2)
RedirectResponse	O	0..1	308 Permanent Redirect	Permanent redirection. (NOTE 2)
PduSessionCreateError	M	1	400 Bad Request	The "cause" attribute shall be set to one of the errors defined in Table 5.2.7.2-1 of 3GPP TS 29.500 [4].
ProblemDetails	O	0..1	400 Bad Request	This error shall only be returned by an SCP or a SEPP for errors they originate. As an exception, this error may also be returned by an SMF, with an empty content, for a protocol error other than those specified for the SMF PDUSession service logic (e.g. protocol error found by the HTTP stack).
PduSessionCreateError	M	1	403 Forbidden	The "cause" attribute shall be set to one of the following application errors: - N1_SM_ERROR - SNSSAI_DENIED - DNN_DENIED - PDUTYPE_DENIED - SSC_DENIED - SUBSCRIPTION_DENIED - DNN_NOT_SUPPORTED - PDUTYPE_NOT_SUPPORTED - SSC_NOT_SUPPORTED - NO_EPS_5GS_CONTINUITY - INTEGRITY_PROTECTED_MDR_NOT_ACCEPTABLE - NOT_SUPPORTED_WITH_ISMF - EXCEEDED_UE_SLICE_DATA_RATE - EXCEEDED_SLICE_DATA_RATE See table 6.1.7.3-1 for the description of these errors.
ProblemDetails	O	0..1	403 Forbidden	This error shall only be returned by an SCP or a SEPP for errors they originate. As an exception, this error may also be returned by an SMF, with an empty content, for a protocol error other than those specified for the SMF PDUSession service logic (e.g. protocol error found by the HTTP stack).
PduSessionCreateError	M	1	404 Not Found	The "cause" attribute shall be set to one of the following application error: - CONTEXT_NOT_FOUND See table 6.1.7.3-1 for the description of these errors.
PduSessionCreateError	M	1	500 Internal Server Error	The "cause" attribute shall be set to one of the errors defined in Table 5.2.7.2-1 of 3GPP TS 29.500 [4] or to one of the following application errors: - INSUFFICIENT_RESOURCES_SLICE - INSUFFICIENT_RESOURCES_SLICE_DNN See table 6.1.7.3-1 for the description of these errors.
ProblemDetails	O	0..1	500 Internal Server Error	This error shall only be returned by an SCP or a SEPP for errors they originate. As an exception, this error may also be returned by an SMF, with an empty content, for a general server error other than those specified for the SMF PDUSession service logic.
PduSessionCreateError	M	1	503 Service Unavailable	The "cause" attribute shall be set to one of the errors defined in Table 5.2.7.2-1 of 3GPP TS 29.500 [4] or to one of the following application errors: - DNN_CONGESTION - S_NSSAI_ CONGESTION See table 6.1.7.3-1 for the description of these errors.
ProblemDetails	O	0..1	503 Service Unavailable	This error shall only be returned by an SCP or a SEPP for errors they originate. As an exception, this error may also be returned by an SMF, with an empty content, for a general server error other than those specified for the SMF PDUSession service logic.

PduSessionCreateError	M	1	504 Gateway Timeout	The "cause" attribute shall be set to one of the following application errors: - PEER_NOT_RESPONDING - NETWORK_FAILURE See table 6.1.7.3-1 for the description of these errors.
ProblemDetails	O	0..1	504 Gateway Timeout	This error shall only be returned by an SCP or a SEPP for errors they originate.
NOTE 1: The mandatory HTTP error status codes for the POST method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] other than those specified in the table above also apply, with a ProblemDetails data type (see clause 5.2.7 of 3GPP TS 29.500 [4]). NOTE 2: RedirectResponse may be inserted by an SCP or SEPP, see clause 6.10.9.1 of 3GPP TS 29.500 [4].				

Table 6.1.3.5.3.1-4: 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}/nsmf-pdusession/<apiVersion>/pdu-sessions/{pduSessionRef}

Table 6.1.3.5.3.1-5: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located on an alternative service instance within the same SMF or SMF (service) set. For the case when a request is redirected to the same target resource via a different SCP or SEPP, see clause 6.10.9.1 in 3GPP TS 29.500 [4].
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target SMF (service) instance ID towards which the request is redirected

Table 6.1.3.5.3.1-6: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located on an alternative service instance within the same SMF or SMF (service) set. For the case when a request is redirected to the same target resource via a different SCP or SEPP, see clause 6.10.9.1 in 3GPP TS 29.500 [4].
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target SMF (service) instance ID towards which the request is redirected

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

Custom operaration URI	Mapped HTTP method	Description
n/a		

6.1.3.6 Resource: Individual PDU session (H-SMF or SMF)

6.1.3.6.1 Description

This resource represents an individual PDU session created in the H-SMF for a HR PDU session or in the SMF for a PDU session with an I-SMF.

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

6.1.3.6.2 Resource Definition

Resource URI: **{apiRoot}/nsmf-pdusession/<apiVersion>/pdu-sessions/{pduSessionRef}**

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.
pduSessionRef	string	PDU session reference assigned by the H-SMF or SMF during the Create service operation.

6.1.3.6.3 Resource Standard Methods

None.

6.1.3.6.4 Resource Custom Operations

6.1.3.6.4.1 Overview

Table 6.1.3.6.4.1-1: Custom operations

Operation Name	Custom operation URI	Mapped HTTP method	Description
modify	{resourceUri}/modify	POST	Update service operation
release	{resourceUri}/release	POST	Release service operation
transfer-mo-data	{resourceUri}/ transfer-mo-data	POST	Transfer MO Data service operation
retrieve	{resourceUri}/retrieve	POST	Retrieve service operation

6.1.3.6.4.2 Operation: modify

6.1.3.6.4.2.1 Description

6.1.3.6.4.2.2 Operation Definition

This custom operation updates an individual PDU session resource in the H-SMF or SMF and/or provide the H-SMF or SMF with information received by the V-SMF or I-SMF in N1 SM signalling from the UE.

This operation shall support the request data structures specified in table 6.1.3.6.4.2.2-1 and the response data structure and response codes specified in table 6.1.3.6.4.2.2-2.

Table 6.1.3.6.4.2.2-1: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
HsmfUpdateData	M	1	Representation of the updates to apply to the PDU session.

Table 6.1.3.6.4.2.2-2: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
HsmfUpdatedData	C	0..1	200 OK	This case represents a successful update of the PDU session, when the H-SMF or SMF needs to return information in the response.
n/a			204 No Content	This case represents a successful update of the PDU session, when the H-SMF or SMF does not need to return information in the response.
RedirectResponse	O	0..1	307 Temporary Redirect	Temporary redirection. (NOTE 2)
RedirectResponse	O	0..1	308 Permanent Redirect	Permanent redirection. (NOTE 2)
HsmfUpdateError	M	1	400 Bad Request	The "cause" attribute shall be set to one of the errors defined in Table 5.2.7.2-1 of 3GPP TS 29.500 [4].
ProblemDetails	O	0..1	400 Bad Request	This error shall only be returned by an SCP or a SEPP for errors they originate. As an exception, this error may also be returned by an SMF, with an empty content, for a protocol error other than those specified for the SMF PDUSession service logic (e.g. protocol error found by the HTTP stack).
HsmfUpdateError	M	1	403 Forbidden	The "cause" attribute shall be set to one of the following application errors: - N1_SM_ERROR - SUBSCRIPTION_DENIED - PDU_SESSION_ANCHOR_CHANGE - S_NSSAI_UNAVAILABLE_DUE_TO_NSAC - INTEGRITY_PROTECTED_MDR_NOT_ACCEPTABLE See table 6.1.7.3-1 for the description of these errors.
ProblemDetails	O	0..1	403 Forbidden	This error shall only be returned by an SCP or a SEPP for errors they originate. As an exception, this error may also be returned by an SMF, with an empty content, for a protocol error other than those specified for the SMF PDUSession service logic (e.g. protocol error found by the HTTP stack).
HsmfUpdateError	M	1	404 Not Found	The "cause" attribute shall be set to one of the following application error: - CONTEXT_NOT_FOUND See table 6.1.7.3-1 for the description of these errors.
HsmfUpdateError	M	1	500 Internal Server Error	The "cause" attribute shall be set to one of the errors defined in Table 5.2.7.2-1 of 3GPP TS 29.500 [4].
ProblemDetails	O	0..1	500 Internal Server Error	This error shall only be returned by an SCP or a SEPP for errors they originate. As an exception, this error may also be returned by an SMF, with an empty content, for a general server error other than those specified for the SMF PDUSession service logic.
HsmfUpdateError	M	1	503 Service Unavailable	The "cause" attribute shall be set to one of the errors defined in Table 5.2.7.2-1 of 3GPP TS 29.500 [4] or to one of the following application errors: - DNN_CONGESTION - S_NSSAI_CONGESTION See table 6.1.7.3-1 for the description of these errors.
ProblemDetails	O	0..1	503 Service Unavailable	This error shall only be returned by an SCP or a SEPP for errors they originate. As an exception, this error may also be returned by an SMF, with an empty content, for a general server error other than those specified for the SMF PDUSession service logic.
NOTE 1: The mandatory HTTP error status codes for the POST method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] other than those specified in the table above also apply, with a ProblemDetails data type (see clause 5.2.7 of 3GPP TS 29.500 [4]). NOTE 2: RedirectResponse may be inserted by an SCP or SEPP, see clause 6.10.9.1 of 3GPP TS 29.500 [4].				

Table Table 6.1.3.6.4.2.2-3: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located on an alternative service instance within the same SMF or SMF (service) set. For the case when a request is redirected to the same target resource via a different SCP or SEPP, see clause 6.10.9.1 in 3GPP TS 29.500 [4].
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target SMF (service) instance ID towards which the request is redirected

Table Table 6.1.3.6.4.2.2-4: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located on an alternative service instance within the same SMF or SMF (service) set. For the case when a request is redirected to the same target resource via a different SCP or SEPP, see clause 6.10.9.1 in 3GPP TS 29.500 [4].
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target SMF (service) instance ID towards which the request is redirected

6.1.3.6.4.3 Operation: release

6.1.3.6.4.3.1 Description

6.1.3.6.4.3.2 Operation Definition

This custom operation releases an individual PDU session resource in the H-SMF for a HR PDU session or in the SMF for a PDU session with an I-SMF.

This operation shall support the request data structures specified in table 6.1.3.6.4.3.2-1 and the response data structure and response codes specified in table 6.1.3.6.4.3.2-2.

Table 6.1.3.6.4.3.2-1: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
ReleaseData	C	0..1	Representation of the data to be sent to the H-SMF or SMF when releasing the PDU session.

Table 6.1.3.6.4.3.2-2: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
ReleasedData	M	1	200 OK	Successful release of a PDU session context, when information needs to be returned to the NF Service Consumer. (NOTE 2)
n/a			204 No Content	Successful release of a PDU session.
RedirectResponse	O	0..1	307 Temporary Redirect	Temporary redirection. (NOTE 3)
RedirectResponse	O	0..1	308 Permanent Redirect	Permanent redirection. (NOTE 3)
NOTE 1: The mandatory HTTP error status codes for the POST method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] other than those specified in the table above also apply, with a ProblemDetails data type (see clause 5.2.7 of 3GPP TS 29.500 [4]). NOTE 2: The support for 200 OK shall be dependent on the support of the indicated feature. NOTE 3: RedirectResponse may be inserted by an SCP or SEPP, see clause 6.10.9.1 of 3GPP TS 29.500 [4].				

Table 6.1.3.6.4.3.2-3: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located on an alternative service instance within the same SMF or SMF (service) set. For the case when a request is redirected to the same target resource via a different SCP or SEPP, see clause 6.10.9.1 in 3GPP TS 29.500 [4].
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target SMF (service) instance ID towards which the request is redirected

Table 6.1.3.6.4.3.2-4: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located on an alternative service instance within the same SMF or SMF (service) set. For the case when a request is redirected to the same target resource via a different SCP or SEPP, see clause 6.10.9.1 in 3GPP TS 29.500 [4].
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target SMF (service) instance ID towards which the request is redirected

6.1.3.6.4.4 Operation: transfer-mo-data

6.1.3.6.4.4.1 Description

6.1.3.6.4.4.2 Operation Definition

This custom operation enables to transfer mobile originated data received from AMF, for a given PDU session, towards the H-SMF for HR roaming scenarios, or the SMF for a PDU session with an I-SMF.

This operation shall support the request data structures specified in table 6.1.3.6.4.4.2-1 and the response data structure and response codes specified in table 6.1.3.6.4.4.2-2.

Table 6.1.3.6.4.4.2-1: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
TransferMoDataReqData	M	1	Representation of the content of a Transfer MO Data Request

Table 6.1.3.6.4.4.2-2: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	Successful MO data transfer
RedirectResponse	O	0..1	307 Temporary Redirect	Temporary redirection. (NOTE 2)
RedirectResponse	O	0..1	308 Permanent Redirect	Permanent redirection. (NOTE 2)
NOTE 1: The mandatory HTTP error status codes for the POST method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] other than those specified in the table above also apply, with a ProblemDetails data type (see clause 5.2.7 of 3GPP TS 29.500 [4]). NOTE 2: RedirectResponse may be inserted by an SCP or SEPP, see clause 6.10.9.1 of 3GPP TS 29.500 [4].				

Table 6.1.3.6.4.4.2-3: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located on an alternative service instance within the same SMF or SMF (service) set. For the case when a request is redirected to the same target resource via a different SCP or SEPP, see clause 6.10.9.1 in 3GPP TS 29.500 [4].
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target SMF (service) instance ID towards which the request is redirected

Table 6.1.3.6.4.4.2-4: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located on an alternative service instance within the same SMF or SMF (service) set. For the case when a request is redirected to the same target resource via a different SCP or SEPP, see clause 6.10.9.1 in 3GPP TS 29.500 [4].
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target SMF (service) instance ID towards which the request is redirected

6.1.3.6.4.5 Operation: retrieve

6.1.3.6.4.5.1 Description

6.1.3.6.4.5.2 Operation Definition

This custom operation retrieves information from an individual PDU session context in the H-SMF for a HR PDU session or in the SMF for a PDU session with an I-SMF.

This operation shall support the request data structures specified in table 6.1.3.6.4.5.2-1 and the response data structure and response codes specified in table 6.1.3.6.4.5.2-2.

Table 6.1.3.6.4.5.2-1: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
RetrieveData	M	1	Representation of the content of a Retrieve Request

Table 6.1.3.6.4.5.2-2: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
RetrievedData	M	1	200 OK	Successful retrieval of information from a PDU session context.
RedirectResponse	O	0..1	307 Temporary Redirect	Temporary redirection. (NOTE 2)
RedirectResponse	O	0..1	308 Permanent Redirect	Permanent redirection. (NOTE 2)
ProblemDetails	O	0..1	504 Gateway Timeout	The "cause" attribute may be set to one of the following application errors: - UPF_NOT_RESPONDING See table 6.1.7.3-1 for the description of these errors.
NOTE 1: The mandatory HTTP error status codes for the POST method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] other than those specified in the table above also apply, with a ProblemDetails data type (see clause 5.2.7 of 3GPP TS 29.500 [4]). NOTE 2: RedirectResponse may be inserted by an SCP or SEPP, see clause 6.10.9.1 of 3GPP TS 29.500 [4].				

Table 6.1.3.6.4.5.2-3: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located on an alternative service instance within the same SMF or SMF (service) set. For the case when a request is redirected to the same target resource via a different SCP or SEPP, see clause 6.10.9.1 in 3GPP TS 29.500 [4].
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target SMF (service) instance ID towards which the request is redirected

Table 6.1.3.6.4.5.2-4: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located on an alternative service instance within the same SMF or SMF (service) set. For the case when a request is redirected to the same target resource via a different SCP or SEPP, see clause 6.10.9.1 in 3GPP TS 29.500 [4].
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target SMF (service) instance ID towards which the request is redirected

6.1.3.7 Resource: Individual PDU session (V-SMF or I-SMF)

6.1.3.7.1 Description

This resource represents an individual PDU session created in the V-SMF for a HR PDU session or in the I-SMF for a PDU session with an I-SMF.

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

6.1.3.7.2 Resource Definition

Callback URI: **{vsmfPduSessionUri} or {ismfPduSessionUri}**

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

Table 6.1.3.7.2-1: Callback URI variables for this resource

Name	Data type	Definition
vsmfPduSessionUri	Uri	PDU session reference assigned by the V-SMF during the Create service operation.
ismfPduSessionUri	Uri	PDU session reference assigned by the I-SMF during the Create service operation.

6.1.3.7.3 Resource Standard Methods

6.1.3.7.3.1 POST

This method sends a status notification to the NF Service Consumer.

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 POST method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 6.1.3.7.3.1-2 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 POST Request Body on this resource

Data type	P	Cardinality	Description
StatusNotification	M	1	Representation of the status notification.

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

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	Successful notification of status change
RedirectResponse	O	0..1	307 Temporary Redirect	Temporary redirection. (NOTE 2)
RedirectResponse	O	0..1	308 Permanent Redirect	Permanent redirection. (NOTE 2)
NOTE 1: The mandatory HTTP error status codes for the POST method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] other than those specified in the table above also apply, with a ProblemDetails data type (see clause 5.2.7 of 3GPP TS 29.500 [4]). NOTE 2: RedirectResponse may be inserted by an SCP or SEPP, see clause 6.10.9.1 of 3GPP TS 29.500 [4].				

Table 6.1.3.7.3.1-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located on an alternative service instance within the same SMF or SMF (service) set. For the case when a request is redirected to the same target resource via a different SCP or SEPP, see clause 6.10.9.1 in 3GPP TS 29.500 [4].
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target SMF (service) instance ID towards which the request is redirected

Table 6.1.3.7.3.1-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located on an alternative service instance within the same SMF or SMF (service) set. For the case when a request is redirected to the same target resource via a different SCP or SEPP, see clause 6.10.9.1 in 3GPP TS 29.500 [4].
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target SMF (service) instance ID towards which the request is redirected

6.1.3.7.4 Resource Custom Operations

6.1.3.7.4.1 Overview

Table 6.1.3.7.4.1-1: Custom operations

Operation Name	Custom operation URI	Mapped HTTP method	Description
modify	{vsmfPduSessionUri}/modify or {ismfPduSessionUri}/modify	POST	Update service operation (initiated by H-SMF or SMF)
transfer-mt-data	{vsmfPduSessionUri}/transfer-mt-data or {ismfPduSessionUri}/transfer-mt-data	POST	Transfer MT Data service operation

6.1.3.7.4.2 Operation: modify

6.1.3.7.4.2.1 Description

6.1.3.7.4.2.2 Operation Definition

This custom operation modifies an individual PDU session resource in the V-SMF for a HR PDU session or in the I-SMF for a PDU session with an I-SMF.

This operation shall support the request data structures specified in table 6.1.3.7.4.2.2-1 and the response data structure and response codes specified in table 6.1.3.7.4.2.2-2.

Table 6.1.3.7.4.2.2-1: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
VsmfUpdateData	M	1	Representation of the updates to apply to the PDU session.

Table 6.1.3.7.4.2.2-2: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
VsmfUpdatedData	M	1	200 OK	This case represents a successful update of the PDU session, when the V-SMF or I-SMF needs to return information in the response.
n/a			204 No Content	This case represents a successful update of the PDU session, when the V-SMF or I-SMF does not need to return information in the response.
RedirectResponse	O	0..1	307 Temporary Redirect	Temporary redirection. (NOTE 2)
RedirectResponse	O	0..1	308 Permanent Redirect	Permanent redirection. (NOTE 2)
VsmfUpdateError	M	1	400 Bad Request	The "cause" attribute shall be set to one of the errors defined in Table 5.2.7.2-1 of 3GPP TS 29.500 [4].
ProblemDetails	O	0..1	400 Bad Request	This error shall only be returned by an SCP or a SEPP for errors they originate. As an exception, this error may also be returned by an SMF, with an empty content, for a protocol error other than those specified for the SMF PDUSession service logic (e.g. protocol error found by the HTTP stack).
VsmfUpdateError	M	1	403 Forbidden	The "cause" attribute shall be set to one of the following application errors: - N1_SM_ERROR - UNABLE_TO_PAGE_UE - UE_NOT_RESPONDING - REJECTED_BY_UE - REJECTED_DUE_VPLMN_POLICY - HO_TAU_IN_PROGRESS - EBI_EXHAUSTED - EBI_REJECTED_LOCAL_POLICY, if the EBI allocation was rejected due to local policies at the AMF as specified in clause 4.11.1.4.1 of 3GPP TS 23.502 [3]. - EBI_REJECTED_NO_N26, if the EBI allocation was rejected when the AMF is in a serving PLMN that does not support 5GS-EPS interworking procedures with N26 interface as specified in clause 5.17.2.3.1 of 3GPP TS 23.501 [2]. See table 6.1.7.3-1 for the description of these errors.
ProblemDetails	O	0..1	403 Forbidden	This error shall only be returned by an SCP or a SEPP for errors they originate. As an exception, this error may also be returned by an SMF, with an empty content, for a protocol error other than those specified for the SMF PDUSession service logic (e.g. protocol error found by the HTTP stack).
VsmfUpdateError	M	1	404 Not Found	The "cause" attribute shall be set to one of the following application error: - CONTEXT_NOT_FOUND See table 6.1.7.3-1 for the description of these errors.
VsmfUpdateError	O	0..1	409 Conflict	The "cause" attribute may be used to indicate one of the following application errors: - HIGHER_PRIORITY_REQUEST_ONGOING; - UE_IN_CM_IDLE_STATE See table 6.1.7.3-1 for the description of these errors.
VsmfUpdateError	M	1	500 Internal Server Error	The "cause" attribute shall be set to one of the errors defined in Table 5.2.7.2-1 of 3GPP TS 29.500 [4].
ProblemDetails	O	0..1	500 Internal Server Error	This error shall only be returned by an SCP or a SEPP for errors they originate. As an exception, this error may also be returned by an SMF, with an empty content, for a general server error other than those specified for the SMF PDUSession service logic.
VsmfUpdateError	M	1	503 Service Unavailable	The "cause" attribute shall be set to one of the errors defined in Table 5.2.7.2-1 of 3GPP TS 29.500 [4].
ProblemDetails	O	0..1	503 Service Unavailable	This error shall only be returned by an SCP or a SEPP for errors they originate. As an exception, this error may also be returned by an SMF, with an empty content, for a general server error other than those specified for the SMF PDUSession service logic.

VsmfUpdateError	M	1	504 Gateway Timeout	The "cause" attribute shall be set to one of the following application errors: - PEER_NOT_RESPONDING - NETWORK_FAILURE See table 6.1.7.3-1 for the description of these errors.
ProblemDetails	O	0..1	504 Gateway Timeout	This error shall only be returned by an SCP or a SEPP for errors they originate.
NOTE 1: The mandatory HTTP error status codes for the POST method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] other than those specified in the table above also apply, with a ProblemDetails data type (see clause 5.2.7 of 3GPP TS 29.500 [4]). NOTE 2: RedirectResponse may be inserted by an SCP or SEPP, see clause 6.10.9.1 of 3GPP TS 29.500 [4].				

Table 6.1.3.7.4.2.2-3: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located on an alternative service instance within the same SMF or SMF (service) set. For the case when a request is redirected to the same target resource via a different SCP or SEPP, see clause 6.10.9.1 in 3GPP TS 29.500 [4].
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target SMF (service) instance ID towards which the request is redirected

Table 6.1.3.7.4.2.2-4: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located on an alternative service instance within the same SMF or SMF (service) set. For the case when a request is redirected to the same target resource via a different SCP or SEPP, see clause 6.10.9.1 in 3GPP TS 29.500 [4].
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target SMF (service) instance ID towards which the request is redirected

6.1.3.7.4.3 Operation: transfer-mt-data

6.1.3.7.4.3.1 Description

This custom operation enables to transfer mobile terminated data received from NEF, for a given PDU session, towards the V-SMF for HR roaming scenarios, or the I-SMF for a PDU session with an I-SMF.

6.1.3.7.4.3.2 Operation Definition

This operation shall support the request data structures specified in Table 6.1.3.7.4.3.2-1 and the response data structure and response codes specified in Table 6.1.3.7.4.3.2-2.

Table 6.1.3.7.4.3.2-1: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
TransferMtDataReqData	M	1	Representation of the content of a Transfer MT Data Request

Table 6.1.3.7.4.3.2-2: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	Successful MT data transfer
RedirectResponse	O	0..1	307 Temporary Redirect	Temporary redirection. (NOTE 2)
RedirectResponse	O	0..1	308 Permanent Redirect	Permanent redirection. (NOTE 2)
TransferMtDataError	M	1	504 Gateway Timeout	The "cause" attribute may be used to indicate the following application errors: - UE_NOT_REACHABLE, if the UE is not reachable to deliver the mobile terminated data; Estimated Maximum Waiting Time shall be included if available; See table 6.1.7.3-1 for the description of these errors.
NOTE 1: The mandatory HTTP error status codes for the POST method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] other than those specified in the table above also apply, with a ProblemDetails data type (see clause 5.2.7 of 3GPP TS 29.500 [4]). NOTE 2: RedirectResponse may be inserted by an SCP or SEPP, see clause 6.10.9.1 of 3GPP TS 29.500 [4].				

Table 6.1.3.7.4.3.2-3: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located on an alternative service instance within the same SMF or SMF (service) set. For the case when a request is redirected to the same target resource via a different SCP or SEPP, see clause 6.10.9.1 in 3GPP TS 29.500 [4].
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target SMF (service) instance ID towards which the request is redirected

Table 6.1.3.7.4.3.2-4: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located on an alternative service instance within the same SMF or SMF (service) set. For the case when a request is redirected to the same target resource via a different SCP or SEPP, see clause 6.10.9.1 in 3GPP TS 29.500 [4].
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target SMF (service) instance ID towards which the request is redirected

6.1.4 Custom Operations without associated resources

None.

6.1.5 Notifications

6.1.5.1 General

This clause specifies the notifications provided by the Nsmf_PDUSession service.

The delivery of notifications shall be supported as specified in clause 6.2 of 3GPP TS 29.500 [4] for Server-initiated communication.

Table 6.1.5.1-1: Notifications overview

Notification	Callback URI	HTTP method or custom operation	Description (service operation)
SM Context Status Notification	{smContextStatusUri} (NF Service Consumer provided callback reference)	POST	Notify SM Context Status

6.1.5.2 SM Context Status Notification

6.1.5.2.1 Description

If the NF Service Consumer (e.g AMF) has provided the callback URI for getting notified about change of SM context status, the SMF shall notify the NF Service Consumer when the SM context status information is updated.

6.1.5.2.2 Notification Definition

The POST method shall be used for SM context status notification and the URI shall be the callback reference provided by the NF Service Consumer during the subscription to this notification.

Callback URI: **{smContextStatusUri}**

Support of URI query parameters is specified in table 6.1.5.2.2-1.

Table 6.1.5.2.2-1: 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 6.1.5.2.2-2, and support of response data structures and response codes is specified in table 6.1.5.2-3.

Table 6.1.5.2.2-2: Data structures supported by the POST Request Body

Data type	P	Cardinality	Description
SmContextStatus Notification	M	1	Representation of the SM context status notification.

Table 6.1.5.2.2-3: Data structures supported by the POST Response Body

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	Successful notification of the SM context status change
RedirectResponse	O	0..1	307 Temporary Redirect	Temporary redirection. (NOTE 2)
RedirectResponse	O	0..1	308 Permanent Redirect	Permanent redirection. (NOTE 2)
NOTE 1: The mandatory HTTP error status codes for the POST method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] other than those specified in the table above also apply, with a ProblemDetails data type (see clause 5.2.7 of 3GPP TS 29.500 [4]). NOTE 2: RedirectResponse may be inserted by an SCP, see clause 6.10.9.1 of 3GPP TS 29.500 [4].				

Table 6.1.5.2.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	A URI pointing to the endpoint of NF service consumer to which the notification should be sent. For the case when a request is redirected to the same target resource via a different SCP, see clause 6.10.9.1 in 3GPP TS 29.500 [4].
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target NF (service) instance ID towards which the notification is redirected

Table 6.1.5.2.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	A URI pointing to the endpoint of NF service consumer to which the notification should be sent. For the case when a request is redirected to the same target resource via a different SCP, see clause 6.10.9.1 in 3GPP TS 29.500 [4].
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target NF (service) instance ID towards which the notification 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 Nsmf service-based interface protocol.

Table 6.1.6.1-1: Nsmf specific Data Types

Data type	Clause defined	Description
SmContextCreateData	6.1.6.2.2	Data within Create SM Context Request
SmContextCreatedData	6.1.6.2.3	Data within Create SM Context Response
SmContextUpdateData	6.1.6.2.4	Data within Update SM Context Request
SmContextUpdatedData	6.1.6.2.5	Data within Update SM Context Response
SmContextReleaseData	6.1.6.2.6	Data within Release SM Context Request
SmContextRetrieveData	6.1.6.2.7	Data within Retrieve SM Context Request
SmContextStatusNotification	6.1.6.2.8	Data within Notify SM Context Status Request
PduSessionCreateData	6.1.6.2.9	Data within Create Request
PduSessionCreatedData	6.1.6.2.10	Data within Create Response
HsmfUpdateData	6.1.6.2.11	Data within Update Request towards H-SMF, or from I-SMF to SMF
HsmfUpdatedData	6.1.6.2.12	Data within Update Response from H-SMF to V-SMF, or from SMF to I-SMF
ReleaseData	6.1.6.2.13	Data within Release Request
HsmfUpdateError	6.1.6.2.14	Error within Update Response from H-SMF to V-SMF, or from SMF to I-SMF
VsmfUpdateData	6.1.6.2.15	Data within Update Request towards V-SMF, or from SMF to I-SMF
VsmfUpdatedData	6.1.6.2.16	Data within Update Response from V-SMF, or from I-SMF to SMF
StatusNotification	6.1.6.2.17	Data within Notify Status Request
QosFlowItem	6.1.6.2.18	Individual QoS flow
QosFlowSetupItem	6.1.6.2.19	Individual QoS flow to setup
QosFlowAddModifyRequestItem	6.1.6.2.20	Individual QoS flow requested to be created or modified
QosFlowReleaseRequestItem	6.1.6.2.21	Individual QoS flow requested to be released
QosFlowProfile	6.1.6.2.22	QoS flow profile
GbrQosFlowInformation	6.1.6.2.23	GBR QoS flow information
QosFlowNotifyItem	6.1.6.2.24	Notification related to a QoS flow
SmContextRetrievedData	6.1.6.2.27	Data within Retrieve SM Context Response
TunnelInfo	6.1.6.2.28	Tunnel Information
StatusInfo	6.1.6.2.29	Status of SM context or of PDU session
VsmfUpdateError	6.1.6.2.30	Error within Update Response from V-SMF, or from I-SMF to SMF
EpsPdnCnxInfo	6.1.6.2.31	EPS PDN Connection Information from H-SMF to V-SMF, or from SMF to I-SMF
EpsBearerInfo	6.1.6.2.32	EPS Bearer Information from H-SMF to V-SMF, or from SMF to I-SMF
PduSessionNotifyItem	6.1.6.2.33	Notification related to a PDU session
EbiArpMapping	6.1.6.2.34	EBI to ARP mapping
SmContextCreateError	6.1.6.2.35	Error within Create SM Context Response
SmContextUpdateError	6.1.6.2.36	Error within Update SM Context Response
PduSessionCreateError	6.1.6.2.37	Error within Create Response
MmeCapabilities	6.1.6.2.38	MME capabilities
SmContext	6.1.6.2.39	Complete SM Context
ExemptionInd	6.1.6.2.40	Exemption Indication
PsaInformation	6.1.6.2.41	PSA Information
DnaiInformation	6.1.6.2.42	DNAI Information
N4Information	6.1.6.2.43	N4 Information
IndirectDataForwardingTunnelInfo	6.1.6.2.44	Indirect Data Forwarding Tunnel Information
SmContextReleasedData	6.1.6.2.45	Data within Release SM Context Response
ReleasedData	6.1.6.2.46	Data within Release Response
SendMoDataReqData	6.1.6.2.47	Data within Send MO Data Request
CnAssistedRanPara	6.1.6.2.48	SMF derived CN assisted RAN parameters tuning
UlclBpInformation	6.1.6.2.49	UL CL or BP Information
TransferMoDataReqData	6.1.6.2.50	Data within Transfer MO Data Request
TransferMtDataReqData	6.1.6.2.51	Data within Transfer MT Data Request
TransferMtDataError	6.1.6.2.52	Transfer MT Data Error Response
TransferMtDataAddInfo	6.1.6.2.53	Transfer MT Data Error Response Additional Information
VplmnQos	6.1.6.2.54	VPLMN QoS
DdnFailureSubs	6.1.6.2.55	DDN Failure Subscription
RetrieveData	6.1.6.2.56	Data within Retrieve Request
RetrievedData	6.1.6.2.57	Data within Retrieve Response
SecurityResult	6.1.6.2.58	Security Result
UpSecurityInfo	6.1.6.2.59	User Plane Security Information

DdnFailureSubInfo	6.1.6.2.60	DDN Failure Subscription Information
AlternativeQosProfile	6.1.6.2.61	Alternative QoS Profile
ProblemDetailsAddInfo	6.1.6.2.62	Problem Details Additional Information
ExtProblemDetails	6.1.6.2.63	Extended Problem Details
QosMonitoringInfo	6.1.6.2.64	QoS Monitoring Information
IpAddress	6.1.6.2.65	IP Address
RedundantPduSessionInformation	6.1.6.2.66	Redundant PDU Session Information
QosFlowTunnel	6.1.6.2.67	Tunnel Information per QoS Flow
TargetDnaiInfo	6.1.6.2.68	Target DNAI Information
AfCoordinationInfo	6.1.6.2.69	AF Coordination Information
NotificationInfo	6.1.6.2.70	Notification Correlation ID and Notification URI provided by the NF service consumer
AnchorSmfFeatures	6.1.6.2.71	Anchor SMF supported features
HrsboInfoFromVplmn	6.1.6.2.72	HR-SBO Information signaled from VPLMN
HrsboInfoFromHplmn	6.1.6.2.73	HR-SBO Information signaled from HPLMN
EasInfoToRefresh	6.1.6.2.74	EAS information to be refreshed for EAS re-discovery
EcnMarkingCongestionInfoReq	6.1.6.2.75	ECN Marking or Congestion Information Request
EcnMarkingCongestionInfoStatus	6.1.6.2.76	ECN Marking or Congestion Information Status
TscAssistanceInformation	6.1.6.2.77	TSC Assistance Information
N6JitterInformation	6.1.6.2.78	N6 Jitter Information
TrafficInfluenceInfo	6.1.6.2.79	Traffic influence information applicable at the VPLMN for an HR-SBO PDU session.
TrafficInfluenceData	6.1.6.2.80	Traffic influence data comprising the Service Data Flow description and the Application Function influence on traffic routing Enforcement Control parameters of a PCC rule.
LocalOffloadingMgtInfoFromIsmf	6.1.6.2.81	Information signaled by the I-SMF to the SMF for I-SMF based Local Offloading Management
LocalOffloadingMgtInfoToIsmf	6.1.6.2.82	Information signaled by the SMF to the I-SMF for I-SMF based Local Offloading Management
AvailableBitrateMonitoringRequest	6.1.6.2.83	Available Bitrate Monitoring Request information
Teid	6.1.6.3.2	GTP Tunnel Endpoint Identifier
ProcedureTransactionId	6.1.6.3.2	Procedure Transaction Identifier
EpsPdnCnxContainer	6.1.6.3.2	UE EPS PDN Connection container from SMF to AMF
EpsBearerId	6.1.6.3.2	EPS Bearer Id
EpsBearerContainer	6.1.6.3.2	EPS Bearer container from SMF to AMF
EpsBearerContextStatus	6.1.6.3.2	EPS Bearer context status
DrbId	6.1.6.3.2	Data Radio Bearer Identifier
AdditionalTnlNb	6.1.6.3.2	Indication of additional indirect data forwarding tunnel for multi-connectivity
ForwardingBearerContainer	6.1.6.3.2	Forwarding bearer container
SecondaryRatUsageDataReportContainer	6.1.6.3.2	Secondary RAT usage data report container
DnsServerSecurityInformation	6.1.6.3.2	DNS server security information
PduSessionPriority	6.1.6.3.2	PDU Session Priority
ServiceLevelAaContainer	6.1.6.3.2	Service Level AA Container
UpCnxState	6.1.6.3.3	User Plane Connection State
HoState	6.1.6.3.4	Handover State
RequestType	6.1.6.3.5	Request Type in Create (SM context) service operation.
RequestIndication	6.1.6.3.6	Request Indication in Update (SM context) service operation.
NotificationCause	6.1.6.3.7	Cause for generating a notification
Cause	6.1.6.3.8	Cause information
ResourceStatus	6.1.6.3.9	Status of SM context or PDU session resource
DnnSelectionMode	6.1.6.3.10	DNN Selection Mode
EpsInterworkingIndication	6.1.6.3.11	EPS Interworking Indication
N2SmInfoType	6.1.6.3.12	N2 SM Information Type
MaxIntegrityProtectedDataRate	6.1.6.3.13	Maximum Integrity Protected Data Rate
MaReleaseIndication	6.1.6.3.14	Multi-Access PDU session release Indication
SmContextType	6.1.6.3.15	Type of SM Context information
PsaIndication	6.1.6.3.16	Indication of whether a PSA is inserted or removed
N4MessageType	6.1.6.3.17	N4 Message Type
QosFlowAccessType	6.1.6.3.18	Access type associated with the QoS Flow
UnavailableAccessIndication	6.1.6.3.19	Indicates the access type of a MA PDU session that is unavailable
ProtectionResult	6.1.6.3.20	Protection Result of the security policy indicated as "preferred"

QosMonitoringReq	6.1.6.3.21	Indicates to measure UL, or DL, or both UL/DL delays, or to stop on-going measurements.
Rsn	6.1.6.3.22	Redundancy Sequence Number
SmfSelectionType	6.1.6.3.23	SMF Selection Type
PduSessionContextType	6.1.6.3.24	PDU Session Context Type
PendingUpdateInfo	6.1.6.3.25	Pending Update Information
EstablishmentRejectionCause	6.1.6.3.26	PDU Session Establishment Rejection Cause
EcnMarkingReq	6.1.6.3.27	ECN Marking Request
CongestionInfoReq	6.1.6.3.28	Congestion Information Request
ActivationStatus	6.1.6.3.29	Activation Status
QosMonitoringPdSupported	6.1.6.3.30	QoS Monitoring for packet delay supported information
QosMonitoringCongestionSupported	6.1.6.3.31	QoS Monitoring for congestion supported information
AvailableBitrateRequest	6.1.6.3.32	Available Bitrate Request
AvailBitRateMonSupported	6.1.6.3.33	Available Bitrate Monitoring Support Indication
UliChangeGranularity	6.1.6.3.34	ULI Change Granularity
QosMonitoringPdMethod	6.1.6.3.35	Supported QoS Monitoring for Packet Delay Method

Table 6.1.6.1-2 specifies data types re-used by the Nsmf service based interface protocol from other specifications, including a reference to their respective specifications and when needed, a short description of their use within the Nsmf service based interface.

Table 6.1.6.1-2: Nsmf re-used Data Types

Data type	Reference	Comments
Uint32	3GPP TS 29.571 [13]	Unsigned 32-bit integers
Ipv4Addr	3GPP TS 29.571 [13]	IPv4 Address
Ipv6Prefix	3GPP TS 29.571 [13]	IPv6 Prefix
Uri	3GPP TS 29.571 [13]	Uniform Resource Identifier
Supi	3GPP TS 29.571 [13]	Subscription Permanent Identifier
Pei	3GPP TS 29.571 [13]	Permanent Equipment Identifier
Gpsi	3GPP TS 29.571 [13]	General Public Subscription Identifier
AccessType	3GPP TS 29.571 [13]	Access Type (3GPP or non-3GPP access)
SupportedFeatures	3GPP TS 29.571 [13]	Supported features
Qfi	3GPP TS 29.571 [13]	QoS Flow Identifier
PduSessionId	3GPP TS 29.571 [13]	PDU Session Identifier
PduSessionType	3GPP TS 29.571 [13]	PDU Session Type
Ambr	3GPP TS 29.571 [13]	PDU Session Aggregate Maximum Bit Rate
5Qi	3GPP TS 29.571 [13]	5G QoS Identifier
Arp	3GPP TS 29.571 [13]	Allocation and Retention Priority
ReflectiveQoSAttribute	3GPP TS 29.571 [13]	Reflective QoS Attribute
Dynamic5Qi	3GPP TS 29.571 [13]	QoS characteristics for a 5QI that is neither standardized nor pre-configured.
NonDynamic5Qi	3GPP TS 29.571 [13]	QoS characteristics that replace the default QoS characteristics for a standardized or pre-configured 5QI.
PacketLossRate	3GPP TS 29.571 [13]	Packet Loss Rate
NotificationControl	3GPP TS 29.571 [13]	Notification Control
Dnn	3GPP TS 29.571 [13]	Data Network Name
Snssai	3GPP TS 29.571 [13]	Single Network Slice Selection Assistance Information
NfInstanceId	3GPP TS 29.571 [13]	NF Instance Identifier
UserLocation	3GPP TS 29.571 [13]	User Location
TimeZone	3GPP TS 29.571 [13]	Time Zone
ProblemDetails	3GPP TS 29.571 [13]	Error description
UpSecurity	3GPP TS 29.571 [13]	User Plane Security Policy Enforcement information
RefToBinaryData	3GPP TS 29.571 [13]	Cross-Reference to binary data encoded within a binary body part in an HTTP multipart message.
Guami	3GPP TS 29.571 [13]	Globally Unique AMF ID
BackupAmfInfo	3GPP TS 29.571 [13]	Backup AMF Information
PresenceState	3GPP TS 29.571 [13]	Indicates the UE presence in or out of a LADN service area
TraceData	3GPP TS 29.571 [13]	Trace control and configuration parameters
PlmnId	3GPP TS 29.571 [13]	PLMN Identity
RatType	3GPP TS 29.571 [13]	RAT Type
NgApCause	3GPP TS 29.571 [13]	NGAP Cause
5GMmCause	3GPP TS 29.571 [13]	5G MM Cause
DurationSec	3GPP TS 29.571 [13]	Duration in units of seconds
AdditionalQosFlowInfo	3GPP TS 29.571 [13]	Additional QoS Flow Information
NfGroupId	3GPP TS 29.571 [13]	Network Function Group Id
SecondaryRatUsageReport	3GPP TS 29.571 [13]	Secondary RAT Usage Report
SecondaryRatUsageInfo	3GPP TS 29.571 [13]	Secondary RAT Usage Information
Dnai	3GPP TS 29.571 [13]	Data Network Access Identifier
PlmnIdNid	3GPP TS 29.571 [13]	PLMN Identity and, for SNPN, Network Identity
SmallDataRateStatus	3GPP TS 29.571 [13]	Small Data Rate Control Status
ApnRateStatus	3GPP TS 29.571 [13]	APN Rate Control Status
StationaryIndication	3GPP TS 29.571 [13]	Stationary Indication
ScheduledCommunicationTime	3GPP TS 29.571 [13]	Scheduled Communication Time
ScheduledCommunicationType	3GPP TS 29.571 [13]	Scheduled Communication Type
TrafficProfile	3GPP TS 29.571 [13]	Traffic Profile
BatteryIndication	3GPP TS 29.571 [13]	Battery Indication
NfSetId	3GPP TS 29.571 [13]	NF Set Identifier
MoExpDataCounter	3GPP TS 29.571 [13]	MO Exception Data Counter
DddTrafficDescriptor	3GPP TS 29.571 [13]	Traffic Descriptor
NfServiceSetId	3GPP TS 29.571 [13]	NF Service Set ID
RedirectResponse	3GPP TS 29.571 [13]	Response body of the redirect response message
ServerAddressingInfo	3GPP TS 29.571 [13]	Information of a Provisioning Server
PcfUeCallbackInfo	3GPP TS 29.571 [13]	The callback information of the PCF for the UE to allow the PCF for the PDU session to send SM Policy Association Establishment and Termination events notification

SatelliteBackhaulCategory	3GPP TS 29.571 [13]	Satellite backhaul category
Uint16	3GPP TS 29.571 [13]	Unsigned 16-bit integer
GeoSatelliteId	3GPP TS 29.571 [13]	GEO satellite ID (string)
Uinteger	3GPP TS 29.571 [13]	Unsigned Integer common data type
VplmnOffloadingInfo	3GPP TS 29.571 [13]	VPLMN Specific Offloading Information
GroupId	3GPP TS 29.571 [13]	Internal Group Id
OffloadIdentifier	3GPP TS 29.571 [13]	Offload identifier uniquely identifying a VPLMN offloading policy information instance from the HPLMN (for HR-SBO) or a Local Offloading Management Information instance of the PLMN (for I-SMF based Local Offloading Management).
Ipv4AddressRange	3GPP TS 29.571 [13]	IPv4 address range
Ipv6AddressRange	3GPP TS 29.571 [13]	IPv6 address range
Fqdn	3GPP TS 29.571 [13]	FQDN
PduSetQosPara	3GPP TS 29.571 [13]	PDU Set QoS Parameters
SmfChargingId	3GPP TS 29.571 [13]	SMF Charging Identifier
Int32	3GPP TS 29.571 [13]	Signed 32-bit integer
VplmnDlAmbr	3GPP TS 29.571 [13]	Authorized DL Session AMBR for Offloading for the V-PLMN
UeLevelMeasurementsConfiguration	3GPP TS 29.571 [13]	5GC UE level measurements configuration
LocalOffloadingManagementInfo	3GPP TS 29.571 [13]	Local Offloading Management Information
SatelliteId	3GPP TS 29.571 [13]	Unique identifier of a satellite
Bitrate	3GPP TS 29.571 [13]	Bit rate
EcsAddrConfigInfo	3GPP TS 29.503 [46]	ECS Address Configuration Information
ServiceName	3GPP TS 29.510 [19]	Service Name
WAgfInfo	3GPP TS 29.510 [19]	Information about N3 terminations at the W-AGF
TngfInfo	3GPP TS 29.510 [19]	Information about N3 terminations at the TNGF
TwifInfo	3GPP TS 29.510 [19]	Information about N3 terminations at the TWIF
ChargingInformation	3GPP TS 29.512 [30]	CHF addresses
TrafficControlData	3GPP TS 29.512 [30]	Contains parameters influencing the routing of traffic for service data flows.
FlowInformation	3GPP TS 29.512 [30]	Ethernet or IP flow packet filter information
MultiModalId	3GPP TS 29.514 [49]	Multi-Modal Service Identifier
NgRanTargetId	3GPP TS 29.518 [20]	NG-RAN Target Id
SbiBindingLevel	3GPP TS 29.518 [20]	SBI Binding Level
IpIndex	3GPP TS 29.519 [38]	Information that identifies which IP pool or external server is used to allocate the IP address.
EventType	3GPP TS 29.564 [48]	Event type supported by the UPF Event Exposure service
RoamingChargingProfile	3GPP TS 32.291 [26]	Roaming Charging Profile

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: SmContextCreateData

Table 6.1.6.2.2-1: Definition of type SmContextCreateData

Attribute name	Data type	P	Cardinality	Description	Applicability
supi	Supi	C	0..1	This IE shall be present, except if the UE is emergency registered and UICCless. When present, it shall contain the subscriber permanent identify.	
unauthenticatedSupi	boolean	C	0..1	This IE shall be present if the SUPI is present in the message but is not authenticated and is for an emergency registered UE. When present, it shall be set as follows: - true: unauthenticated SUPI; - false (default): authenticated SUPI.	
roamingUeInd	boolean	O	0..1	This IE may be present, when the requestType IE indicates that the request refers to an emergency PDU session and the supi IE is present. When present, this IE shall indicate whether the UE is a roaming UE or not: - true: the UE is a roaming UE. - false: the UE is a non-roaming UE.	
pei	Pei	C	0..1	This IE shall be present if the UE is emergency registered and it is either UICCless or the SUPI is not authenticated. For all other cases, this IE shall be present if it is available. When present, it shall contain the permanent equipment identifier.	
gpsi	Gpsi	C	0..1	This IE shall be present if it is available. When present, it shall contain the user's GPSI.	
pduSessionId	PduSessionId	C	0..1	This IE shall be present, except during an EPS to 5GS Idle mode mobility or handover using the N26 interface. When present, it shall contain the PDU Session ID.	
dnn	Dnn	C	0..1	This IE shall be present, except during an EPS to 5GS Idle mode mobility or handover using the N26 interface. When present, it shall contain the requested DNN; the DNN shall be the full DNN (i.e. with both the Network Identifier and Operator Identifier) for a HR PDU session, and it should be the full DNN in LBO and non-roaming scenarios. If the Operator Identifier is absent, the serving core network operator shall be assumed. (NOTE 9)	
selectedDnn	Dnn	C	0..1	This IE shall be present, if another DNN other than the UE requested DNN is selected for this PDU session. When present, it shall contain the selected DNN. The DNN shall be the full DNN (i.e. with both the Network Identifier and Operator Identifier) for a HR PDU session, and it should be the full DNN in LBO and non-roaming scenarios. If the Operator Identifier is absent, the serving core network operator shall be assumed. (NOTE 9)	

sNssai	Snssai	C	0..1	This IE shall be present during the PDU session establishment procedure. In this case, it shall contain the requested S-NSSAI for the serving PLMN. This corresponds to an S-NSSAI from the allowed NSSAI. This IE shall also be present during an EPS to 5GS idle mode mobility or handover with I-SMF/V-SMF involved using the N26 interface. In this case, it shall contain the S-NSSAI configured in the AMF for EPS interworking. This IE shall also be present during a V-SMF insertion or an inter PLMN V-SMF change procedures. When present, it shall contain the S-NSSAI for the serving PLMN which shall be used by the (target) V-SMF instead of the one that it receives in the SmContext from the old V-SMF or the H-SMF. This IE shall also be present during an inter PLMN I-SMF insertion or change procedures, if the Serving PLMN ID is not the same as the PLMN ID of the SUPI and a mapped S-NSSAI value of the HPLMN is present in the Allowed NSSAI for a non-roaming UE. When present, it shall contain the S-NSSAI for the serving PLMN which shall be used by the (target) I-SMF instead of the one that it receives in the SmContext from the old I-SMF or the SMF. This IE shall also be present in Indirect Network Sharing deployment. It shall contain the S-NSSAI for the hosting operator corresponding to the participating operator's S-NSSAI. See clause 5.18.5 of 3GPP TS 23.501 [2].	
altSnssai	Snssai	C	0..1	This IE shall be present during the PDU session establishment procedure if the NF service consumer supports the network slice replacement, and the network slice indicated in the sNssai IE is requested to be replaced. In this case, the NF service consumer shall send the S-NSSAI and the alternative S-NSSAI. See clause 5.15.19 of 3GPP TS 23.501 [2].	NSRP
hplmnSnssai	Snssai	C	0..1	This IE shall be present for a roaming PDU session, or a non-roaming PDU session if the Serving PLMN ID is not the same as the PLMN ID of the SUPI and a mapped S-NSSAI value of the HPLMN is present in the Allowed NSSAI, except during an EPS to 5GS idle mode mobility or handover using the N26 interface. When present, it shall contain the requested S-NSSAI for the HPLMN. This corresponds to an S-NSSAI from the Mapping of Allowed NSSAI corresponding to the SNSSAI value included in the sNssai IE. This IE shall be present also in Indirect Network Sharing deployment. It shall contain the S-NSSAI for the HPLMN corresponding to the hosting operator's S-NSSAI. See clause 5.18.5 of 3GPP TS 23.501 [2].	
altHplmnSnssai	Snssai	C	0..1	This IE shall be present for a roaming PDU session during the PDU session establishment procedure if the NF service consumer supports the network slice replacement, and the network slice indicated in the hplmnSnssai IE is requested to be replaced. In this case, the NF service consumer shall send the HPLMN S-NSSAI and the alternative HPLMN S-NSSAI. See clause 5.15.19 of 3GPP TS 23.501 [2].	NSRP
servingNfId	NfInstanceId	M	1	This IE shall contain the identifier of the serving NF (e.g. serving AMF).	

guami	Guami	C	0..1	This IE shall contain the serving AMF's GUAMI. It shall be included if the NF service consumer is an AMF.	
serviceName	ServiceName	O	0..1	When present, this IE shall contain the name of the AMF service to which SM context status 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.	
servingNetwork	PlmnIdNid	M	1	This IE shall contain the serving core network operator PLMN ID and, for an SNPN, the NID that together with the PLMN ID identifies the SNPN. This IE shall contain the selected PLMN ID representing the participating operator in the case of Indirect Network Sharing (see clause 5.18.1 of 3GPP TS 23.501 [2]).	
requestType	RequestType	C	0..1	This IE shall be present if the Request type IE is received from the UE for a single access PDU session and if the request refers to an existing PDU session or an existing emergency PDU session. The requestType IE shall not be included for a MA-PDU session establishment request. It may be present otherwise. When present, it shall indicate whether the request refers to a new PDU session or emergency PDU session, or to an existing PDU session or emergency PDU session. For request sent from UE, this IE shall be set based on the Request type IE received (see clause 9.11.3.47 of 3GPP TS 24.501 [7]).	
n1SmMsg	RefToBinaryData	C	0..1	This IE shall be present and reference the N1 SM Message binary data (see clause 6.1.6.4.2), except during an EPS to 5GS Idle mode mobility or handover using N26.	
anType	AccessType	M	1	This IE shall indicate the Access Network Type to which the PDU session is to be associated.	
additionalAnType	AccessType	C	0..1	This IE shall indicate the additional Access Network Type to which the PDU session is to be associated. This IE shall be present if a MA-PDU session is requested and the UE is registered over both 3GPP access and Non-3GPP access.	MAPDU
ratType	RatType	C	0..1	This IE shall be present and indicate the RAT Type used by the UE, if available.	
presenceInLadn	PresenceState	C	0..1	This IE shall be present if the DNN corresponds to a LADN. When present, it shall be set to "IN" or "OUT" to indicate that the UE is in or out of the LADN service area.	
perLadnDnnSnssaiInd	boolean	C	0..1	This IE shall be present, if the AMF enforces the LADN Service Area per LADN DNN and S-NSSAI (see clause 4.3.2.2.1 of 3GPP TS 23.502 [3]). When present, it shall indicate that the PDU Session is subject to LADN per LADN DNN and S-NSSAI and be set as follows: - True: the PDU Session is subject to LADN per LADN DNN and S-NSSAI. - False (default): the PDU Session is not subject to LADN per LADN DNN and S-NSSAI.	
ueLocation	UserLocation	C	0..1	This IE shall contain the UE location information (see clause 5.2.3.4), if it is available. (NOTE 1).	
ueTimeZone	TimeZone	C	0..1	This IE shall contain the UE Time Zone, if it is available.	

addUeLocation	UserLocation	O	0..1	Additional UE location. This IE may be present, if anType indicates a non-3GPP access and valid 3GPP access user location information is available. When present, it shall contain: - the last known 3GPP access user location (see clause 5.2.3.4); and - the timestamp, if available, indicating the UTC time when the addUeLocation information was acquired. (NOTE 1)	
smContextStatusUri	Uri	M	1	This IE shall include the callback URI to receive notification of SM context status.	
hSmfUri	Uri	C	0..1	This IE shall be present in HR roaming scenarios, including Indirect Communication with Delegated Discovery, if the AMF and V-SMF do not support the ACSCR feature. This IE shall be present in HR roaming scenarios during a PDU session establishment procedure and EPS to 5GS mobility procedures, if the AMF and V-SMF support the ACSCR feature. When present, it shall contain the API URI of the Nsmf_PDUSession service of the selected H-SMF. The API URI shall be formatted as specified in clause 6.1.1. (NOTE 8)	
hSmfId	NfInstanceId	O	0..1	This IE may be present when hSmfUri is present. If present, this IE shall carry the NF instance ID of the selected H-SMF. (NOTE 2)	
hsmfSetId	NfSetId	O	0..1	This IE may be present when the hSmfId IE is present, if SMF Set is supported by the H-SMF indicated by the hSmfId. When present, this IE shall contain the NF Set ID of the H-SMF identified by the hSmfId. (NOTE 11)	
smfUri	Uri	C	0..1	This IE shall be present for a PDU session with an I-SMF, including Indirect Communication with Delegated Discovery, if the AMF and I-SMF do not support the ACSCR feature. This IE shall be present for a PDU session with an I-SMF during a PDU session establishment procedure and EPS to 5GS mobility procedures, if the AMF and I-SMF support the ACSCR feature. When present, it shall contain the API URI of the Nsmf_PDUSession service of the selected SMF. The API URI shall be formatted as specified in clause 6.1.1. (NOTE 8)	DTSSA
smfId	NfInstanceId	O	0..1	This IE may be present when smfUri is present. If present, this IE shall carry the NF instance ID of the selected SMF. (NOTE 2)	DTSSA
smfSetId	NfSetId	O	0..1	This IE may be present when the smfId IE is present, if SMF Set is supported by the SMF indicated by the smfId. When present, this IE shall contain the NF Set ID of the anchor SMF identified by the smfId.	
oldPduSessionId	PduSessionId	C	0..1	This IE shall be present if this information is received from the UE. When present, it shall contain the old PDU Session ID received from the UE. See clauses 4.3.2.2.1 and 4.3.5.2 of 3GPP TS 23.502 [3].	

pduSessionsActivateList	array(PduSessionId)	C	1..N	This IE shall be present, during an EPS to 5GS Idle mode mobility using the N26 interface, if the UE indicated PDU session(s) to be activated in the Registration Request. When present, it shall indicate all the PDU session(s) requested to be re-activated by the UE.	
ueEpsPdnConnection	EpsPdnCnxContainer	C	0..1	This IE shall be present, during an EPS to 5GS Idle mode mobility or handover using the N26 interface. When present, it shall contain an MME/SGSN UE EPS PDN connection including the EPS bearer context(s).	
hoState	HoState	C	0..1	This IE shall be present during an EPS to 5GS handover using N26 interface or during a N2 handover with I-SMF insertion/change/removal procedure, to request the preparation of a handover of the PDU session. When present, it shall be set as specified in clauses 5.2.2.2.3 or 5.2.2.2.5.	
additionalHsmfUri	array(Uri)	O	1..N	This IE may be present in HR roaming scenarios. When present, it shall contain an array of API URI of the Nsmf_PDUSession service of the additional H-SMFs discovered by the AMF for the given DNN, hplmnSnssai and for this PDU session. If provided, the V-SMF shall use these additional H-SMF(s) if the V-SMF is not able to receive any response from the H-SMF identified by hSmfUri. The V-SMF may also use these additional H-SMF(s) if the PDU session resource cannot be created due to H-SMF server failure (e.g. insufficient resource). The API URI shall be formatted as specified in clause 6.1.1.	
additionalHsmfId	array(NfInstanceId)	O	1..N	This IE may be present when additionalHsmfUri is present. If present, this IE shall carry the NF instance ID(s) of H-SMF(s) as stated in additionalHsmfUri IE, in exactly the same order. (NOTE 2)	
additionalHsmfSetIdList	map(NfSetId)	O	1..N	This IE may be present when the additionalHsmfId IE is present. When present, this IE shall carry the SMF Set ID per additional H-SMF which supports SMF Set. The NF instance ID of the additional H-SMF is the key of the map. (NOTE 10, NOTE 11)	
additionalSmfUri	array(Uri)	O	1..N	This IE may be present for a PDU session with an I-SMF. When present, it shall contain an array of API URI of the Nsmf_PDUSession service of the additional SMFs discovered by the AMF for the given DNN, Snssai and for this PDU session. If provided, the I-SMF shall use these additional SMF(s) if the I-SMF is not able to receive any response from the SMF identified by smfUri. The I-SMF may also use these additional SMF(s) if the PDU session resource cannot be created due to SMF server failure (e.g. insufficient resource). The API URI shall be formatted as specified in clause 6.1.1.	DTSSA
additionalSmfId	array(NfInstanceId)	O	1..N	This IE may be present when additionalSmfUri is present. If present, this IE shall carry the NF instance ID(s) of SMF(s) as stated in additionalSmfUri IE, in exactly the same order. (NOTE 2)	DTSSA

additionalSmfSetIdList	map(NfSetId)	O	1..N	This IE may be present when the additionalSmfId IE is present. When present, this IE shall carry the SMF Set ID per additional anchor SMF which supports SMF Set. The NF instance ID of the additional anchor SMF is the key of the map. (NOTE 10)	
pcfId	NfInstanceId	O	0..1	When present, this IE shall contain the identifier of: - the H-PCF selected by the AMF (for UE Policy), for a HR PDU session; or - the V-PCF selected by the AMF (for Access and Mobility Policy), for a PDU session in LBO roaming scenarios; or - the PCF selected by the AMF (for Access and Mobility Policy and/or UE Policy), for a PDU session in non-roaming scenarios.	
pcfGroupId	NfGroupId	O	0..1	This IE may be present in non-roaming and HR roaming scenarios. When present, this IE shall contain the identity of the (home) PCF group serving the UE for Access and Mobility Policy and/or UE Policy.	
pcfSetId	NfSetId	O	0..1	This IE may be present if pcfId IE is present. When present, this IE shall contain the NF Set ID of the PCF indicated by the pcfId IE.	
nrfUri	Uri	O	0..1	This IE may be present to indicate the NRF to use for PCF selection within the same network slice instance. When present, the SMF shall use the NRF URI to select the PCF.	
supportedFeatures	SupportedFeatures	C	0..1	This IE shall be present if at least one feature defined in clause 6.1.8 is supported.	
anchorSmfFeatures	SupportedFeatures	C	0..1	This IE shall be present, during the establishment of a HR PDU session or a PDU session with an I-SMF, if the information is known by the AMF. When present, this IE shall include the features of the Nsmf_PDUSession service (see clause 6.1.8) that are supported by anchor SMF. The absence of this IE shall not be interpreted as indicating that the anchor SMF does not support any feature.	
additional AnchorSmfFeatures	array(SupportedFeatures)	C	1..N	This IE shall be present, during the establishment of a HR PDU session or a PDU session with an I-SMF, if the additionalHsmfUri IE or the additionalSmfUri IE is present and the information is known for all the additional anchor SMFs. When present, this IE shall include the features of the Nsmf_PDUSession service (see clause 6.1.8) that are supported by the additional anchor SMFs, in exactly the same order. The absence of this IE shall not be interpreted as indicating that the additional anchor SMFs do not support any feature.	

selMode	DnnSelectionMode	C	0..1	This IE shall be present if it is available. When present, it shall be set to: - "VERIFIED", if the requested DNN provided by UE or the selected DNN provided by the network corresponds to an explicitly subscribed DNN; or - "UE_DNN_NOT_VERIFIED", if the requested DNN provided by UE corresponds to the usage of a wildcard subscription; or - "NW_DNN_NOT_VERIFIED", if the selected DNN provided by the network corresponds to the usage of a wildcard subscription. If both the requested DNN (i.e. dnn IE) and selected DNN (i.e. selected Dnn IE) are present, the selMode shall be related to the selected DNN.	
backupAmfInfo	array(BackupAmfInfo)	C	1..N	This IE shall be included if the NF service consumer is an AMF and the AMF supports the AMF management without UDSF for the following cases: - First interaction with SMF. - Modification of the BackupAmfInfo.	
traceData	TraceData	C	0..1	This IE shall be included if trace is required to be activated (see 3GPP TS 32.422 [22]).	
udmGroupId	NfGroupId	O	0..1	When present, it shall indicate the identity of the UDM group serving the UE.	
routingIndicator	string	O	0..1	When present, it shall indicate the Routing Indicator of the UE.	
hNwPubKeyId	integer	O	0..1	When present, it shall indicate the Home Network Public Key Identifier of the UE. (NOTE 3)	
epsInterworkingInd	EpsInterworkingIndication	C	0..1	An AMF complying with this version of the specification shall provide this IE during a PDU session establishment when a PGW-C+SMF is selected, if EPS interworking is possible (i.e. if the indication takes any value other than "NONE"). An AMF may provide this IE during a PDU session establishment when a PGW-C+SMF is selected, if EPS interworking is not possible (i.e. if the indication takes the value "NONE"). When present, this IE shall indicate whether the PDU session may possibly be moved to EPS or EPC/ePDG and whether N26 interface to be used during EPS interworking procedures. The AMF may derive the value of the indication from different sources, like UE 5GMM capabilities (e.g. "S1 mode supported"), UE subscription data (e.g. "Core Network Type Restriction to EPC" and "Interworking with EPS Indication" for the DNN) and configurations. The SMF shall assume the value "NONE" (or optionally make its decision based on subscription), if no epsInterworkingInd IE is received during a PDU session establishment.	
indirectForwardingFlag	boolean	C	0..1	The AMF shall include this indication during N26 based Handover procedure from EPS to 5GS (see 3GPP TS 23.502 [3], clause 4.11.1.2.2), to inform the SMF of the applicability or non-applicability of indirect data forwarding. When present, it shall be set as follows: - True: indirect data forwarding is applicable - False: indirect data forwarding is not applicable	

directForwardingFlag	boolean	C	0..1	The AMF shall include this indication during N26 based Handover procedure from EPS to 5GS (see 3GPP TS 23.502 [3], clause 4.11.1.2.2), to inform the SMF of the applicability or non-applicability of direct data forwarding. When present, it shall be set as follows: - True: direct data forwarding is applicable - False: direct data forwarding is not applicable	
targetId	NgRanTargetId	C	0..1	This IE shall be present in the following cases: - during an EPS to 5GS handover preparation using the N26 interface, when the hoState IE is set to the value "PREPARING"; - during N2 based handover procedure with I-SMF or V-SMF insertion/change/removal, when hostate IE is set to the value "PREPARING". When present, it shall contain the Target ID identifying the target RAN Node ID and TAI. In case of EPS to 5GS handover, the TAI is received in the Forward Relocation Request from the Source MME.	
epsBearerCtxStatus	EpsBearerContextStatus	C	0..1	This IE shall be present during an EPS to 5GS idle mode mobility using the N26 interface, if received in the Registration Request from the UE. When present, it shall be set to the value received from the UE.	
cpCiotEnabled	boolean	C	0..1	This IE shall be present with the value "True", if - the NF service consumer (e.g. the AMF) has verified that the CIOT feature is supported by the SMF (and for a home-routed session, that it is also supported by the H-SMF); and - Control Plane CIoT 5GS Optimisation is enabled for the PDU session (see 3GPP TS 23.502 [3], clauses 4.3.2.2.1 and 4.3.2.2.2). When present, it shall be set as follows: - True: Control Plane CIoT 5GS Optimisation is enabled. - False (default): Control Plane CIoT 5GS Optimisation is not enabled.	CIOT
cpOnlyInd	boolean	C	0..1	This IE shall be present with the value "True", if the PDU session shall only use Control Plane CIoT 5GS Optimisation (see clause 5.31.4.1 of 3GPP TS 23.501 [2]). When present, it shall be set as follows: - True: the PDU session shall only use Control Plane CIoT 5GS Optimisation - False (default): the PDU session is not constrained to only use Control Plane CIoT 5GS Optimisation.	CIOT
invokeNef	boolean	C	0..1	This IE shall be present with the value "True", if Control Plane CIoT 5GS Optimisation is enabled and data delivery via NEF is selected for the PDU session (see 3GPP TS 23.502 [3], clause 4.3.2.2.2). When present, it shall be set as follows: - True: Data delivery via NEF is selected. - False (default): Data delivery via NEF is not selected.	CIOT

maRequestInd	boolean	C	0..1	This IE shall be present if a MA-PDU session is requested to be established. When present, it shall be set as follows: - True: a MA-PDU session is requested - False (default): a MA-PDU session is not requested	MAPDU
maNwUpgradeInd	boolean	C	0..1	This IE shall only be present if the PDU session is allowed to be upgraded to MA PDU session (see clause 4.22.3 of 3GPP TS 23.502 [3]). When present, it shall be set as follows: - True: the PDU session is allowed to be upgraded to MA PDU session - False (default): the PDU session is not allowed to be upgraded to MA PDU session When maRequestInd is present and set to "true", this IE shall not be present.	MAPDU
n3gPathSwitchSupportInd	boolean	C	0..1	This IE shall be present if AMF supports non-3GPP access path switching while maintaining two N2 connections for non-3GPP access, the selected SMF supports non-3GPP path switching and if the UE supports non-3GPP access path switching for a MA-PDU session. When present, it shall be set as follows: - true: non-3GPP access path switching is supported - false (default): non-3GPP access path switching is not supported	N3GPS
n2SmInfo	RefToBinaryData	C	0..1	This IE shall be present if N2 SM Information needs to be sent to the I-SMF.	DTSSA
n2SmInfoType	N2SmInfoType	C	0..1	This IE shall be present if "n2SmInfo" attribute is present. When present, this IE shall indicate the NG AP IE type for the NG AP SMF related IE container carried in "n2SmInfo" attribute.	DTSSA
n2SmInfoExt1	RefToBinaryData	C	0..1	This IE shall be present if more than one N2 SM Information has been received from the AN. When present, this IE shall reference the N2 SM Information binary data (see clause 6.1.6.4.3).	DTSSA
n2SmInfoTypeExt1	N2SmInfoType	C	0..1	This IE shall be present if "n2SmInfoExt1" attribute is present. When present, this IE shall indicate the NG AP IE type for the NG AP SMF related IE container carried in "n2SmInfoExt1" attribute.	DTSSA
smContextRef	Uri	C	0..1	This IE shall be present during an I-SMF or V-SMF insertion if available and during an I-SMF or V-SMF change or removal. When present, this IE shall contain the URI of the SM Context resource in the SMF or of the SM context resource in the source I-SMF or V-SMF during an I-SMF or V-SMF insertion or during an I-SMF or V-SMF change/removal respectively. The URI shall be an absolute URI, including apiRoot (see clause 6.1.3.3.2). (NOTE 6)	DTSSA
smContextSmfPlmnId	PlmnIdNid	C	0..1	This IE shall be present during an inter-PLMN mobility procedure if the smContextRef IE is present. It may be present otherwise, if the smContextRef IE is present. When present, this IE shall carry the PLMN ID of the SMF which hosts the SM Context resource identified by smContextRef IE. For an SNPN, the NID together with the PLMN ID shall identify the SNPN. (NOTE 7)	DTSSA

smContextSmfId	NfInstanceId	O	0..1	This IE may be present if smContextRef is present. When present, this IE shall carry the NF instance ID of the SMF which hosts the SM Context resource identified by smContextRef IE. (NOTE 2)	DTSSA
smContextSmfSetId	NfSetId	C	0..1	This IE shall be present, if available. When present, this IE shall contain the NF Set ID of the old V-SMF or the old I-SMF or the SMF as identified by the smContextSmfId.	DTSSA
smContextSmfService SetId	NfServiceSetId	C	0..1	This IE shall be present, if available. When present, this IE shall contain the NF Service Set ID of the PDUSession service instance (for this SmContext) in the old V-SMF or the old I-SMF or the SMF.	DTSSA
smContextSmfBinding	SbiBindingLevel	C	0..1	This IE shall be present, if available. When present, this IE shall contain the SBI binding level of the SM context resource.	DTSSA
upCnxState	UpCnxState	C	0..1	This IE shall be present to request the activation of the user plane connection of the PDU session, in the following cases: - during Service Request procedure with an I-SMF insertion / change / removal, or with a V-SMF change (see clause 5.2.2.2.6); - during Registration procedure with an I-SMF insertion / change / removal, or with a V-SMF insertion / change / removal (see clause 5.2.2.2.7), if this PDU session is requested to be activated by the UE.	DTSSA
smallDataRateStatus	SmallDataRateStatus	C	0..1	This IE shall be present if the small data rate control status is available in AMF, see clause 5.31.14.3 of 3GPP TS 23.501 [2] and clause 4.3.2.2.1 of 3GPP TS 23.502 [3].	CIOT
apnRateStatus	ApnRateStatus	C	0..1	This IE shall be present if the APN rate control status is available in AMF, see clause 4.7.7.3 in 3GPP TS 23.401 [33] and clause 5.2.8.2.5 in 3GPP TS 23.502 [3].	CIOT
extendedNasSmTimer Ind	boolean	C	0..1	This IE shall be present with the value "True" if the UE supports CE mode B and use of CE mode B is not restricted according to the Enhanced Coverage Restriction information in the UE context in the AMF. When present, it shall indicate whether extended NAS SM timers shall be used for the UE as specified in 3GPP TS 24.501 [7], as follows: - True: extended NAS SM timers shall be used - False (default): normal NAS SM timers shall be used.	CIOT
dlDataWaitingInd	boolean	C	0..1	This IE shall be present during an EPS to 5GS Idle mode mobility using N26 interface with data forwarding (see clause 4.11.1.3.3A of 3GPP TS 23.502 [3]), if the same indication is received from the MME in the Context Response message. When present, it shall be set as follows: - true: DL data needs to be sent to the UE; - false (default): no DL data needs to be sent to the UE.	CIOT

ddnFailureSubs	DdnFailureSubs	C	0..1	This IE shall be present to subscribe the notification of the DDN Failure if the Availability after DDN failure event is subscribed by the UDM, see clause 4.15.3.2.7 of 3GPP TS 23.502 [3].	CIOT
smfTransferInd	boolean	C	0..1	This IE shall be present during an SMF Context Transfer procedure, LBO or no Roaming, no I-SMF. When present, it shall be set as follows: - True: SMF Context Transfer - False (default): Not an SMF Context Transfer	CTXTR
oldSmfId	NfInstanceId	C	0..1	This IE shall be present if smfTransferInd is set to true. When present, it shall indicate old SMF instance identifier.	CTXTR
oldSmContextRef	Uri	C	0..1	This IE shall be present if smfTransferInd is set to true. When present, this IE shall contain the URI of the SM Context resource in the old SMF.	CTXTR
				This IE shall be present, without smfTransferInd set, if this information was received earlier with the resourceStatus IE set to "UNCHANGED" in Notify SM Context Status. When present, this IE shall contain the URI of the SM Context resource (with structure as specified in clause 6.1.3.3.2) in the old SMF including AF coordination information, see clause 4.3.5.2 of 3GPP TS 23.502 [3]. This IE shall be used by the SMF to retrieve the AF coordination information from the old SMF, as specified in clause 5.2.2.6.1.	EnEDGE
wAgfInfo	WAgfInfo	C	0..1	This IE shall be present, if received from the W-AGF. When present, it shall contain information about the N3 terminations of the W-AGF. The SMF may use this information when selecting the UPF.	
tngfInfo	tngfInfo	C	0..1	This IE shall be present, if received from the TNGF. When present, it shall contain information about the N3 terminations of the TNGF. The SMF may use this information when selecting the UPF.	
twifInfo	twifInfo	C	0..1	This IE shall be present, if received from the TWIF. When present, it shall contain information about the N3 terminations of the TWIF. The SMF may use this information when selecting the UPF.	
ranUnchangedInd	boolean	C	0..1	This IE shall be present if the NG-RAN is not changed in case of I-SMF/V-SMF change or insertion during CM-CONNECTED registration procedure after EPS to 5GS handover (see clause 5.2.2.2.7) or I-SMF/V-SMF selection per DNAI (see clause 5.2.2.2.12). When present, it shall be set as follows: - true: NG-RAN is not changed; - false: NG-RAN is changed.	DTSSA
samePcfSelectionInd	boolean	C	0..1	This IE shall be present, if the AMF received the PCF Selection Assistance info from the UDM indicating that the same PCF is required. (NOTE 4) When present, it shall be set as follows: - True: the SMF is indicated to select the same PCF instance for the PDU session. - False (default): the SMF is not indicated to select the same PCF instance for the PDU session.	
targetDnai	Dnai	C	0..1	This IE shall be present, if this information was received earlier in Notify SM Context Status. I-SMF or SMF shall use this information for I-UPF / L-PSA / PSA selection, see clauses 4.3.5.1, 4.3.5.2 or 4.23.5.4 of 3GPP TS 23.502 [3]. V-SMF shall use this information for V-UPF selection, see clause 6.7.3.2 of 3GPP TS 23.548 [74].	EnEDGE HR-SBO

nrfManagementUri	Uri	C	0..1	If included, this IE shall contain the API URI of the NFManagement Service (see clause 6.1.1 of 3GPP TS 29.510 [19]) of the NRF or hNRF. It shall be present during the PDU session establishment procedure with an I-SMF/V-SMF or mobility procedure with I-SMF/V-SMF insertion/change, if it is returned from the NSSF or hNSSF (see clause 6.1.6.2.7 of 3GPP TS 29.531 [40]).	
nrfDiscoveryUri	Uri	C	0..1	If included, this IE shall contain the API URI of the NFDiscovery Service (see clause 6.2.1 of 3GPP TS 29.510 [19]) of the NRF or hNRF. It shall be present during the PDU session establishment procedure with an I-SMF/V-SMF or mobility procedure with I-SMF/V-SMF insertion/change, if it is returned from the NSSF or hNSSF (see clause 6.1.6.2.7 of 3GPP TS 29.531 [40]).	
nrfAccessTokenUri	Uri	C	0..1	If included, this IE shall contain the API URI of the Access Token Service (see clause 6.3.2 of 3GPP TS 29.510 [19]) of the NRF or hNRF. It shall be present during the PDU session establishment procedure with an I-SMF/V-SMF or mobility procedure with I-SMF/V-SMF insertion/change, if it is returned from the NSSF or hNSSF (see clause 6.1.6.2.7 of 3GPP TS 29.531 [40]).	
nrfOauth2Required	map(boolean)	O	1..N	This IE should be present if the nrfUri IE, nrfManagementUri IE or nrfDiscoveryUri IE is present and if the information is available. When present, this IE shall indicate whether the NRF requires Oauth2-based authorization for accessing its services. The key of the map shall be the name of an NRF service, e.g. "nnrf-nfm" or "nnrf-disc". The value of each entry of the map shall be encoded as follows: - true: OAuth2 based authorization is required. - false: OAuth2 based authorization is not required. The absence of this IE means that no indication is available about the usage of Oauth2 for authorization of NRF services.	
smfBindingInfo	string	C	0..1	This IE shall be present, if available. When present, this IE shall contain the Binding indications of the SM context resource and shall be set to the value of the 3gpp-Sbi-Binding header defined in clause 5.2.3.2.6 of 3GPP TS 29.500 [4], without the header name.	DTSSA
pvsInfo	array(ServerAddressingInfo)	C	1..N	This IE shall be present, if the AMF received this information from AUSF during User Plane Remote Provisioning of UEs procedure (see clause 5.30.2.10.4 of 3GPP TS 23.501 [2]). When present, this IE shall contain the remote Provisioning Server(s) information.	ENPN

onboardingInd	boolean	C	0..1	This IE shall be present, if the UE is registered for onboarding in an SNPN (see clause 5.30.2.10.4 in 3GPP TS 23.501 [40] and clause 4.2.2.2.4 in 3GPP TS 23.502 [3]). - false (default): The UE is not registered in an SNPN for the purpose of onboarding; - true: The UE has registered in the SNPN for the purpose of onboarding.	ENPN
oldPduSessionRef	Uri	C	0..1	This IE shall be present if this information was received earlier in Notify SM Context Status, see clause 4.3.5.2 of 3GPP TS 23.502 [3]. When present, this IE shall contain the URI of the PDU session resource in the old SMF. The URI shall be an absolute URI, including apiRoot (see clause 6.1.3.6.2).	EnEDGE
smPolicyNotifyInd	boolean	O	0..1	When present, this IE shall indicate whether the SM Policy Association Establishment and Termination events shall be reported for the PDU session by the PCF for the SM Policy to the PCF for the UE: - true: SM Policy Association Establishment and Termination events shall be reported - false (default): SM Policy Association Establishment and Termination events is not required (NOTE 5)	SPAE
pcfUeCallbackInfo	PcfUeCallbackInfo	C	0..1	This IE shall be present when the smPolicyNotifyInd IE is present with value true. When present, this IE shall contain the callback information (callback URI and binding information, if available) of the PCF for the UE to receive SM Policy Association Establishment and Termination events notification from the PCF for the SM Policy. (NOTE 5)	SPAE
satelliteBackhaulCat	SatelliteBackhaulCategory	O	0..1	This IE may be present if the AMF supports the 5GSAT feature and the AMF is aware that there is a satellite backhaul towards the 5G AN serving the UE. When present, this IE shall indicate the category of the satellite backhaul used towards the 5G AN serving the UE.	5GSAT
upipSupported	boolean	C	0..1	This IE shall be present during the PDU session establishment procedure, if the UE supports User Plane Integrity Protection with EPS and if the AMF supports the related functionality. It may be present otherwise. When present, this IE shall be set as follows: - true: User Plane Integrity Protection with EPS is supported; - false (default): User Plane Integrity Protection with EPS is not supported.	UPIPE
disasterRoamingInd	boolean	O	0..1	This IE may be set when the UE is registered for Disaster Roaming service. When present, this IE shall be set as follows: - true: the UE is registered for Disaster Roaming service - false (default): the UE is not registered for Disaster Roaming service	

anchorSmfOauth2Required	boolean	O	0..1	When present, this IE shall indicate whether the H-SMF or SMF for a PDU session with an I-SMF requires Oauth2-based authorization for accessing its Nsmf_PDUSession service. - true: OAuth2 based authorization is required. - false: OAuth2 based authorization is not required. The absence of this IE means that no indication is available about the usage of Oauth2 for authorization of the anchor SMF's Nsmf_PDUSession service. (NOTE 2)	
smContextSmfOauth2Required	boolean	O	0..1	This IE may be present during an I-SMF insertion, change or removal. This IE may be present when V-SMF changes within the same PLMN. When present, this IE shall indicate whether the SMF hosting the SM Context requires Oauth2-based authorization for accessing its Nsmf_PDUSession service. - true: OAuth2 based authorization is required. - false: OAuth2 based authorization is not required. The absence of this IE means that no indication is available about the usage of Oauth2 for authorization of the Nsmf_PDUSession service on the SMF hosting the SM Context. (NOTE 2)	
geoSatelliteId	GeoSatelliteId	O	0..1	The AMF may include this IE during a PDU Session Establishment procedure (see clause 4.3.2.2.1 of 3GPP TS 23.502 [3]) for support of 5G satellite backhaul as defined in clause 5.43 of 3GPP TS 23.501 [2]. When present, this IE shall contain a GEO satellite ID.	5GSATB
servingSatelliteId	SatelliteId	O	0..1	The AMF may include this IE during a PDU Session Establishment procedure (see clause 4.3.2.2.1 of 3GPP TS 23.502 [3]) to support UE-Satellite-UE communication for the NR satellite access as defined in clause 5.4.14 of 3GPP TS 23.501 [2]. When present, this IE shall contain UE's serving satellite ID.	5GSAT-ACCESS
hrsboAllowedInd	boolean	O	0..1	This IE may be present in HR roaming scenarios. When present, this IE shall Indicate whether Session Breakout for HR Session in VPLMN is allowed: - true: Allowed. - false (default): Not allowed.	HR-SBO
estabRejectionInd	boolean	O	0..1	This IE may be present with the value true if the AMF has determined that the PDU Session Establishment shall be rejected, e.g. according to the ODB configuration of the UE retrieved from the UDM. Presence of this IE with the value false shall be prohibited.	PSER
estabRejectionCause	EstablishmentRejectionCause	C	0..1	This IE shall be included if the estabRejectionInd is present with the value true. When present, this IE shall indicate the cause of the PDU session establishment rejection.	PSER

sliceAreaRestrictInd	boolean	C	0..1	This IE shall be present and set to true if the AMF determines that the PDU Session is subject to area restriction for the S-NSSAI, i.e. if the S-NSSAI is part of the partially allowed NSSAI or if the support of the S-NSSAI is restricted to a NS-AoS. See clauses 5.15.17 and 5.15.18 of 3GPP TS 23.501 [2]. Presence of this IE with the false value shall be prohibited.	SAR
qosMonitoringPdSupported	QosMonitoringPdSupported	C	0..1	This IE shall be present if the QME feature is supported by AMF and SMF and if the information is available. When present, this IE shall indicate whether the NG-RAN supports the QoS monitoring for packet delay feature. See clause 5.45.1 of 3GPP TS 23.501 [2].	QME
qosMonitoringPdMethods	array(QosMonitoringPdMethod)	O	1..N	This IE should be present when the qosMonitoringPdSupported IE is present and set to SUPPORTED. When present, this IE shall indicate the supported method(s) for QoS Monitoring for packet delay in the NG-RAN.	QME
qosMonitoringCongestionSupported	QosMonitoringCongestionSupported	C	0..1	This IE shall be present if: - the QME feature is supported by the AMF; - the QME feature and the EMECI feature are supported by the SMF; and - the information is available. When present, this IE shall indicate whether the NG-RAN supports the QoS monitoring for congestion feature. See clause 5.45.1 of 3GPP TS 23.501 [2].	QME
availBitRateMonSupported	AvailBitRateMonSupported	C	0..1	This IE shall be present if the AVABIT feature is supported by AMF and SMF and if the information is available. When present, this IE shall indicate whether the NG-RAN supports the available bitrate monitoring feature. See clause 5.45.1 of 3GPP TS 23.501 [2].	AVABIT
ueLevelMeasConfig	UeLevelMeasurementsConfiguration	C	0..1	This IE shall be present if the signalling based UE Level Measurement task is activated. When present, this IE shall contain UE Level Measurement configuration data for UE (see clause 4.1.2.18 of 3GPP TS 32.422 [22]).	
pgwChangeInd	boolean	C	0..1	This IE shall be present if the AMF performs PDN connection restoration at an alternative PGW-C/SMF during a EPS to 5GS mobility procedure. See clause 31.5 of 3GPP TS 23.007 [45]. When present, this IE shall indicate whether it is the restoration of the PDN connection at an alternative PGW-C/SMF. - true: it is for the restoration of the PDN connection at an alternative PGW-C/SMF Presence of this IE with the value false shall be prohibited.	
localOffloadingMgtAllowedInd	boolean	C	0..1	This IE shall be present with the value true, if Local Offloading Management is allowed based on subscription data and the UE is within a Local Offloading Management service area. The presence of this IE with the value false shall be prohibited.	ISMF-LOM

priorityUserInd	boolean	C	0..1	This IE shall be present and set to true if the AMF determines that the subscriber is a priority user, during HR PDU Session Establishment or V-SMF insertion scenarios. Presence of this IE with the value false shall be prohibited. (NOTE 12)	

NOTE 1: In shared networks, when the message is sent from the VPLMN to the HPLMN, the PLMN ID that is communicated in this IE shall be that of the selected Core Network Operator.
In shared networks, when the AMF and SMF pertain to the same PLMN, the Primary PLMN ID shall be communicated in the ECGI or NCGI to the SMF. The Core Network Operator PLMN ID shall be communicated in the TAI and the Serving Network.

NOTE 2: If the SMF is aware that Oauth is enabled for the indicated next hop SMF, e.g. when the anchorSmfOauth2Required IE and/or the smContextSmfOauth2Required IE are received with the value true or when received a "401 Unauthorized" response code from next hop SMF, the SMF shall use the NF instance Identifier to acquire the access token for the Nsmf_PduSession service on the indicated SMF.

NOTE 3: If present, this attribute shall be used together with routingIndicator. This attribute is only used by the HPLMN in roaming scenarios.

NOTE 4: If present, this attribute shall be used together with the PCF ID received from the AMF for selecting the same PCF instance for the PDU session.

NOTE 5: If the AMF has received the callback information of the PCF for the UE together with the information of the PDU sessions (i.e. Slice and DNN combination) that are applicable for notification of SM Policy Association events (from PCF or from old AMF in UE Context), during the PDU session establishment procedure, the AMF shall identify whether the non-roaming or local breakout PDU session to be created is applicable for SM Policy Association events, i.e, whether the slice and DNN combination of the PDU session is listed in the received PDU session information from the PCF for the UE. If the PDU session is applicable for notification of SM Policy Association events, the AMF shall include the smPolicyNotifyInd IE with the value "true" and the callback information of the PCF for the UE in the request. The SMF shall forward the callback information of the PCF for the UE to the PCF for SM Policy during SM Policy Association Establishment. See clause 4.3.2.2.1 of 3GPP TS 23.502 [3].

NOTE 6: See NOTE 2 of Table 6.1.6.2.3-1.

NOTE 7: If the PLMN ID of the SMF holding the SM context received in smContextSmfPlmnId attribute is different from the PLMN ID of the target V-SMF/I-SMF/anchor SMF, the target V-SMF/I-SMF/anchor SMF shall retrieve the SM Context from the SMF via the SEPP. In this case, the smContextSmfPlmnId attribute may also be used for the discovery and selection of the local SEPP.

NOTE 8: The smfUri and hSmfUri attributes need not be included in Create SM Context request in procedures other than PDU session establishment procedure and EPS to 5GS mobility procedures if the NF Service Consumer (e.g. AMF) and I-SMF/V-SMF support the "ACSCR" feature. See clause 6.1.8.

NOTE 9: When the AMF supports the "subscription-based routing to a target core network" feature as specified in clause 5.48 of 3GPP TS 23.501 [2] and it receives the targetPlmnId as part of SmfSelectionSubscriptionData, it shall include the targetPlmnId as Operator Identifier in the Dnn to establish the PDU session in the SMF in that PLMN.
The V/I-SMF shall forward the Dnn to the (H-)SMF in the PduSessionCreateData and should include the Dnn as one of query parameters if it needs to perform a service discovery to select an alternative (H-)SMF, e.g., when the binding indication is not received from the failed (H-)SMF. If the PDU session is a HR PDU session, the V-SMF shall include the target-plmn-list set to the PLMN ID derived from UE's SUPI in the discovery request message.

NOTE 10: Additional (H-)SMF instances belonging to different SMF Sets shall be allowed only during establishment of a new PDU session, i.e. when Create SM Context is invoked for an existing PDU session (e.g. I-SMF/V-SMF insertion or change) or PDN connection (e.g. EPS to 5GS mobility), only alternative SMF instances within the same SMF Set of the (H-)SMF can be reselected.

NOTE 11: If an H-SMF Set ID is received, the V-SMF may further delegate the re-selection of the H-SMF instance within the H-SMF set selected by the AMF as specified in clause 4.17.10a of 3GPP TS 23.502 [3] and clause 6.10.12 3GPP TS 29.500 [4], during the establishment of a HR PDU session, by including the 3gpp-Sbi-Discovery-target-nf-set-id set to the H-SMF Set ID and all the other discovery factors necessary for the H-SMF instance reselection in the Create Request it sends towards the HPLMN. In this scenario, the V-SMF should support the 3gpp-Sbi-Response-Info header to determine whether it may retry or not a request that is not successful towards an alternative H-SMF instance of the H-SMF set (see NOTE 2 of Table 6.1.6.2.8-1).

NOTE 12: For a HR PDU Session, if the VPLMN QoS Constraints is enabled and the VPLMN QoS Constraints for high priority PDU sessions and normal PDU sessions are different, the V-SMF shall determine the VPLMN QoS Constraints applicable for this PDU session based on the priority user indication received from the AMF.

6.1.6.2.3 Type: SmContextCreatedData

Table 6.1.6.2.3-1: Definition of type SmContextCreatedData

Attribute name	Data type	P	Cardinality	Description	Applicability
hsmfUri	Uri	C	0..1	This IE shall be present in HR roaming scenarios if the additionalHsmfUri IE was received in the request and the V-SMF established the PDU session towards an alternative SMF listed in the additionalHsmfUri IE. When present, it shall contain the API URI of the H-SMF towards which the PDU session was established. The API URI shall be formatted as specified in clause 6.1.1.	
hsmfInstanceId	NfInstanceId	C	0..1	This IE shall be present for a HR PDU session, if the V-SMF has reselected an alternative H-SMF instance within the SMF Set of the original H-SMF. When present, this IE shall indicate the identifier of the reselected H-SMF instance.	
smfUri	Uri	C	0..1	This IE shall be present for a PDU session with an I-SMF, if the additionalSmfUri IE was received in the request and the I-SMF established the PDU session towards an alternative SMF listed in the additionalSmfUri IE. When present, it shall contain the API URI of the SMF towards which the PDU session was established. The API URI shall be formatted as specified in clause 6.1.1.	DTSSA
smfInstanceId	NfInstanceId	C	0..1	This IE shall be present for a PDU session with I-SMF, if the I-SMF has reselected an alternative anchor SMF instance within the SMF Set of the original anchor SMF. When present, this IE shall indicate the identifier of the reselected anchor SMF instance.	
pduSessionId	PduSessionId	C	0..1	This IE shall be present, during an EPS to 5GS Idle mode mobility or handover using the N26 interface. When present, it shall be set to the PDU Session ID.	
sNssai	Snssai	C	0..1	This IE shall be present during an EPS to 5GS Idle mode mobility or handover using the N26 interface. When present, it shall contain the S-NSSAI assigned to the PDU session. In Home-Routed roaming case, or in non-roaming case the Serving PLMN ID is not the same as the PLMN ID of the SUPI, this IE shall contain the S-NSSAI for home PLMN.	
additionalSnssai	Snssai	C	0..1	This IE shall be present during an EPS to 5GS Idle mode mobility or handover using the N26 interface for LBO roaming case. When present, this IE shall indicate the associated S-NSSAI in HPLMN for the PDU Session.	
upCnxState	UpCnxState	C	0..1	This IE shall be present if the SMF was requested to activate the user plane connection of the PDU session in the corresponding request. When present, it shall be set as specified in clauses 5.2.2.2.2, 5.2.2.2.6 or 5.2.2.2.7.	
n2SmInfo	RefToBinaryData	C	0..1	This IE shall be present if N2 SM Information needs to be sent to the AN.	
n2SmInfoType	N2SmInfoType	C	0..1	This IE shall be present if "n2SmInfo" attribute is present. When present, this IE shall indicate the NG AP IE type for the NG AP SMF related IE container carried in "n2SmInfo" attribute.	
allocatedEbiList	array(EbiArpMapping)	C	1..N	This IE shall be present if the consumer NF is an AMF and Inter-system mobility happens. When present, it shall contain an array of EBI to ARP mappings currently allocated to the PDU session.	

hoState	HoState	C	0..1	This IE shall be present if the SMF was requested to prepare an EPS to 5GS handover for the PDU session in the corresponding request. When present, it shall be set as specified in clause 5.2.2.2.3.	
gpsi	Gpsi	C	0..1	This IE shall be present if no GPSI IE is provided in the request, e.g. for a PDU session moved from another access or another system, and the SMF knows that a GPSI is already associated with the PDU session (or a GPSI is received from h-SMF for a HR PDU session). When present, it shall contain the user's GPSI associated with the PDU session.	
smfServiceInstanceId	string	O	0..1	When present, this IE shall contain the serviceInstanceId of the SMF PDUSession service instance serving the SM Context, i.e. of: - the I-SMF, for a PDU session with I-SMF; - the V-SMF, for a HR PDU session; or - the SMF, for a non-roaming or an LBO roaming PDU session without I-SMF. This IE may be used by the AMF to identify PDU session contexts affected by a failure or restart of the SMF service instance (see clause 6.2 of 3GPP TS 23.527 [24]).	
recoveryTime	DateTime	O	0..1	Timestamp (in UTC) when the SMF service instance serving the PDU session was (re)started (see clause 6.3 of 3GPP TS 23.527 [24]).	
supportedFeatures	SupportedFeatures	C	0..1	This IE shall be present if at least one feature defined in clause 6.1.8 is supported.	
selectedSmfId	NfInstanceId	C	0..1	This IE shall be present if a new (h)SMF is selected e.g. by the new I/V-SMF, or a SCP between the new I/V-SMF and the (h)SMF. (NOTE 1) When present, it shall contain the selected SMF NF Instance Id.	DTSSA
selectedOldSmfId	NfInstanceId	C	0..1	This IE shall be present if another old I/V-SMF(as alternative to the old I/V-SMF) is selected, e.g. by the new I/V-SMF, anchor SMF or a SCP between the new I/V-SMF and the old I/V-SMF. (NOTE 1) When present, it shall contain the selected old I/V-SMF NF Instance Id.	DTSSA
interPlmnApiRoot	Uri	O	0..1	This IE should be present if the PDU session may be subject to inter-PLMN mobility and different SM context URIs shall be used for intra-PLMN and inter-PLMN signaling requests targeting the SM context. When present, it shall contain the apiRoot of the SM context to be used in inter-PLMN signalling request targeting the SM context. (NOTE 2)	
udmGroupId	NfGroupId	O	0..1	This IE may be present during an EPS to 5GS handover using the N26 interface procedure. When present, it shall indicate the identity of the UDM group serving the UE.	
pcfGroupId	NfGroupId	O	0..1	This IE may be present during an EPS to 5GS handover using the N26 interface procedure. When present, this IE shall contain the identity of the (home) PCF group serving the PDU session for Session Management policy.	

pduSessionPrio	PduSessionPriority	O	0..1	This IE may be present to contain the priority of the PDU session. If received, the AMF shall use the priority of the PDU session indicated in this IE for further PDU Session related priority handling (i.e. to determine the SBI Message Priority (SMP) to set in subsequent signaling it sends related to the PDU session).	
NOTE 1: During an SmContext Creation procedure, e.g. for I-SMF insertion or I-SMF change procedure, when the new I/V-SMF attempts to contact the old I/V-SMF or (h)SMF by invoking Nsmf_PDUSession_Context Request, if a new (h)SMF and/or another old I/V-SMF has been re-selected (since the old I/V-SMF or the (h)SMF is not reachable) by the new I-/V-SMF or a SCP, the selected old I-/V-SMF and/or (h)SMF shall be returned to the AMF, in order to perform potential subsequent operations on the SMF hosting the resource, e.g. to release the SM Context on old I-/V-SMF, or to create SM Context on SMF when the I/V-SMF needs to be removed. NOTE 2: The SM Context URI returned in the Location header in the Create SM Context response shall contain an URI suitable for use in intra-PLMN signaling requests targeting the SM Context. During an inter-PLMN mobility, the target AMF shall replace the apiRoot of the smContextRef with the interPlmnApiRoot if available and send the resulting smContextRef in the Create SM Context request towards the target V-SMF, I-SMF or anchor SMF.					

6.1.6.2.4 Type: SmContextUpdateData

Table 6.1.6.2.4-1: Definition of type SmContextUpdateData

Attribute name	Data type	P	Cardinality	Description	Applicability
pei	Pei	C	0..1	This IE shall be present if it is available and has not been provided earlier to the SMF. When present, this IE shall contain the permanent equipment identifier.	
servingNfId	NfInstanceId	C	0..1	This IE shall be present upon inter-AMF change or mobility, or upon a N2 handover execution with AMF change. When present, it shall contain the identifier of the serving NF (e.g. AMF).	
smContextStatusUri	Uri	C	0..1	This IE shall be present if the servingNfId IE is present. It may be present otherwise. When present, this IE shall include the callback URI to receive notification of SM context status.	
guami	Guami	C	0..1	This IE shall be present if the servingNfId of AMF is present. When present, it shall contain the serving AMF's GUAMI.	
servingNetwork	PlmnIdNid	C	0..1	This IE shall be present if the servingNfId IE is present. When present, it shall contain the serving core network operator PLMN ID and, for an SNPN, the NID that together with the PLMN ID identifies the SNPN. This IE shall contain the selected PLMN ID representing the participating operator in the case of Indirect Network Sharing (see clause 5.18.1 of 3GPP TS 23.501 [2]).	
backupAmfInfo	array(BackupAmfInfo)	C	1..N	This IE shall be included for the modification of the BackupAmfInfo if the NF service consumer is an AMF and the AMF supports the AMF management without UDSF. For deleting the backupAmfInfo, it shall contain the Null value.	
anType	AccessType	C	0..1	This IE shall be present upon a change of the Access Network Type associated to the PDU session, e.g. during a handover of the PDU session between 3GPP access and untrusted non-3GPP access (see clause 5.2.2.3.5.2). When present, this IE shall indicate the Access Network Type (3GPP or non-3GPP access) to which the PDU session is to be associated.	
additionalAnType	AccessType	C	0..1	This IE shall indicate the additional Access Network Type to which the PDU session is to be associated, if the UE is registered over both 3GPP and non-3GPP accesses. This IE shall be present when the UE requests to establish resources for MA PDU session over the other access.	MAPDU
anTypeToReactivate	AccessType	C	0..1	This IE shall indicate the Access Network Type for which the UP connection is requested to be re-activated, for a MA PDU session.	MAPDU
anTypeOfN1N2Info	AccessType	O	0..1	This IE should be present if the n1SmMsg IE and/or the n2SmInfo IE is present, for a MA PDU session associated with both a 3GPP and a non-3GPP access type. When present, this IE shall indicate the Access Network Type from which the N1 and/or N2 information was received.	
ratType	RatType	C	0..1	This IE shall be present and indicate the RAT Type used by the UE, if available, upon a change of RAT Type.	

presenceInLadn	PresenceState	C	0..1	This IE shall be present during a Service Request procedure (see clause 5.2.2.3.2.2)), an Xn handover (see clause 5.2.2.3.3) or a N2 handover execution (see clause 5.2.2.3.4.3), if the DNN of the PDU session corresponds to a LADN. When present, it shall be set to "IN" or "OUT" to indicate that the UE is in or out of the LADN service area.	
ueLocation	UserLocation	C	0..1	This IE shall be present if it is available and if it needs to be reported to the SMF (e.g. the user location has changed or the user plane of the PDU session is deactivated). When present, this IE shall contain: - the UE location information (see clause 5.2.3.4); and - the timestamp, if available, indicating the UTC time when the UeLocation information was acquired. (NOTE 1)	
ueTimeZone	TimeZone	C	0..1	This IE shall be present if it is available, the UE Time Zone has changed and needs to be reported to the SMF. When present, this IE shall contain the UE Time Zone.	
addUeLocation	UserLocation	O	0..1	Additional UE location. This IE may be present, if anType indicates a non-3GPP access and a valid 3GPP access user location information is available. When present, it shall contain: - the last known 3GPP access user location (see clause 5.2.3.4); and - the timestamp, if available, indicating the UTC time when the addUeLocation information was acquired. (NOTE 1)	
upCnxState	UpCnxState	C	0..1	This IE shall be present to request the activation or the deactivation of the user plane connection of the PDU session. When present, it shall be set as specified in clauses 5.2.2.3.2, 5.2.2.3.15 and 5.2.2.3.16.	
hoState	HoState	C	0..1	This IE shall be present to request the preparation, execution or cancellation of a handover of the PDU session. When present, it shall be set as specified in clause 5.2.2.3.4.	
toBeSwitched	boolean	C	0..1	This IE shall be present during an Xn Handover (see clause 5.2.2.3.3) to request to switch the PDU session to a new downlink N3 tunnel endpoint. When present, it shall be set as follows: - true: request to switch to the PDU session. - false (default): no request to switch the PDU session.	
failedToBeSwitched	boolean	C	0..1	This IE shall be present during an Xn Handover (see clause 5.2.2.3.3) if the PDU session failed to be setup in the target RAN. When present, it shall be to true to indicate that the PDU session failed to be setup in the target RAN.	
n1SmMsg	RefToBinaryData	C	0..1	This IE shall be present if N1 SM Information has been received from the UE. When present, this IE shall reference the N1 SM Message binary data (see clause 6.1.6.4.2).	

n2SmInfo	RefToBinaryData	C	0..1	This IE shall be present if N2 SM Information has been received from the AN. When present, this IE shall reference the N2 SM Information binary data (see clause 6.1.6.4.3).	
n2SmInfoType	N2SmInfoType	C	0..1	This IE shall be present if "n2SmInfo" attribute is present. When present, this IE shall indicate the NG AP IE type for the NG AP SMF related IE container carried in "n2SmInfo" attribute.	
targetId	NgRanTargetId	C	0..1	This IE shall be present during a N2 handover preparation, when the hoState IE is set to the value "PREPARING". When present, it shall contain the Target ID identifying the target RAN Node ID and TAI received in the Handover Required from the Source RAN.	
targetServingNfId	NfInstanceId	C	0..1	This IE shall be present during a N2 handover preparation with AMF change, when the hoState IE is set to the value "PREPARING". When present, it shall contain the identifier of the target serving NF (e.g. AMF).	
dataForwarding	boolean	C	0..1	This IE shall be present and set as specified in clause 5.2.2.3.9 during a 5GS to EPS handover, or as specified in 5.2.2.3.13 during a N2 based handover with I-SMF insertion/change/removal, or as specified in clause 5.2.2.3.21 during N9 Forwarding Tunnel establishment between Branching Points or UL CLs controlled by different I-SMFs. When present, it shall be set as follows: - true: setup the direct or indirect data forwarding tunnels; - false (default): data forwarding tunnels are not required to be setup.	
n9ForwardingTunnel	TunnelInfo	C	0..1	This IE shall be present in the following case: - UE triggered Service Request with I-SMF change/removal, if requesting to forward buffered downlink data packets at I-UPF (See clause 4.23.4 of 3GPP TS 23.502 [3]). When present, it shall carry the N9 forwarding tunnel info of I-UPF.	DTSSA
n9DlForwardingTnlList	array (IndirectDataForwardingTunnelInfo)	C	1..N	This IE shall be present in the following case: - N2 based handover with I-SMF insertion/change/removal, if downlink indirect data forwarding tunnels are requested to be established between target I-UPF and source I-UPF / source UPF (see clause 4.23.7 and 4.23.11 of 3GPP TS 23.502 [3]). When present, it shall carry the list of N9 downlink indirect data forwarding tunnel(s) info of I-UPF.	DTSSA
n9UlForwardingTnlList	array (IndirectDataForwardingTunnelInfo)	C	1..N	This IE shall be present in the following case: - N2 based handover with I-SMF insertion/change/removal, if uplink indirect data forwarding tunnels are requested to be established between target I-UPF and source I-UPF / source UPF (see clause 4.23.7 and 4.23.11 of 3GPP TS 23.502 [3]). When present, it shall carry the list of N9 uplink indirect data forwarding tunnel(s) info of I-UPF.	DTSSA

n9DlForwardingTunnel	TunnelInfo	C	0..1	This IE shall be present in the following case: - simultaneous change of Branching Points or UL CLs controlled by different I-SMFs, if downlink data forwarding tunnel is requested to be established from source BP / UL CL to target BP / UL CL (see clause 4.23.9.5 of 3GPP TS 23.502 [3]). When present, it shall carry the N9 downlink data forwarding tunnel info of the target BP / UL CL.	N9FSC
n9InactivityTimer	DurationSec	O	0..1	When present, this IE shall indicate an inactivity detection timer, in seconds, that the I-SMF may use to set the N9 forwarding tunnel inactive traffic detection timer in Branching Point or UL CL as specified in clause 4.23.9.5 of 3GPP TS 23.502 [3].	N9FSC
epsBearerSetup	array(EpsBearerContainer)	C	0..N	This IE shall be present during a 5GS to EPS handover using the N26 interface. When present, it shall include the EPS bearer context(s) successfully setup in EPS. The array shall be empty if no resource was successfully allocated in EPS for any PDU session.	
revokeEbiList	array(EpsBearerId)	C	1..N	This IE shall be present to request the SMF to revoke some EBIs (see clause 4.11.1.4.1 of 3GPP TS 23.502 [3]). When present, it shall contain the EBIs to revoke.	
release	boolean	C	0..1	This IE shall be used to indicate a network initiated PDU session release is requested. This IE shall be present and set as specified in clause 5.2.2.3.10 during P-CSCF restoration procedure, in clause 5.2.2.3.11 during AMF requested PDU Session Release due to duplicated PDU Session Id, in clause 5.2.2.3.12 during AMF requested PDU Session Release due to slice not available, in clause 5.2.2.3.17 during AMF requested PDU Session Release due to Network Slice-Specific Authentication and Authorization failure or revocation, in clause 5.2.2.3.19 during AMF requested PDU Session Release due to Control Plane Only indication associated with PDU Session is not applicable any longer, in clause 5.2.2.3.20 during AMF requested PDU Session Release due to ODB changes, and in clause 5.2.2.3.27 during AMF requested PDU Session Release due to MBSR not authorized. When present, it shall be set as follows: - true: PDU session release is required; - false (default): PDU session release is not required.	
cause	Cause	O	0..1	When present, this IE shall indicate the cause for the requested modification, e.g. the NF Service Consumer cause for requesting to deactivate the user plane connection of the PDU session.	
ngApCause	NgApCause	C	0..1	This IE shall be present, if the information is available. When present, this IE shall indicate the cause for the requested modification, e.g. the NGAP cause for requesting to deactivate the user plane connection of the PDU session.	
5gMmCauseValue	5GMmCause	C	0..1	This IE shall be included if the AMF received a 5GMM cause code from the UE during any network initiated PDU session modification or release procedure. (e.g 5GMM Status message in response to a Downlink NAS Transport message carrying 5GSM payload).	

sNssai	Snssai	C	0..1	This IE shall be present and sent to the V-SMF, or to the I-SMF if the Serving PLMN ID is not the same as the PLMN ID of the SUPI for a non-roaming UE, during an EPS to 5GS mobility registration using the N26 interface, if the S-NSSAI for the serving PLMN derived from the S-NSSAI of the home PLMN differs from the S-NSSAI provided in the Create SM Context Request. When present, it shall contain the S-NSSAI for the serving PLMN. For the Network slice replacement if nsReplTerminInd attribute is set to true, the sNssai attribute shall indicate the replaced SNSSAI.	
traceData	TraceData	C	0..1	This IE shall be included if trace is required to be activated, modified or deactivated (see 3GPP TS 32.422 [22]). For trace modification, it shall contain a complete replacement of trace data. For trace deactivation, it shall contain the Null value.	
epsInterworkingInd	EpsInterworkingIndication	O	0..1	This IE may be present if its value has changed after session creation or last update. When present, this IE shall indicate whether the PDU session may possibly be moved to EPS or EPC/ePDG and whether N26 interface to be used during EPS interworking procedures.	
anTypeCanBeChanged	boolean	C	0..1	This IE shall be present and set to true to indicate that the Access Network Type associated to the PDU session can be changed (see clause 5.2.2.3.2.4), during a Service Request procedure (see clause 4.2.3.2 of 3GPP TS 23.502 [3])), in response to paging or NAS notification indicating non-3GPP access, when the PDU Session for which the UE was paged or notified is in the List Of Allowed PDU Sessions provided by the UE, and the AMF received N2 SM Information only or N1 SM Container and N2 SM Information from the SMF in step 3a of clause 4.2.3.3 of 3GPP TS 23.502 [3]. When present, it shall be set as follows: - true: the access type of the PDU session can be changed. - false (default): the access type of the PDU session cannot be changed.	
n2SmInfoExt1	RefToBinaryData	C	0..1	This IE shall be present if more than one N2 SM Information has been received from the AN. When present, this IE shall reference the N2 SM Information binary data (see clause 6.1.6.4.3).	
n2SmInfoTypeExt1	N2SmInfoType	C	0..1	This IE shall be present if "n2SmInfoExt1" attribute is present. When present, this IE shall indicate the NG AP IE type for the NG AP SMF related IE container carried in "n2SmInfoExt1" attribute.	
maReleaseInd	MaReleaseIndication	C	0..1	This IE shall be present if one access of a MA PDU session is requested to be released, in the following cases: - when UE/AMF initiates MA PDU session release over one access; or - when UE deregisters from one access. When present, it indicates the access to be released.	MAPDU

maNwUpgradeInd	boolean	C	0..1	This IE shall be present if the PDU session is allowed to be upgraded to MA PDU session (see clause 6.4.2.2 of 3GPP TS 24.501 [7]). When present, it shall be set as follows: - true: the PDU session is allowed to be upgraded to MA PDU session - false (default): the PDU session is not allowed to be upgraded to MA PDU session	MAPDU
maRequestInd	boolean	C	0..1	This IE shall be present if a MA-PDU session is requested to be established (see clause 4.22.6.3 of 3GPP TS 23.502 [3]). When present, it shall be set as follows: - true: a MA-PDU session is requested - false (default): a MA-PDU session is not requested	MAPDU
n3gPathSwitchExecutionInd	boolean	O	0..1	This IE may be present and set to true if the AMF receives the indication "Non-3GPP access path switching while using old AN resources" in the registration request message from the UE and if the SMF supports non-3GPP path switching, so to request the SMF to add a new non-3GPP access path (while also keeping the existing one) during a UE requested non-3GPP access switching for a MA-PDU session.	N3GPS
exemptionInd	ExemptionInd	C	0..1	This IE shall be present if the AMF has exempted the NAS message from a NAS SM congestion control activated in the AMF.	
supportedFeatures	SupportedFeatures	C	0..1	This IE shall be present if the servingNfId or the targetServingNfId is present (i.e. during a change of AMF) and at least one feature defined in clause 6.1.8 is supported by the new AMF. If this IE is absent when the servingNfId or the targetServingNfId is present, the new serving AMF or the target AMF respectively shall be considered as not supporting any feature.	
moExpDataCounter	MoExpDataCounter	C	0..1	This IE shall be included if the UE has accessed the network by using "MO exception data" RRC establishment cause and when the AMF decides to send a non-zero value to the SMF. (NOTE 2) When present, this IE shall contain the MO Exception Data Counter.	CIOT
extendedNasSmTimerInd	boolean	C	0..1	This IE shall be present if the UE supports CE mode B and use of CE mode B changes from restricted to unrestricted or vice versa in the Enhanced Coverage Restriction information in the UE context in the AMF. When present, it shall indicate whether extended NAS SM timers shall be used for the UE as specified in 3GPP TS 24.501 [7], as follows: - True: extended NAS SM timers shall be used - False: normal NAS SM timers shall be used.	CIOT
forwardingFTeid	Bytes	C	0..1	This IE shall be present during a 5GS to EPS Idle mode mobility using N26 interface with data forwarding (see clause 4.11.1.3.2A of 3GPP TS 23.502 [3]), if the Forwarding F-TEID IE is present in the Context Acknowledge message received from the MME. When present, it shall contain Base64-encoded characters, encoding the Forwarding F-TEID in the Context Acknowledge message, as specified in Figure 8.22-1 of 3GPP TS 29.274 [16] (starting from octet 1).	CIOT

forwardingBearerContexts	array(ForwardingBearerContainer)	C	1..N	This IE shall be present during a 5GS to EPS Idle mode mobility using N26 interface with data forwarding (see clause 4.11.1.3.2A of 3GPP TS 23.502 [3]), if the Bearer Contexts IE is present in the Context Acknowledge message received from the MME. When present, it shall contain the Bearer Contexts in the Context Acknowledge message.	CIOT
ddnFailureSubs	DdnFailureSubs	C	0..1	This IE shall be present to subscribe or unsubscribe to the notification of the DDN Failure if the Availability after DDN failure event is subscribed/unsubscribed by the UDM, see clause 4.15.3.2.7 of 3GPP TS 23.502 [3]. This IE shall also be present if it is required to add, modify or remove DDN failure subscriptions. If it is present and the included dnnFailureSubsInd indicates notification of DDN failure is subscribed, the content of the received ddnFailureSubs shall overwrite any ddnFailureSubs received earlier.	CIOT
skipN2PduSessionResRelInd	boolean	O	0..1	This IE may be present when the release IE is present with value "true". When present, this IE shall indicate whether N2 message shall be skipped for the PDU session RAN resources release, if the UP connection is active: - true: N2 message shall be skipped. - false (default): N2 message shall not be skipped.	
secondaryRatUsageDataReportContainer	array(SecondaryRatUsageDataReportContainer)	C	1..N	The IE shall be present during an EPS to 5GS handover procedure, if one or more instance of Secondary RAT Usage Data Report IE(s) are present and applicable to the PDU session. When present, it shall contain Base64-encoded characters, encoding the Secondary RAT Usage Data Report in the Forward Relocation Complete Acknowledge message, as specified in Figure 8.132-1 of 3GPP TS 29.274 [16] (starting from octet 1).	
smPolicyNotifyInd	boolean	O	0..1	When present, this IE shall indicate that the SM Policy Association Establishment and Termination events shall be reported for the PDU session by the PCF for the SM Policy to the PCF for the UE: - true: SM Policy Association Establishment and Termination events shall be reported Presence of this IE with the value false shall be prohibited. (NOTE 3)	SPAE
pcfUeCallbackInfo	PcfUeCallbackInfo	C	0..1	This IE shall be present when the smPolicyNotifyInd IE is present with value true. When present, this IE shall contain the callback information (callback URI and binding information, if available) of the PCF for the UE to receive SM Policy Association Establishment and Termination events notification from the PCF for the SM Policy. (NOTE 3)	SPAE

satelliteBackhaulCat	SatelliteBackhaulCategory	O	0..1	This IE may be present if the AMF and the SMF supports the 5GSAT feature and the AMF is aware that: - there is a change of the satellite backhaul category; or - the UE is newly served by a 5G-AN without any satellite backhaul and a satellite backhaul category had been signalled to the SMF; or - the UE is newly served by a 5G-AN with a satellite backhaul and no satellite backhaul category had been signalled to the SMF; or - there is a satellite backhaul towards the 5G AN serving the UE, but it does not know whether a satellite backhaul category had been signalled to the SMF (e.g. upon Inter-AMF mobility). When present, this IE shall indicate the category of the satellite backhaul used towards the new 5G AN serving the UE, or that there is no longer any satellite backhaul towards the new 5G AN serving the UE.	5GSAT
cnBasedMt	boolean	O	0..1	When present, this IE shall indicate to the SMF that UE is in RRC_INACTIVE mode with eDRX and CN Based MT handling is applied for the PDU session, i.e. the user plane connection is suspended and the UPF is requested to buffer subsequent DL Data and send a report upon subsequent DL data arrival, the SMF will then invoke the AMF EnableUEReachability service, see also clauses 4.8.1.1a and 4.8.2.2b of 3GPP TS 23.502 [3]. - true: CN Based MT handling is to be applied.	
geoSatelliteId	GeoSatelliteId	C	0..1	The AMF shall include this attribute when the Geo satellite ID changes (see clause 4.3.3.2 of 3GPP TS 23.502 [3]) for support of 5G satellite backhaul as defined in clause 5.43 of 3GPP TS 23.501 [2]. When present, this IE shall contain a GEO satellite ID.	5GSATB
servingSatelliteId	SatelliteId	C	0..1	The AMF shall include this attribute when UE's serving satellite ID changes (see clause 4.3.3.2 of 3GPP TS 23.502 [3]) to support UE-Satellite-UE communication for the NR satellite access as defined in clause 5.4.14 of 3GPP TS 23.501 [2]. When present, this IE shall contain new serving satellite ID.	5GSAT-ACCESS
altSnssai	Snssai	C	0..1	This IE shall be present when the PDU Session is to be transferred to an alternative S-NSSAI. When present, this IE shall indicate the alternative network slice to be used by the PDU session. See clause 5.15.19 of 3GPP TS 23.501 [2].	NSRP
altHplmnSnssai	Snssai	C	0..1	This IE shall be present for HR PDU session when the PDU Session is to be transferred to an alternative S-NSSAI in HPLMN. When present, this IE shall indicate the alternative network slice to be used by the PDU session in the HPLMN. See clause 5.15.19 of 3GPP TS 23.501 [2].	NSRP

nsReplTerminInd	boolean	C	0..1	This IE shall be present for a notification of termination of Network Slice Replacement, if the PDU Session is associated with the Alternative S-NSSAI and the replaced S-NSSAI is available again. The SMF shall transfer the PDU Session to the replaced S-NSSAI. When present, it shall be set as follows: - true: the network slice replacement is terminated The presence of this IE with false value shall be prohibited. See clause 5.15.19 of 3GPP TS 23.501 [2].	NSRP
sliceAreaRestrictInd	boolean	C	0..1	This IE shall be present if the AMF determines that the PDU Session is newly subject to area restriction for the S-NSSAI (i.e. if the S-NSSAI is newly part of the partially allowed NSSAI or if the support of the S-NSSAI is newly restricted to a NS-AoS) or if the PDU session becomes no longer subject to area restriction for the S-NSSAI. See clauses 5.15.17 and 5.15.18 of 3GPP TS 23.501 [2]. When present, it shall be set as follows: true: the PDU Session is newly subject to area restriction for the S-NSSAI false: the PDU Session is no longer subject to area restriction	SAR
qosMonitoringPdSupported	QosMonitoringPdSupported	C	0..1	This IE shall be present if the QME feature is supported by the AMF and SMF, and: - the value of the qosMonitoringPdSupported attribute has changed since last update to SMF in the scenarios without AMF change; or - the information is available in the scenarios with AMF change. It may be present otherwise. When present, this IE shall indicate whether the NG-RAN supports the QoS monitoring for packet delay feature. See clause 5.45.1 of 3GPP TS 23.501 [2]. If the SMF receives the IE, it shall replace any earlier received value with the new value.	QME
qosMonitoringPdMethods	array(QosMonitoringPdMethod)	O	1..N	This IE should be present when the qosMonitoringPdSupported IE is present and set to SUPPORTED. When present, this IE shall indicate the supported method(s) for QoS Monitoring for packet delay in the NG-RAN.	QME

qosMonitoringCongestionSupported	QosMonitoringCongestionSupported	C	0..1	This IE shall be present if:
				- the QME feature is supported by the AMF;
				- the QME feature and the EMECI feature are supported by the SMF; and
				  - the value of the qosMonitoringCongestionSupported attribute has changed since last update to SMF in the scenarios without AMF change; or
				  - the information is available in the scenarios with AMF change.
				
				When present, this IE shall indicate whether the NG-RAN supports the QoS monitoring for congestion feature. See clause 5.45.1 of 3GPP TS 23.501 [2].
				
				If the SMF receives the IE, it shall replace any earlier received value with the new value.
					QME

availBitRateMonSupported	AvailBitRateMonSupported	C	0..1	This IE shall be present if the AVABIT feature is supported by AMF and SMF and: - the value of the availBitRateMonSupported attribute has changed since last update to SMF in the scenarios without AMF change; or - the information is available in the scenarios with AMF change. It may be present otherwise. When present, this IE shall indicate whether the NG-RAN supports the available bitrate monitoring feature. See clause 5.45.1 of 3GPP TS 23.501 [2]. If the SMF receives the IE, it shall replace any earlier received value with the new value.	AVABIT
ueLevelMeasConfig	UeLevelMeasurementsConfiguration	C	0..1	This IE shall be present if the signalling based UE Level Measurement task is activated or the trace control and configuration parameters information is updated. When present, this IE shall contain UE Level Measurement configuration data for UE (see clause 4.1.2.18 of 3GPP TS 32.422 [22]).	
udmGroupId	NfGroupId	C	0..1	This IE shall be present if the AMF has re-discovered new UDM group after receiving the Data Restoration Notification from UDM, as specified in clause 6.7.3 of 3GPP TS 23.527 [24]. When present, it shall indicate the identity of the new UDM group that is re-discovered by the AMF to serve the UE.	SUBDMIG
amfResynchedInd	boolean	C	0..1	This IE shall be present if the AMF has initiated data resynchronization for the corresponding UE, as a result of the processing of the Data Restoration Notification received from the UDM as specified in clause 6.7.4 of 3GPP TS 23.527 [24]. Presence of this IE with the value false shall be prohibited.	AMF-RESYNCHED

localOffloadingMgtAllowedInd	boolean	C	0..1	This IE shall be present if the local offloading management allowed indication information needs to be changed, e.g. due to the UE moving in or out of a Local Offloading Management service area or due to subscription data change. When present, it shall indicate whether Local Offloading Management is allowed based on subscription data and the presence of the UE within a Local Offloading Management service area. It shall be set as follows: true: Local Offloading Management is allowed false: Local Offloading Management is not allowed	ISMF-LOM

NOTE 1: In shared networks, when the message is sent from the VPLMN to the HPLMN, the PLMN ID that is communicated in this IE shall be that of the selected Core Network Operator.
In shared networks, when the AMF and SMF pertain to the same PLMN, the Primary PLMN ID shall be communicated in the ECGI or NCGI to the SMF. The Core Network Operator PLMN ID shall be communicated in the TAI and the Serving Network.

NOTE 2: The AMF increments the MO Exception Data Counter when the UE establishes/resumes RRC with "MO Exception Data" RRC cause. The AMF may defer sending the moExpDataCounter attribute to the SMF based on local configuration. The AMF resets the MO Exception Data Counter when receiving successful response from the SMF. The SMF however keeps incrementing the counter locally.

NOTE 3: If the AMF has received the callback information of the PCF for the UE together with the information of the PDU sessions (i.e. Slice and DNN combination) that are applicable for notification of SM Policy Association events from the PCF, the AMF shall identify whether any ongoing non-roaming or local breakout PDU session is applicable for SM Policy Association events, i.e, whether the slice and DNN combination of the PDU session is listed in the received PDU session information from the PCF for the UE. If the PDU session is applicable for notification of SM Policy Association events , the AMF shall invoke Update SM context service operation for the PDU session and include the smPolicyNotifyInd IE with the value "true" and the callback information of the PCF for the UE in the request. The SMF shall forward the callback information of the PCF for the UE to the PCF for SM Policy if exists via SM Policy Association Modification. See clause 4.3.3.2 of 3GPP TS 23.502 [3]. The AMF needs not update the SMF if the subscription to the SM Policy Association events for the PDU session is cancelled by the PCF for UE.

6.1.6.2.5 Type: SmContextUpdatedData

Table 6.1.6.2.5-1: Definition of type SmContextUpdatedData

Attribute name	Data type	P	Cardinality	Description	Applicability
upCnxState	UpCnxState	C	0..1	This IE shall be present if the SMF was requested to activate or deactivate the user plane connection of the PDU session in the corresponding request. When present, it shall be set as specified in clauses 5.2.2.3.2, 5.2.2.3.6, 5.2.2.3.15 and 5.2.2.3.16.	
hoState	HoState	C	0..1	This IE shall be present if the SMF was requested to prepare, execute or cancel a handover for the PDU session in the corresponding request. When present, it shall be set as specified in clause 5.2.2.3.4.	
releaseEbiList	array(EpsBearerId)	C	1..N	This IE shall be present if the SMF determines that some EBIs are not needed. When present, it shall contain the EBIs to be released.	
allocatedEbiList	array(EbiArpMapping)	C	1..N	This IE shall be present if the consumer NF is an AMF and Inter-system mobility happens. When present, it shall contain an array of EBI to ARP mappings currently allocated to the PDU session.	
modifiedEbiList	array(EbiArpMapping)	C	1..N	This IE shall be present if a PDU session modification procedure resulted in the change of ARP for a QoS flow that was already allocated an EBI.	
n1SmMsg	RefToBinaryData	C	0..1	This IE shall be present if N1 SM Information needs to be sent to the UE. When present, this IE shall reference the N1 SM Message binary data (see clause 6.1.6.4.2).	
n2SmInfo	RefToBinaryData	C	0..1	This IE shall be present if N2 SM Information needs to be sent to the AN. When present, this IE shall reference the N2 SM Information binary data (see clause 6.1.6.4.3).	
n2SmInfoType	N2SmInfoType	C	0..1	This IE shall be present if "n2SmInfo" attribute is present. When present, this IE shall indicate the NG AP IE type for the NG AP SMF related IE container carried in "n2SmInfo" attribute.	
epsBearerSetup	array(EpsBearerContainer)	C	1..N	This IE shall be present during an EPS to 5GS handover using the N26 interface. When present, it shall include the EPS bearer context(s) successfully handed over to 5GS.	
dataForwarding	boolean	C	0..1	This IE shall be present if it was present in the corresponding request. When present, it shall be set as specified in clause 5.2.2.3.9 or 5.2.2.3.21.	
n3DlForwardingTnlList	array (IndirectDataForwardingTunnelInfo)	C	1..N	This IE shall be present if indirect data forwarding is requested and N9 downlink indirect data forwarding tunnels info is included in the corresponding request. When present, it shall carry the list of N3 downlink indirect data forwarding tunnels info of source I-UPF or source UPF.	DTSSA
n3UlForwardingTnlList	array (IndirectDataForwardingTunnelInfo)	C	1..N	This IE shall be present if indirect data forwarding is requested and N9 uplink indirect data forwarding tunnels info is included in the corresponding request. When present, it shall carry the list of N3 uplink indirect data forwarding tunnels info of source I-UPF or source UPF.	DTSSA
n9UlForwardingTunnel	TunnelInfo	C	0..1	This IE shall be present in the following case: - simultaneous change of Branching Points or UL CLs controlled by different I-SMFs, if uplink data forwarding tunnel is requested to be established from target BP / UL CL to source BP / UL CL (see clause 4.23.9.5 of 3GPP TS 23.502 [3]). When present, it shall carry the N9 uplink data forwarding tunnel info of the source BP / UL CL.	N9FSC

cause	Cause	C	0..1	This IE shall be present if the activation of the User Plane connection failed due to insufficient resources (see clauses 5.2.2.3.2.2 and 5.2.2.3.6).	
maAcceptedInd	boolean	C	0..1	This IE shall be present if a request to modify a single access PDU session into a MA PDU session was accepted (see clause 4.22.6.3 of 3GPP TS 23.502 [3]). When present, it shall be set as follows: - true: MA PDU session - false (default): single access PDU session	MAPDU
supportedFeatures	SupportedFeatures	C	0..1	This IE shall be present if the supportedFeatures IE was received in the request and at least one feature defined in clause 6.1.8 is supported by the updated SM context resource.	
forwardingFTeid	Bytes	C	0..1	This IE shall be present during an EPS to 5GS Idle mode mobility using N26 interface with data forwarding (see clause 4.11.1.3.3A of 3GPP TS 23.502 [3]), if the Forwarding F-TEID IE shall be sent to the MME in the Context Acknowledge message. When present, it shall contain Base64-encoded characters, encoding the Forwarding F-TEID to be sent in the Context Acknowledge message, as specified in Figure 8.22-1 of 3GPP TS 29.274 [16] (starting from octet 1).	CIOT
forwardingBearerContexts	array(ForwardingBearerContainer)	C	1..N	This IE shall be present during an EOS to 5GS Idle mode mobility using N26 interface with data forwarding (see clause 4.11.1.3.3A of 3GPP TS 23.502 [3]), if the Bearer Contexts IE shall be sent to the MME in the Context Acknowledge message. When present, it shall contain the Bearer Contexts to be sent in the Context Acknowledge message.	CIOT
selectedSmfId	NfInstanceId	C	0..1	This IE shall be present if a new (h)SMF is selected e.g. by the new I/V-SMF, or a SCP between the new I/V-SMF and the (h)SMF. (NOTE) When present, it shall contain the selected SMF NF Instance Id.	DTSSA
selectedOldSmfId	NfInstanceId	C	0..1	This IE shall be present if if another old I/V-SMF(as alternative to the old I/V-SMF) is selected, e.g. by the new I/V-SMF or a SCP between the new I/V-SMF and the old I/V-SMF. (NOTE) When present, it shall contain the selected old I/V-SMF NF Instance Id.	DTSSA
interPlmnApiRoot	Uri	O	0..1	This IE should be present if the information has changed. When present, it shall contain the apiRoot of the SM context to be used in inter-PLMN signalling request targeting the SM context.	
anchorSmfFeatures	AnchorSmfFeatures	O	0..1	This IE may be present to indicate a list of features supported by the (H-)SMF to the AMF.	
pduSessionPrio	PduSessionPriority	C	0..1	This IE shall be present if the priority of the PDU session needs to be updated. If received, the AMF shall use the priority of the PDU session indicated in this IE for further PDU Session related priority handling (i.e. to determine the SBI Message Priority (SMP) to set in subsequent signaling it sends related to the PDU session).	

NOTE:	During an SmContext Update procedure, if a new (h)SMF and/or another old I/V-SMF has been re-selected (since the old I/V-SMF or the (h)SMF is not reachable) by the new I-/V-SMF or a SCP, the selected old I-/V-SMF and/or (h)SMF shall be returned to the AMF, in order to perform potential subsequent operations on the SMF hosting the resource, e.g. to release the SM Context on old I-/V-SMF, or to create SM Context on SMF when the I/V-SMF needs to be removed.

6.1.6.2.6 Type: SmContextReleaseData

Table 6.1.6.2.6-1: Definition of type SmContextReleaseData

Attribute name	Data type	P	Cardinality	Description	Applicability
cause	Cause	C	0..1	This IE shall be present, if the information is available. When present, this IE shall indicate the NF Service Consumer cause for the requested SM context release.	
ngApCause	NgApCause	C	0..1	This IE shall be present, if the information is available. When present, this IE shall indicate the NGAP cause for the requested SM context release.	
5gMmCauseValue	5GMmCause	C	0..1	This IE shall be included if the PDU session is released by the AMF due to any 5GMM failure. When present, this IE shall contain the 5GMM cause code value received from the UE.	
ueLocation	UserLocation	C	0..1	This IE shall be present, if available. When present, it shall contain the UE location information (see clause 5.2.3.4). See NOTE.	
ueTimeZone	TimeZone	C	0..1	This IE shall be present, if available. When present, it shall contain the UE Time Zone information.	
addUeLocation	UserLocation	O	0..1	Additional UE location. This IE may be present, if anType previously reported is a non-3GPP access and a valid 3GPP access user location information is available. When present, it shall contain: - the last known 3GPP access user location (see clause 5.2.3.4); and - the timestamp, if available, indicating the UTC time when the addUeLocation information was acquired. See NOTE.	
vsmfReleaseOnly	boolean	C	0..1	This IE shall be present and set to "true" during a 5GS to EPS Idle mode mobility or handover, for a Home Routed PDU session associated with 3GPP access and with assigned EBI(s), during UE Triggered Service Request with V-SMF change, or during Registration, Inter NG-RAN node Xn based handover and N2 based handover procedures with V-SMF change or removal. When present, it shall be set as follows: - true: release the SM context and PDU session in the V-SMF only; - false (default): release the SM context and PDU session in V-SMF and H-SMF.	
n2SmInfo	RefToBinaryData	C	0..1	This IE shall be present if N2 SM Information has been received from the AN. When present, this IE shall reference the N2 SM Information binary data (see clause 6.1.6.4.3).	
n2SmInfoType	N2SmInfoType	C	0..1	This IE shall be present if "n2SmInfo" attribute is present. When present, this IE shall indicate the NG AP IE type for the NG AP SMF related IE container carried in "n2SmInfo" attribute.	
ismfReleaseOnly	boolean	C	0..1	This IE shall be present and set to "true" during a 5GS to EPS Idle mode mobility or handover with I-SMF removal, or during Registration, UE Triggered Service Request, Inter NG-RAN node Xn based handover and N2 based handover with I-SMF change or removal. When present, it shall be set as follows: - true: only release the SM context of the PDU session in the I-SMF; - false (default): release the SM context and PDU session in I-SMF and SMF.	DTSSA

NOTE: In shared networks, when the message is sent from the VPLMN to the HPLMN, the PLMN ID that is communicated in this IE shall be that of the selected Core Network Operator.
In shared networks, when the AMF and SMF pertain to the same PLMN, the Primary PLMN ID shall be communicated in the ECGI or NCGI to the SMF. The Core Network Operator PLMN ID shall be communicated in the TAI and the Serving Network.

6.1.6.2.7 Type: SmContextRetrieveData

Table 6.1.6.2.7-1: Definition of type SmContextRetrieveData

Attribute name	Data type	P	Cardinality	Description	Applicability
targetMmeCap	MmeCapabilities	C	0..1	This IE shall be present if it is available. When present, it shall contain the target MME capabilities.	
smContextType	SmContextType	C	0..1	This IE shall be present if this is a request to retrieve the complete SM context, during scenarios with an I-SMF or V-SMF insertion/change/removal, or during SMF Context Transfer procedure for LBO or non-roaming PDU session without I-SMF (see clause 4.26.5.3 of 3GPP TS 23.502 [3]). This IE shall also be present if this is a request to retrieve the AF Coordination Information during the change of SSC mode 3 PDU Session Anchor with multiple PDU Sessions, if the runtime coordination between old SMF and AF is enabled (see clause 4.3.5.2 of 3GPP TS 23.502 [3]).	DTSSA, CTXTR EnEDGE
servingNetwork	PlmnId	C	0..1	This IE shall be present when the procedure is triggered by a new V-SMF, if the new V-SMF supports inter-PLMN V-SMF change or insertion. This IE shall also be present during the procedure with an I-SMF insertion. When present, this IE shall contain the serving core network operator PLMN ID of the NF Service Consumer (i.e. new V-SMF or new I-SMF).	DTSSA
notToTransferEbiList	array(EpsBearerId)	C	1..N	This IE shall be present, if the SM context type IE is absent or indicate a request to retrieve the EPS PDN connection, and the AMF determines that certain EPS bearers shall not to be transferred to EPS during a 5GS to EPS mobility procedure, as specified in clause 4.11.1 of 3GPP TS 23.502 [3]. When present, it shall contain the EBI list not to be transferred.	
ranUnchangedInd	boolean	C	0..1	This IE shall be present if AN Tunnel is required, in scenario of I-SMF/V-SMF change/insertion during registration procedure after EPS to 5GS handover or I-SMF selection per DNAI, when UE is in CM-CONNECTED state (see clause 5.2.2.6.1). When present, it shall be set as follows: - true: NG-RAN is not changed and the tunnel information is required; - false (default):NG-RAN is changed and the tunnel information is not required.	DTSSA
hrsboSupportInd	boolean	C	0..1	This IE shall be present if the procedure is triggered by a new V-SMF which supports the HR-SBO feature. When present, it shall be set as follows: - true: HR-SBO is supported; - false (default): HR-SBO is not supported.	
ismfLomSupportInd	boolean	C	0..1	This IE shall be present if the procedure is triggered by a new I-SMF which supports the ISMF-LOM feature. When present, it shall be set as follows: - true: I-SMF Local Offloading Management is supported; - false (default): I-SMF Local Offloading Management is not supported.	

storedOffloadIds	array(OffloadIdentifier)	C	1...N	The IE shall be present when: - the target V-SMF has a list of the stored offload identifiers for the HPLMN of the PDU session from previous procedures (for the same or different PDU sessions) with the HPLMN; or - the target I-SMF has a list of the stored offload identifiers (for the PLMN of the PDU session) which are preconfigured at the target I-SMF or which were learned from anchor SMFs of the same PLMN during previous procedures (for the same or different PDU sessions). When present, this IE shall contain the list of offload identifiers known by the target V-SMF/I-SMF for the HPLMN (for HR-SBO) or PLMN (for I-SMF-LOM) of the PDU session. (NOTE)	HR-SBO, ISMF-LOM
NOTE: The stored Offload identifiers shall be included in any subsequent request message to the source V-SMF/I-SMF for other HR-PDU sessions (for HR-SBO) or other PDU sessions with I-SMF (for I-SMF-LOM).					

6.1.6.2.8 Type: SmContextStatusNotification

Table 6.1.6.2.8-1: Definition of type SmContextStatusNotification

Attribute name	Data type	P	Cardinality	Description	Applicability
statusInfo	StatusInfo	M	1	This IE shall contain status information about the SM context.	
smallDataRateStatus	SmallDataRateStatus	C	0..1	This IE shall be present, if the NF Service Consumer has indicated support of CIoT and if the status is available. When present, it shall indicate the current small data rate control status for the PDU session.	CIOT
apnRateStatus	ApnRateStatus	C	0..1	This IE shall be present, if the NF Service Consumer has indicated support of CIoT and if the status is available. When present, it shall indicate the current APN rate control status for the PDN connection (APN rates are shared by all PDN connections of the UE to this APN).	CIOT
ddnFailureStatus	boolean	C	0..1	This IE shall be present if the DDN Failure shall be reported (see clause 5.2.8.2.8 of 3GPP TS 23.502 [3]). When present, it shall be set as follows: - true: DDN failure detected - false (default): DDN failure is not detected	CIOT
notifyCorrelationIdsForddnFailure	array(string)	C	1..N	This IE shall be present if the DDN Failure shall be reported. When present, it shall contain the notification correlation Id(s) of the DDN failure subscriptions for which a DDN failure has been detected. This parameter can be useful if the NF service consumer has multiple subscriptions for the same PDU session.	CIOT
newIntermediateSmfId	NfInstanceId	O	0..1	This IE may be present for a PDU session with an I-SMF or V-SMF, if the resourceStatus attribute in statusInfo is set to "UPDATED" and the cause in statusInfo is set to "CHANGED_INTERMEDIATE_SMF". When present, it shall include the NF instance identifier of the new intermediate SMF when it is changed within an SMF set.	ES3XX
newSmfId	NfInstanceId	O	0..1	This IE may be present if resourceStatus in statusInfo is set to "TRANSFERRED". (NOTE 1) When present, it shall include: - the new I-SMF instance identifier if the cause in statusInfo is "ISMF_CONTEXT_TRANSFER"; - the new SMF instance identifier if the cause in statusInfo is "SMF_CONTEXT_TRANSFER". This IE may also be present if the resourceStatus attribute in statusInfo is set to "UPDATED". When present, it shall include the NF instance identifier of the new H-SMF or SMF (for a PDU session with an I-SMF) handling the PDU session, when it is changed within an SMF set, if the cause in statusInfo is "CHANGED_ANCHOR_SMF".	CTXTR ES3XX

newSmfSetId	NfSetId	O	0..1	This IE may be present if resourceStatus in statusInfo is set to "TRANSFERRED". (NOTE 1) When present, it shall include: - The new I-SMF set identifier if cause in statusInfo is "ISMF_SERVICE_CONTEXT_TRANSFER"; - The new SMF set identifier if cause in statusInfo is "SMF_SERVICE_CONTEXT_TRANSFER".	CTXTR
oldSmfId	NfInstanceId	C	0..1	This IE shall be present if resourceStatus in statusInfo is: - TRANSFERRED When present, it shall include: - The old I-SMF instance identifier if cause in statusInfo is "ISMF_CONTEXT_TRANSFER"; - The old SMF instance identifier if cause in statusInfo is "SMF_CONTEXT_TRANSFER".	CTXTR
oldSmContextRef	Uri	O	0..1	This IE may be present if resourceStatus in statusInfo is: - TRANSFERRED When present, this IE shall include the URI of the SM Context resource in the old I-SMF or SMF.	CTXTR
				This IE may be present with the resourceStatus IE in statusInfo is set to "UNCHANGED", if the SMF selection during PDU Session re-establishment for SSC mode 3 is needed and the runtime coordination between old SMF and AF is enabled. When present, this IE shall contain the URI of the SM Context resource (with structure as specified in clause 6.1.3.3.2) in the old SMF including the AF coordination information, see clause 4.3.5.2 of 3GPP TS 23.502 [3].	EnEDGE
altAnchorSmfUri	Uri	C	0..1	This IE shall be present if resourceStatus in statusInfo is: - ALT_ANCHOR_SMF When present, it shall contain the API URI of the alternative (H-)SMF towards which the PDU session is established.	AASN
altAnchorSmfId	NfInstanceId	O	0..1	This IE may be present if resourceStatus in statusInfo is: - ALT_ANCHOR_SMF When present, it shall contain the NF Instance Id of the alternative (H-)SMF towards which the PDU session is established. (NOTE 2)	AASN
targetDnaiInfo	TargetDnaiInfo	C	0..1	This IE shall be present if the I-SMF selection or removal for the current PDU session, or SMF selection during PDU Session re-establishment for SSC mode 2/3 is needed, or if it is received from the SMF in Notify Status. When present, this IE shall include the target DNAI Information.	EnEDGE

oldPduSessionRef	Uri	C	0..1	This IE shall be present if resourceStatus in statusInfo is "UNCHANGED", the SMF selection during PDU Session re-establishment for SSC mode 3 is needed and the runtime coordination between old SMF and AF is enabled. When present, this IE shall contain the URI of the PDU session resource in the old SMF. The URI shall be an absolute URI, including apiRoot (see clause 6.1.3.6.2).	EnEDGE
interPlmnApiRoot	Uri	O	0..1	This IE should be present if the information has changed and, within the statusInfo IE, the resourceStatus IE is set to "UPDATED" and the cause IE set as following: - to "CHANGED_INTERMEDIATE_SMF" for HR PDU session or a PDU session with I-SMF; or - to "CHANGED_ANCHOR_SMF" for a PDU session without V-SMF/I-SMF. When present, it shall contain the apiRoot of the SM context to be used in inter-PLMN signalling request targeting the SM context.	
targetDnai	Dnai	C	0..1	This IE shall be present if it is received from H-SMF in Update Request (see clause 6.7.3.2 of 3GPP TS 23.548 [74]). When present, this IE shall include the target DNAI.	HR-SBO
oldGuami	Guami	O	0..1	This IE should be present during an AMF planned removal procedure when the SMF sends the notification towards a re-selected AMF within the same AMF set, for a UE associated to an AMF that is unavailable (see clause 5.21.2.2 of 3GPP TS 23.501 [2]).	

NOTE 1: If resourceStatus in statusInfo is "TRANSFERRED", at least one of newSmfId and newSmfSetId shall be included.

NOTE 2: The SCP in the target PLMN includes, in the Create Response, the 3gpp-Sbi-Producer-Id header set to the NF instance ID of the H-SMF instance it has reselected, if the HPLMN reselects an alternative H-SMF instance within the SMF Set of the original H-SMF during the HR PDU session establishment. In this case, the V-SMF shall set the altAnchorSmfId IE accordingly in the SM Context Status Notification.
If no H-SMF instance within the H-SMF Set of the original H-SMF can serve the Create Request, the SCP in the target PLMN should indicate so to the V-SMF by including the 3gpp-Sbi-Response-Info header in the Create Response with the "no-retry" parameter set to true to prevent the V-SMF from retrying the Create Request towards an alternative H-SMF instance of the H-SMF Set (see clauses 5.2.3.3.8 and 6.10.8.1 of 3GPP TS 29.500 [4]).

6.1.6.2.9 Type: PduSessionCreateData

Table 6.1.6.2.9-1: Definition of type PduSessionCreateData

Attribute name	Data type	P	Cardinality	Description	Applicability
supi	Supi	C	0..1	This IE shall be present, except if the UE is emergency registered and UICCless. When present, it shall contain the subscriber permanent identify.	
unauthenticatedSupi	boolean	C	0..1	This IE shall be present if the SUPI is present in the message but is not authenticated and is for an emergency registered UE. When present, it shall be set as follows: - true: unauthenticated SUPI; - false (default): authenticated SUPI.	
pei	Pei	C	0..1	This IE shall be present if the UE is emergency registered and it is either UICIless or the SUPI is not authenticated. For all other cases, this IE shall be present if it is available. When present, it shall contain the permanent equipment identifier.	
pduSessionId	PduSessionId	C	0..1	This IE shall contain the PDU Session ID, except during an EPS to 5GS Idle mode mobility or handover using the N26 interface.	
dnn	Dnn	M	1	This IE shall contain the requested DNN. The DNN shall be the full DNN (i.e. with both the Network Identifier and Operator Identifier) for a HR PDU session, and it should be the full DNN in LBO and non-roaming scenarios. If the Operator Identifier is absent, the serving core network operator shall be assumed.	
selectedDnn	Dnn	C	0..1	This IE shall be present, if another DNN other than the UE requested DNN is selected for this PDU session. When present, it shall contain the selected DNN. The DNN shall be the full DNN (i.e. with both the Network Identifier and Operator Identifier) for a HR PDU session, and it should be the full DNN in LBO and non-roaming scenarios. If the Operator Identifier is absent, the serving core network operator shall be assumed.	
sNssai	Snssai	C	0..1	This IE shall be present, except during an EPS to 5GS idle mode mobility or handover using the N26 interface. When present, it shall contain: - the HPLMN S-NSSAI for a HR PDU session, which is mapped from the requested S-NSSAI by the VPLMN; - the HPLMN S-NSSAI for a non-roaming PDU session with an I-SMF, if the Serving PLMN ID is not the same as the PLMN ID of the SUPI; or - the requested S-NSSAI in the serving PLMN for a PDU session with an I-SMF for other scenarios.	
altSnssai	Snssai	C	0..1	This IE shall be present during the PDU session establishment procedure if the NF service consumer supports the network slice replacement, and the network slice indicated in the sNssai IE is requested to be replaced. In this case, the NF service consumer shall send the S-NSSAI and the alternative S-NSSAI. See clause 5.15.19 of 3GPP TS 23.501 [2].	NSRP
hplmnSnssai	Snssai	C	0..1	This IE shall be present for an LBO PDU session with an I-SMF, except during an EPS to 5GS idle mode mobility or handover using the N26 interface. When present, it shall contain the HPLMN S-NSSAI of the LBO PDU session, which is mapped from the requested S-NSSAI by the VPLMN.	DTSSA
vsmfId	NfInstanceId	C	0..1	This IE shall be present for a HR PDU session. When present, it shall contain the identifier of the V-SMF.	

ismfId	NfInstanceId	C	0..1	This IE shall be present for a PDU session with an I-SMF. When present, it shall contain the identifier of the I-SMF.	DTSSA
iupfId	NfInstanceId	C	0..1	This IE shall be present if the I-SMF has inserted an I-UPF without a UL CL, Branching Point, or local PSA. When present, this IE shall contain the NF instance ID of the I-UPF.	
servingNetwork	PlmnIdNid	M	1	This IE shall contain the serving core network operator PLMN ID and, for an SNPN, the NID that together with the PLMN ID identifies the SNPN. This IE shall contain the selected PLMN ID representing the participating operator in the case of Indirect Network Sharing (see clause 5.18.1 of 3GPP TS 23.501 [2]).	
requestType	RequestType	C	0..1	This IE shall be present if the Request type IE is received from the UE for a single access PDU session and if the request refers to an existing PDU session or an existing emergency PDU session. The requestType IE shall not be included for a MA-PDU session establishment request. It may be present otherwise. When present, it shall indicate whether the request refers to a new PDU session or emergency PDU session, or to an existing PDU session or emergency PDU session. For request sent from AMF, this IE shall be set based on the requestType received.	
epsBearerId	array(EpsBearerId)	C	1..N	This IE shall be present during an EPS to 5GS Idle mode mobility or handover preparation using the N26 interface. When present, it shall contain the list of EPS bearer Id(s) received from the MME.	
pgwS8cFteid	Bytes	C	0..1	This IE shall be present during an EPS to 5GS Idle mode mobility or handover preparation using the N26 interface. When present, it shall contain Base64-encoded characters, encoding the PGW S8 F-TEID for Control Plane as specified in Figure 8.22-1 of 3GPP TS 29.274 [16] (starting from octet 1), received from the MME.	
vsmfPduSessionUri	Uri	C	0..1	This IE shall be present for a HR PDU session. When present, it shall include the callback URI representing the PDU session in the V-SMF.	
ismfPduSessionUri	Uri	C	0..1	This IE shall be present for a PDU session with an I-SMF. When present, it shall include the callback URI representing the PDU session in the I-SMF.	DTSSA
vcnTunnelInfo	TunnelInfo	C	0..1	This IE shall be present for a HR PDU session, except for: - an EPS to 5GS handover using N26 interface; and - when Control Plane CIoT 5GS Optimisation is enabled and data delivery via NEF is selected for this PDU session. When present, this IE shall contain the DL N9 tunnel CN information of the visited CN side, i.e. V-UPF.	
icnTunnelInfo	TunnelInfo	C	0..1	This IE shall be present for a PDU session involving an I-SMF, except for: - an EPS to 5GS handover using N26 interface with I-SMF insertion; and - when Control Plane CIoT 5GS Optimisation is enabled and data delivery via NEF is selected for this PDU session. When present, this IE shall contain the DL N9 tunnel CN information of the I-UPF controlled by the I-SMF.	DTSSA

n9ForwardingTunnelInfo	TunnelInfo	C	0..1	This IE shall be present during Service Request procedures with I-SMF insertion, if buffered DL data is available at the I-UPF that is controlled by the SMF (see clause 4.23.4 in 3GPP TS 23.502 [3]). When present, this IE shall contain the N9 tunnel information of the I-UPF controlled by the I-SMF.	DTSSA
additionalCnTunnelInfo	TunnelInfo	C	0..1	This IE shall be present if a MA PDU session is requested or if the PDU session is allowed to be upgraded to a MA PDU session, and the UE is registered over both 3GPP access and Non-3GPP access. When present, it shall contain additional DL N9 tunnel CN information of the UPF controlled by the V-SMF or I-SMF.	MAPDU
anType	AccessType	M	1	This IE shall indicate the Access Network Type to which the PDU session is to be associated.	
additionalAnType	AccessType	C	0..1	This IE shall indicate the additional Access Network Type to which the PDU session is to be associated. This IE shall be present if a MA-PDU session is requested and the UE is registered over both 3GPP access and Non-3GPP access.	MAPDU
ratType	RatType	C	0..1	This IE shall be present and indicate the RAT Type used by the UE, if available.	
ueLocation	UserLocation	C	0..1	This IE shall contain the UE location information (see clause 5.2.3.4), if it is available. (NOTE 1)	
ueTimeZone	TimeZone	C	0..1	This IE shall contain the UE Time Zone, if it is available.	
addUeLocation	UserLocation	O	0..1	Additional UE location. This IE may be present, if anType indicates a non-3GPP access and a valid 3GPP access user location information is available. When present, it shall contain: - the last known 3GPP access user location (see clause 5.2.3.4); and - the timestamp, if available, indicating the UTC time when the addUeLocation information was acquired. (NOTE 1)	
gpsi	Gpsi	C	0..1	This IE shall be present if it is available. When present, it shall contain the user's GPSI.	
n1SmInfoFromUe	RefToBinaryData	C	0..1	This IE shall be present if the V-SMF or I-SMF has received known N1 SM information from the UE that does not need to be interpreted by the V-SMF or I-SMF. When present, this IE shall reference the n1SmInfoFromUe binary data (see clause 6.1.6.4.4).	
unknownN1SmInfo	RefToBinaryData	C	0..1	This IE shall be present if the V-SMF or I-SMF has received unknown N1 SM information from the UE. When present, this IE shall reference the unknownN1SmInfo binary data (see clause 6.1.6.4.4).	
supportedFeatures	SupportedFeatures	C	0..1	This IE shall be present if at least one feature defined in clause 6.1.8 is supported.	
hPcfId	NfInstanceId	O	0..1	This IE may be used by V-SMF to indicate the home PCF selected by the AMF for the UE to the H-SMF, for a HR PDU session. When present, this IE shall contain the identifier of the H-PCF selected by the AMF for the UE (for UE Policy Control).	
pcfId	NfInstanceId	O	0..1	This IE may be used by I-SMF to indicate the (V-)PCF selected by the AMF for the UE to the SMF, for a PDU session with an I-SMF. When present, this IE shall contain the identifier of the PCF (for Access and Mobility Policy Control and/or UE Policy Control) in non-roaming scenarios, or the V-PCF (for Access and Mobility Policy Control) in LBO roaming scenarios.	DTSSA

pcfGroupId	NfGroupId	O	0..1	This IE may be present in non-roaming and HR roaming scenarios. When present, this IE shall contain the identity of the (home) PCF group serving the UE for Access and Mobility Policy and/or UE Policy.	
pcfSetId	NfSetId	O	0..1	When present, it shall contain the NF Set ID of the H-PCF indicated by the hPcfId IE or the (V-)PCF indicated by the pcfId IE.	
hoPreparationIndication	boolean	C	0..1	This IE shall be present during an EPS to 5GS handover preparation using the N26 interface or during N2 handover preparation with I-SMF insertion. When present, it shall be set as follows: - true: an EPS to 5GS handover preparation or N2 handover preparation with I-SMF is in progress; the PGW-C/SMF shall not switch the DL user plane of the PDU session yet. - false: there is no on-going EPS to 5GS handover preparation or N2 handover preparation with I-SMF in progress. If a handover preparation was in progress, the handover has been completed. The PGW-C/SMF shall switch the DL user plane of the PDU session using the N9 tunnel information that has been received in the vcnTunnelInfo or icnTunnelInfo. It shall be set to "true" during an EPS to 5GS handover preparation using the N26 interface or during N2 handover preparation with I-SMF insertion.	
selMode	DnnSelectionMode	C	0..1	This IE shall be present if it is available. When present, it shall be set to: - "VERIFIED", if the requested DNN provided by UE or the selected DNN provided by the network corresponds to an explicitly subscribed DNN; or - "UE_DNN_NOT_VERIFIED", if the requested DNN provided by UE corresponds to the usage of a wildcard subscription; or - "NW_DNN_NOT_VERIFIED", if the selected DNN provided by the network corresponds to the usage of a wildcard subscription. If both the requested DNN (i.e. dnn IE) and selected DNN (i.e. selected Dnn IE) are present, the selMode shall be related to the selected DNN.	
alwaysOnRequested	boolean	C	0..1	This IE shall be present and set to true if the UE requests to setup an always-on PDU session and this is allowed by local policy in the V-SMF or I-SMF. When present, it shall be set as follows: - true: request for an always-on PDU session - false (default): not a request for an always-on PDU session	
udmGroupId	NfGroupId	O	0..1	When present, it shall indicate the identity of the UDM group serving the UE.	
routingIndicator	string	O	0..1	When present, it shall indicate the Routing Indicator of the UE.	
hNwPubKeyId	integer	O	0..1	When present, it shall indicate the Home Network Public Key Identifier of the UE. (NOTE 2)	

epsInterworkingInd	EpsInterworkingIndication	C	0..1	A V-SMF complying with this version of the specification shall include this IE if the indication has been received from the AMF and is allowed to be forwarded to the H-SMF by operator configuration. An I-SMF complying with this version of the specification shall include this IE if the indication has been received from the AMF. When present, this IE shall indicate whether the PDU session may possibly be moved to EPS or EPC/ePDG and whether N26 interface to be used during EPS interworking procedures.	
vSmfServiceInstanceId	string	O	0..1	When present, this IE shall contain the serviceInstanceId of the V-SMF service instance serving the PDU session. This IE may be used by the H-SMF to identify PDU sessions affected by a failure or restart of the V-SMF service (see clauses 6.2 and 6.3 of 3GPP TS 23.527 [24]).	
iSmfServiceInstanceId	string	O	0..1	When present, this IE shall contain the serviceInstanceId of I-SMF service instance serving the PDU session. This IE may be used by the SMF to identify PDU sessions affected by a failure or restart of the I-SMF service (see clauses 6.2 and 6.3 of 3GPP TS 23.527 [24]).	DTSSA
recoveryTime	DateTime	O	0..1	Timestamp (in UTC) when the V-SMF or I-SMF service instance serving the PDU session was (re)started (see clause 6.3 of 3GPP TS 23.527 [24]).	
roamingChargingProfile	RoamingChargingProfile	O	0..1	Roaming Charging Profile applicable in the VPLMN (see clauses 5.1.9.1, 5.2.1.7 and 5.2.2.12.2 of 3GPP TS 32.255 [25]).	
chargingId	string	C	0..1	Charging ID assigned by the V-SMF. This IE shall be present during Home-Routed PDU session establishment procedure, where the Charging Identifier is assigned by the V-SMF and transferred to the H-SMF (see clauses 5.1.9.1 of 3GPP TS 32.255 [25]). The string shall encode the Charging ID (32-bit unsigned integer value, with maximum value "4294967295") in decimal representation. Pattern: '^(0|([1-9]{1}[0-9]{0,9}))$' (NOTE 4)	
smfChargingId	SmfChargingId	C	0..1	String based Charging ID assigned by the V-SMF (see 3GPP TS 32.255 [25]). This IE shall be present when the chargingId IE is present and the "SCID" feature is supported by both SMFs. If the V-SMF cannot determine, during a HR PDU session establishment, whether the H-SMF supports the SCID feature (e.g. if the AMF did not indicate the features supported by the anchor SMF), the V-SMF shall include this IE and determine, upon receiving the response from the H-SMF, whether the H-SMF supports the SCID feature and then act accordingly (e.g. only use the Charging ID if the H-SMF does not support the String based Charging ID). When present, this IE shall encode the String based Charging ID of the PDU session and the base Charging ID segment shall be idential to the value carried in the chargingId IE.	SCID

oldPduSessionId	PduSessionId	C	0..1	This IE shall be present if this information is received from the UE and the same SMF is selected for SSC mode 3. When present, it shall contain the old PDU Session ID received from the UE. See clauses 4.3.2.2.1 and 4.3.5.2 of 3GPP TS 23.502 [3].	
epsBearerCtxStatus	EpsBearerContextStatus	C	0..1	This IE shall be present during an EPS to 5GS idle mode mobility using the N26 interface, if received in the Create SM Context request. When present, it shall be set to the value received in the Create SM Context request.	
amfNfId	NfInstanceId	C	0..1	This IE shall be present if it is received in the Create SM Context request, unless the PDU session is related to regulatory prioritized service. When present, it shall contain the identifier of the serving AMF.	
guami	Guami	C	0..1	This IE shall be present if the amfNfId is present. When present, it shall contain the serving AMF's GUAMI.	
maxIntegrityProtectedDataRateUl	MaxIntegrityProtectedDataRate	C	0..1	This IE shall be present if it is available. When present, it shall indicate the maximum integrity protected data rate supported by the UE for uplink.	
maxIntegrityProtectedDataRateDl	MaxIntegrityProtectedDataRate	C	0..1	This IE shall be present if it is available. When present, it shall indicate the maximum integrity protected data rate supported by the UE for downlink.	
cpCiotEnabled	boolean	C	0..1	This IE shall be present with the value "True" if the "5gCiotCpEnabled" attribute is received with "True" value in SM Context Create request, indicating the Control Plane CIoT 5GS Optimisation is enabled for the PDU session (see 3GPP TS 23.502 [3], clause 4.3.2.2.2). When present, it shall be set as follows: - True: Control Plane CIoT 5GS Optimisation is enabled. - False (default): Control Plane CIoT 5GS Optimisation is not enabled.	CIOT
cpOnlyInd	boolean	C	0..1	This IE shall be present with the value "True", if the PDU session shall only use Control Plane CIoT 5GS Optimisation (see clause 5.31.4.1 of 3GPP TS 23.501 [2]). When present, it shall be set as follows: - True: the PDU session shall only use Control Plane CIoT 5GS Optimisation - False (default): the PDU session is not constrained to only use Control Plane CIoT 5GS Optimisation.	CIOT
invokeNef	boolean	C	0..1	This IE shall be present with value "True", if Control Plane CIoT 5GS Optimisation is enabled and data delivery via NEF is selected for the PDU session. When present, it shall be set as follows: - True: Data delivery via NEF is selected. - False (default): Data delivery via NEF is not selected.	CIOT
maRequestInd	boolean	C	0..1	This IE shall be present if a MA-PDU session is requested to be established by the UE. When present, it shall be set as follows: - True: a MA-PDU session is requested - False (default): a MA-PDU session is not requested	MAPDU

maNwUpgradeInd	boolean	C	0..1	This IE shall only be present if the PDU session is allowed to be upgraded to MA PDU session (see clause 4.22.3 of 3GPP TS 23.502 [3]). When present, it shall be set as follows: - True: the PDU session is allowed to be upgraded to MA PDU session - False (default): the PDU session is not allowed to be upgraded to MA PDU session When maRequestInd is present and set to "true", this IE shall not be present.	MAPDU
dnaiList	array(Dnai)	C	1..N	This IE shall be present over N16a if an I-SMF is inserted into a PDU session during the following procedures: PDU session establishment, Registration, Service Request, Xn based handover, Inter NG-RAN node N2 based handover (see clause 4.23 of 3GPP TS 23.502 [3]). When present, it shall include the list of DNAIs supported by the I-SMF.	DTSSA
presenceInLadn	PresenceState	C	0..1	This IE shall be present during Xn based handover with I-SMF insertion, if the DNN corresponds to a LADN. When present, it shall be set to "IN" or "OUT" to indicate that the UE is in or out of the LADN service area.	DTSSA
secondaryRatUsageInfo	array(SecondaryRatUsageInfo)	O	1..N	This IE may be present to report usage data for a secondary RAT for QoS flows and/or the whole PDU session.	DTSSA
smallDataRateStatus	SmallDataRateStatus	C	0..1	This IE shall be present if the small data rate control status is received from AMF, see clause 5.31.14.3 of 3GPP TS 23.501 [2] and clause 4.3.2.2.2 of 3GPP TS 23.502 [3].	CIOT
apnRateStatus	ApnRateStatus	C	0..1	This IE shall be present, if the APN rate control status (APN rates are shared by all PDN connections of the UE to this APN) is received from the AMF, see clause 4.7.7.3 in 3GPP TS 23.401 [33] and clause 4.11.5.3 in 3GPP TS 23.502 [3].	CIOT
dlServingPlmnRateCtl	integer	C	0..1	This IE shall be present if Serving PLMN Rate Control for downlink data packets is enabled in the PLMN and Control Plane CIoT 5GS Optimisation is enabled for the PDU session. When present, this IE shall contain the maximum allowed number of Downlink NAS Data PDUs per deci hour of the serving PLMN, as specified in clause 5.31.14.2 of 3GPP TS 23.501 [2]. Minimum: 10	CIOT
upSecurityInfo	UpSecurityInfo	C	0..1	This IE shall be present if received from NG-RAN during Xn handover procedure with I-SMF Insertion (see clause 5.2.2.7.5). When present, this IE shall contain the User Plane Security Information associated to the PDU session. See clause 9.3.1.60 of 3GPP TS 38.413 [9].	DTSSA
vplmnQos	VplmnQos	C	0..1	This IE shall be present for a HR PDU session, if the V-SMF supports the VQOS feature and if VPLMN QoS constraints are required for the PDU session. When present, this IE shall contain the QoS constraints from the VPLMN.	VQOS
oldSmContextRef	Uri	C	0..1	This IE shall be present, if it is received in the Create SM Context request. When present, this IE shall contain the identifier of the SM Context resource in the old SMF.	EnEDGE

redundantPduSessionInfo	RedundantPduSessionInformation	C	0..1	This IE shall be present for a PDU session with an I-SMF, if an RSN and/or PDU Session Pair ID was received from the UE.	DCE2ER
oldPduSessionRef	Uri	C	0..1	This IE shall be present, if it is received in the Create SM Context request. When present, this IE shall contain the URI of the PDU session resource in the old SMF. The URI shall be an absolute URI, including apiRoot (see clause 6.1.3.6.2).	EnEDGE
smPolicyNotifyInd	boolean	C	0..1	This IE shall be included by I-SMF to SMF, if received from AMF. When present, this IE shall indicate whether the SM Policy Association Establishment and Termination events shall be reported for the PDU session by the PCF for the SM Policy to the PCF for the UE: - true: SM Policy Association Establishment and Termination events shall be reported - false (default): SM Policy Association Establishment and Termination events is not required (NOTE 3)	SPAE
pcfUeCallbackInfo	PcfUeCallbackInfo	C	0..1	This IE shall be present when the smPolicyNotifyInd IE is present with value true. When present, this IE shall contain the callback information (callback URI and binding information, if available) of the PCF for the UE to receive SM Policy Association Establishment and Termination events notification from the PCF for the SM Policy. (NOTE 3)	SPAE
satelliteBackhaulCat	SatelliteBackhaulCategory	O	0..1	This IE may be present if the V-SMF/I-SMF supports the 5GSAT feature and the satelliteBackhaulCat IE has been received from the AMF. When present, this IE shall indicate the value received from the AMF.	5GSAT
upipSupported	boolean	C	0..1	This IE shall be present during the PDU session establishment procedure if the UE supports User Plane Integrity Protection with EPS and if the AMF supports the related functionality. It may be present otherwise. When present, this IE shall be set as follows: - true: User Plane Integrity Protection with EPS is supported; - false (default): User Plane Integrity Protection with EPS is not supported.	UPIPE
upCnxState	UpCnxState	C	0..1	This IE shall be present to indicate that the User Plane resource for the PDU session is going to be established by the I-SMF/V-SMF, during a service request procedure with I-SMF/V-SMF insertion (see clause 4.23.4.3 of 3GPP TS 23.502 [3]). When present, this IE shall be set as specified in clause 5.2.2.7.6.	

disasterRoamingInd	boolean	O	0..1	This IE may be set during the PDU session establishment or a V-SMF insertion procedure when the V-SMF is indicated by the AMF that the UE is registered for Disaster Roaming service. When present, this IE shall be set as follows: - true: the UE is registered for Disaster Roaming service - false (default): the UE is not registered for Disaster Roaming service	
hrsboInfo	HrsboInfoFromVplmn	C	0..1	This IE shall be present in HR roaming scenarios if the V-SMF requests HR SBO authorization. When present, this IE shall Include the information for HR-SBO.	HR-SBO
ecsAddrConfigInfos	array(EcsAddrConfigInfo)	C	1..N	This IE shall be included by V-SMF to SMF, if received from NEF. When present, this IE shall contain the ECS Address Configuration Information Parameters. See 3GPP TS 23.548 [39].	HR-SBO
localOffloadMgtInfo	LocalOffloadingMgtInfoFromIsmf	C	0..1	This IE shall be present if I-SMF based Local Offloading Management applies for the PDU session (i.e. if Local Offloading Management was allowed by the AMF based on subscription data and the UE presence in a Local Offloading Management service area) and any information defined in clause 6.1.6.2.81 needs to be signaled to the SMF.	ISMF-LOM
pduSetSupportInd	boolean	C	0..1	This IE shall be included by I-SMF to SMF for a PDU session with an I-SMF if the NG-RAN has indicated it supports the PDU Set based handling during a Xn based inter NG-RAN handover with the I-SMF insertion. When present, this IE shall indicate whether the PDU Set based handling is supported by the 5G-AN: - true: the PDU Set based handling is supported - false(default): the PDU Set based handling is not supported	PDUSH
ecnMarkingCongestionInfoStatus	array(EcnMarkingCongestionInfoStatus)	C	1..N	This IE shall be present when the V/I-SMF receives the ECN Marking or Congestion Monitoring Reporting Status during an I/V-SMF insertion procedure, e.g. during an N2 based handover or an Xn based handover. When present, this IE shall contain a list of QoS flows with status for QoS monitoring for congestion information or for ECN marking for L4S.	EMECI
qosMonitoringPdSupported	QosMonitoringPdSupported	C	0..1	This IE shall be present if the QME feature is supported by the I-SMF/V-SMF and SMF, and if the information is available. When present, this IE shall indicate whether the NG-RAN supports the QoS monitoring for packet delay feature. See clause 5.45.1 of 3GPP TS 23.501 [2].	QME
qosMonitoringPdMethods	array(QosMonitoringPdMethod)	O	1..N	This IE should be present when the qosMonitoringPdSupported IE is present and set to SUPPORTED. When present, this IE shall indicate the supported method(s) for QoS Monitoring for packet delay in the NG-RAN.	QME

qosMonitoringCongestionSupported	QosMonitoringCongestionSupported	C	0..1	This IE shall be present if the QME feature and the EMECI feature are supported by the I-SMF/V-SMF and the SMF and if the information is available. When present, this IE shall indicate whether the NG-RAN supports the QoS monitoring for congestion feature. See clause 5.45.1 of 3GPP TS 23.501 [2].	QME
availBitRateMonSupported	AvailBitRateMonSupported	C	0..1	This IE shall be present if the AVABIT feature is supported by the I-SMF/V-SMF and SMF, and if the information is available. When present, this IE shall indicate whether the NG-RAN supports the available bitrate monitoring feature. See clause 5.45.1 of 3GPP TS 23.501 [2].	AVABIT
pgwChangeInd	boolean	C	0..1	This IE shall be present if it is received from the AMF during a EPS to 5GS mobility procedure. See clause 31.5 of 3GPP TS 23.007 [45]. When present, this IE shall indicate whether it is the restoration of the PDN connection at an alternative PGW-C/SMF. - true: it is for the restoration of the PDN connection at an alternative PGW-C/SMF Presence of this IE with the value false shall be prohibited.	

NOTE 1: In shared networks, the PLMN ID that is communicated in this IE shall be that of the selected Core Network Operator.
NOTE 2: If present, this attribute shall be used together with routingIndicator. This attribute is only used by the HPLMN in roaming scenarios.
NOTE 3: If the smPolicyNotifyInd IE is received with the value "true", the SMF shall forward the callback information of the PCF for the UE to the PCF for SM Policy during SM Policy Association Establishment. See clause 4.3.2.2.1 of 3GPP TS 23.502 [3].
NOTE 4: Usage of Charging ID with Uint32 value for roaming scenarios may lead to Charging ID collision between SMFs.

6.1.6.2.10 Type: PduSessionCreatedData

Table 6.1.6.2.10-1: Definition of type PduSessionCreatedData

Attribute name	Data type	P	Cardinality	Description	Applicability
pduSessionType	PduSessionType	M	1	This IE shall indicate the selected PDU type.	
sscMode	string	M	1	This IE shall indicate the SSC mode applicable to the PDU session. When present, it shall be encoded as one character in hexadecimal representation, taking a value of "0" to "7", representing the 3 bits of the SSC mode value of the SSC mode IE specified in clause 9.11.4.16 of 3GPP TS 24.501 [7]. Pattern: "^[0-7]$" Example: SSC mode 3 shall be encoded as "3". (NOTE 1).	
hcnTunnelInfo	TunnelInfo	C	0..1	This IE shall be present for a HR PDU session, except when Control Plane CIoT 5GS Optimisation is enabled and data delivery via NEF is selected for this PDU session. When present, this IE shall contain the UL N9 tunnel CN information of the home CN side, i.e. H-UPF.	
cnTunnelInfo	TunnelInfo	C	0..1	This IE shall be present for a PDU session involving an I-SMF, except when Control Plane CIoT 5GS Optimisation is enabled and data delivery via NEF is selected for this PDU session. When present, this IE shall contain the UL N9 tunnel CN information ofthe PSA UPF.	DTSSA
additionalCnTunnelInfo	TunnelInfo	C	0..1	This IE shall be present if a MA-PDU session is established for a UE registered over both 3GPP access and Non-3GPP access. When present, it shall contain additional UL N9 tunnel CN information of the UPF controlled by the H-SMF or SMF.	MAPDU
sessionAmbr	Ambr	C	0..1	This IE shall be present, except when Control Plane CIoT 5GS Optimisation is enabled for the PDU session. When present, this IE shall contain the Session AMBR granted to the PDU session.	
qosFlowsSetupList	array(QosFlowSetupItem)	C	1..N	This IE shall be present, except when Control Plane CIoT 5GS Optimisation is enabled for the PDU session. When present, this IE shall contain the full set of QoS flow(s) to establish for the PDU session. It shall contain at least the Qos flow associated to the default Qos rule. In V-SMF/I-SMF insertion scenarios where no QoS Rule(s) associated to a QoS flow can or need to be sent to the UE, the qosRules attribute of the QosFlowSetupItem may be set to an empty string or to the latest QoS Rule(s) associated to the QoS flow. (NOTE 3)	
hSmfInstanceId	NfInstanceId	C	0..1	This IE shall be present for a HR PDU session. When present, it shall contain the identifier of the home SMF.	
smfInstanceId	NfInstanceId	C	0..1	This IE shall be present for a PDU session with an I-SMF. When present, it shall contain the identifier of the SMF.	DTSSA
pduSessionId	PduSessionId	C	0..1	This IE shall be present during an EPS to 5GS Idle mode mobility or handover preparation using the N26 interface. When present, it shall be set to the PDU Session ID.	

sNssai	Snssai	C	0..1	This IE shall be present during an EPS to 5GS Idle mode mobility or handover using the N26 interface. When present, it shall contain: - the S-NSSAI assigned to the PDU session in the Home PLMN, for a HR PDU session; - the S-NSSAI assigned to the PDU session in the serving PLMN, for a PDU session with an I-SMF. The Snssai shall overwrite the S-NSSAI earlier stored in I-SMF, if they are different.	
additionalSnssai	Snssai	C	0..1	This IE shall be present during an EPS to 5GS Idle mode mobility or handover using the N26 interface for LBO roaming case. When present, this IE shall indicate the associated S-NSSAI in HPLMN for the PDU Session.	
enablePauseCharging	boolean	C	0..1	This IE shall be present, based on operator's policy, to enable the use of Pause of Charging for the PDU session (see clause 4.4.4 of 3GPP TS 23.502 [3]). When present, it shall be set as follows: - true: enable Pause of Charging; - false (default): disable Pause of Charging.	
ueIpv4Address	Ipv4Addr	C	0..1	This IE shall be present if the SMF assigns a UE IPv4 address to the PDU session.	
ueIpv6Prefix	Ipv6Prefix	C	0..1	This IE shall be present if the SMF assigns a UE IPv6 prefix to the PDU session.	
n1SmInfoToUe	RefToBinaryData	C	0..1	This IE shall be present if the SMF needs to send N1 SM information to the UE that does not need to be interpreted by the V-SMF or I-SMF. When present, this IE shall reference the n1SmInfoToUe binary data (see clause 6.1.6.4.4).	
epsPdnCnxInfo	EpsPdnCnxInfo	C	0..1	This IE shall be present if the PDU session may be moved to EPS during its lifetime.	
epsBearerInfo	array(EpsBearerInfo)	C	1..N	This IE shall be present if the PDU session may be moved to EPS during its lifetime.	
supportedFeatures	SupportedFeatures	C	0..1	This IE shall be present if at least one feature defined in clause 6.1.8 is supported.	
maxIntegrityProtectedDataRate	MaxIntegrityProtectedDataRate	C	0..1	This IE shall be present if the upSecurity IE is present and indicates that integrity protection is preferred or required. When present, it shall indicate the maximum integrity protected data rate for uplink. If the maxIntegrityProtectedDataRateDl IE is absent, this IE applies to both uplink and downlink. (NOTE 6)	
maxIntegrityProtectedDataRateDl	MaxIntegrityProtectedDataRate	O	0..1	This IE may be present if the upSecurity IE is present and indicates that integrity protection is preferred or required. When present, it shall indicate the maximum integrity protected data rate for downlink. (NOTE 6)	
alwaysOnGranted	boolean	C	0..1	This IE shall be present if the alwaysOnRequested IE was received in the request or if the SMF determines, based on local policy, that the PDU session needs to be established as an always-on PDU session. When present, it shall be set as follows: - true: always-on PDU session granted. - false (default): always-on PDU session not granted.	

gpsi	Gpsi	C	0..1	This IE shall be present if no GPSI IE is provided in the request, e.g. for a PDU session moved from another access or another system, and the SMF knows that a GPSI is already associated with the PDU session. When present, it shall contain the user's GPSI associated with the PDU session.	
upSecurity	UpSecurity	O	0..1	When present, this IE shall indicate the security policy for integrity protection and encryption for the user plane of the PDU session. If this IE is present, it shall not indicate that integrity protection is preferred or required, if the maxIntegrityProtectedDataRate IE is not present (e.g. if UE Integrity Protection Maximum Data Rate is not available in the SMF). (NOTE 6)	
roamingChargingProfile	RoamingChargingProfile	O	0..1	Roaming Charging Profile selected by the HPLMN (see clauses 5.1.9.1, 5.2.1.7 and 5.2.2.12.2 of 3GPP TS 32.255 [25]).	
hSmfServiceInstanceId	string	O	0..1	When present, this IE shall contain the serviceInstanceId of the H-SMF service instance serving the PDU session, for a HR PDU session. This IE may be used by the V-SMF to identify PDU sessions affected by a failure or restart of the H-SMF service (see clause 6.2 of 3GPP TS 23.527 [24]).	
smfServiceInstanceId	string	O	0..1	When present, this IE shall contain the serviceInstanceId of the SMF service instance serving the PDU session, for a PDU session with an I-SMF. This IE may be used by the I-SMF to identify PDU sessions affected by a failure or restart of the SMF service (see clause 6.2 of 3GPP TS 23.527 [24]).	DTSSA
recoveryTime	DateTime	O	0..1	Timestamp (in UTC) when the SMF service instance serving the PDU session was (re)started (see clause 6.3 of 3GPP TS 23.527 [24]).	
dnaiList	array(Dnai)	C	1..N	This IE shall be present over N16a, if available and an I-SMF has been inserted into a PDU session, during the following procedures: PDU session establishment, Registration, Service Request, Xn based handover, Inter NG-RAN node N2 based handover (see clause 4.23 of 3GPP TS 23.502 [3]). When present, it shall include the list of DNAIs of interest for the PDU session for local traffic steering at the I-SMF. If the I-SMF and the SMF support the DTSSA-Ext1 feature, when present, this IE should include the full list of DNAIs of interest for PDU session, including DNAIs that may not be supported by the I-SMF and excluding the ones supported by the Anchor SMF.	DTSSA DTSSA-Ext1
ipv6MultiHomingInd	boolean	C	0..1	This IE shall be present over N16a, if available and an I-SMF has been inserted into the PDU session during the following procedures: PDU session establishment, Registration, Service Request, Xn based handover, Inter NG-RAN node N2 based handover (see clause 4.23 of 3GPP TS 23.502 [3]). When present, it shall be set as follows: - true: IPv6 multi-homing is permitted. - false (default): IPv6 multi-homing is not allowed.	DTSSA

maAcceptedInd	boolean	C	0..1	This IE shall be present if a request to establish a MA PDU session was accepted or if a single access PDU session was upgraded into a MA PDU session (see clauses 4.22.2 and 4.22.3 of 3GPP TS 23.502 [3]). When present, it shall be set as follows: - true: MA PDU session - false (default): single access PDU session	MAPDU
homeProvidedChargingId	string	O	0..1	When present, this IE shall contain the Home provided Charging ID (see 3GPP TS 32.255 [25]). This IE shall be present during an EPS to 5GS Idle mode mobility or Handover of a HR PDU session. (NOTE 5) The string shall encode the Charging ID (32-bit unsigned integer value, with maximum value "4294967295") in decimal representation. Pattern: '^(0|([1-9]{1}[0-9]{0,9}))$' (NOTE 8)	
homeProvidedSmfChargingId	SmfChargingId	C	0..1	When present, this IE shall contain the Home provided String based Charging ID (see 3GPP TS 32.255 [25]). This IE shall be present during an EPS to 5GS Idle mode mobility or Handover of a HR PDU session, if both the V-SMF and the H-SMF support the "SCID" feature. (NOTE 9)	SCID
nefExtBufSupportInd	boolean	C	0..1	This IE shall be present with value "true", if NEF has indicated Extended Buffering Support for mobile terminated data in SMF-NEF connection establishment response. When present, this IE shall be set as following: - true: Extended Buffering supported by NEF - false (default): Extended Buffering not supported by NEF	CIOT
smallDataRateControlEnabled	boolean	C	0..1	This IE shall be present and set to "true" if small data rate control is applicable on the PDU session. When present, it shall be set as follows: - true: small data rate control is applicable. - false (default): small data rate control is not applicable.	CIOT
ueIpv6InterfaceId	string	C	0..1	This IE shall be present if the H-SMF/SMF has assigned IPv6 interface identifier to the UE during the PDU session establishment for the Home-routed Roaming scenario or for a PDU session with an I-SMF. When present, it shall encode the UE IPv6 Interface Identifier to be used by the UE for its link-local address configuration with 16 hexadecimal digits. Pattern: "^[A-Fa-f0-9]{16}$"	
ipv6Index	IpIndex	C	0..1	This IE shall be present if IPv6 Index has been received from PCF during SM Policy Creation. (NOTE 4)	DTSSA
dnAaaAddress	IpAddress	O	0..1	When present, this IE shall contain the address of DN-AAA server for UE IP Address allocation that has been received from UDM. (NOTE 4).	DTSSA

redundantPduSessionInfo	RedundantPduSessionInformation	C	0..1	This IE shall be present for a PDU session with an I-SMF, if Dual Connectivity based end to end Redundant User Plane Paths shall apply as specified in clause 5.33.2.1 of 3GPP TS 23.501 [2], regardless of whether the redundantPduSessionInfo IE was received or not in the request. If an RSN and/or PDU Session Pair ID was received from the UE, the same RSN and/or PDU Session Pair ID shall be returned in the response; additionally, if either the RSN or PDU Session Pair ID was not received from the UE, the anchor SMF shall determine and also return an RSN or PDU Session Pair ID respectively in the response.	DCE2ER
nspuSupportInd	boolean	C	0..1	This IE shall be present and set to "true" if enablePauseCharging is set to "true" and if the (H-)SMF and PSA UPF support Notify Start Pause of Charging via user plane feature as specified in clause 5.30 of 3GPP TS 29.244 [29]. When present, it shall be set as follows: - true: Notify Start Pause of Charging via user plane feature is supported.	
interPlmnApiRoot	Uri	O	0..1	This IE should be present if the PDU session may be subject to inter-PLMN mobility and different PDU session context URIs shall be used for intra-PLMN and inter-PLMN signaling requests targeting the PDU session context. When present, it shall contain the apiRoot of the PDU session context to be used in inter-PLMN signalling request targeting the PDU session context. (NOTE 7)	
intraPlmnApiRoot	Uri	O	0..1	This IE should be present if the PDU session may be subject to inter-PLMN mobility and different PDU session context URIs shall be used for intra-PLMN and inter-PLMN signaling requests targeting the PDU session context. When present, it shall contain the apiRoot of the PDU session context to be used in intra-PLMN signalling request targeting the PDU session context. (NOTE 7)	
udmGroupId	NfGroupId	O	0..1	This IE may be present during an EPS to 5GS handover using the N26 interface procedure. When present, it shall indicate the identity of the UDM group serving the UE.	
pcfGroupId	NfGroupId	O	0..1	This IE may be present during an EPS to 5GS handover using the N26 interface procedure. When present, this IE shall contain the identity of the (home) PCF group serving the PDU session for Session Management policy.	
hrsboInfo	HrsboInfoFromHplmn	C	0..1	This IE shall be present in HR roaming scenarios if the H-SMF supports the HR-SBO feature and it receives a request for HR-SBO. When present, this IE shall Include the information for HR-SBO. The absence of this IE shall indicate that the HR-SBO is not allowed.	HR-SBO
localOffloadMgtInfo	LocalOffloadingMgtInfoToIsmf	C	0..1	This IE shall be present if any information defined in clause 6.1.6.2.82 needs to be signaled to the I-SMF for I-SMF based Local Offloading Management.	ISMF-LOM
pendingUpdateInfoList	array(PendingUpdateInfo)	O	1..N	When present, this IE shall indicate the list of information that are not required to be updated in real-time to the (H-)SMF, i.e. the change of the listed information (e.g. UE location or Timezone) may be piggybacked in a subsequent essential update (e.g. to exchange the N1 message from the UE) to the (H-)SMF. The NF service consumer (i.e. I-SMF/V-SMF) should not trigger an Update to the (H-)SMF including only the change(s) of the listed information.	

uliChangeGranularity	UliChangeGranularity	O	0..1	This IE may be present to indicate the needed ULI change granularity for UE Location Information (ULI) reporting, when the V/I-SMF sends an Update Request to the anchor SMF for the purpose of reporting immediately a ULI change (i.e. when the anchor SMF did not provide the pendingUpdateInfoList with "UE_LOCATION"). When present, the V/I-SMF shall report immediate ULI change to the (H-)SMF when a ULI change at the indicated ULI change granularity (e.g. upon a change of gNB or TAI) occurs. See clause 5.51.2.2.2 of 3GPP TS 23.501 [2].	

NOTE 1: This IE contains information that the V-SMF or I-SMF only needs to transfer to the UE (without interpretation). It is sent as a separate IE rather than within the n1SmInfoToUE binary data because the Selected SSC mode IE is defined as a "V" IE (i.e. without a Type field) in the NAS PDU Session Establishment Accept message.

NOTE 2: In scenarios with a V-SMF/I-SMF insertion, the V-SMF/I-SMF may receive in the Create Response some IEs it has already received during the earlier SM context retrieval from the SMF (e.g. due to the condition of presence of IEs in the Create Response). In such a case, the V-SMF/I-SMF shall overwrite the IEs earlier received with the new IEs received in the Create Response.

NOTE 3: The V-SMF/I-SMF shall ignore any QoS Rule(s) associated to a QoS flow received in PduSessionCreatedData during V-SMF/I-SMF insertion scenarios where no QoS Rule(s) can be sent to the UE, i.e. during Registration, Inter NG-RAN node N2 based handover, and EPS to 5GS Idle mode mobility/handover using N26 interface procedures with V-SMF/I-SMF insertion, or during Service Request and Xn based handover procedures with I-SMF insertion. In such scenarios, the (H-)SMF shall initiate a subsequent PDU session modification procedure if it needs to change the QoS Rules associated to the QoS flows.

NOTE 4: The I-SMF may use IPv6 index to assist in selecting how the IPv6 prefix is to be allocated for local PSA when IPv6 multi-homing is applied for the PDU session. If the IPv6 index indicates UE IP address allocation should be performed towards DN-AAA server, the DN-AAA server address may be included from the SMF to the I-SMF.

NOTE 5: The chargingId IE in SmContext (see clause 6.1.6.2.39) shall be set to the value received in the homeProvidedChargingId IE during an EPS to 5GS Idle mode mobility or Handover of a HR PDU session.

NOTE 6: During inter-system mobility from EPS to 5GS, the UE Integrity Protection Maximum Data Rate is not available at the SMF during PDU Session Creation. The UE will provide UE Integrity Protection Maximum Data Rate to the network within a subsequent UE triggered PDU session modification procedure, as specified in clause 4.3.3.2 of 3GPP TS 23.502 [3].

NOTE 7: During an inter-PLMN mobility, after retrieving the SM context from the old V-SMF, I-SMF or anchor SMF, the target V-SMF or I-SMF shall replace the apiRoot of the pduSessionRef with the interPlmnApiRoot (if available) if the anchor SMF is not in the target PLMN, or with the intraPlmnApiRoot (if available) otherwise. The Operator Identifier in the DNN indicates the PLMN ID of the anchor SMF.

NOTE 8: Usage of Charging ID with Uint32 value for roaming scenarios may lead to Charging ID collision between SMFs.

NOTE 9: The smfChargingId IE in SmContext (see clause 6.1.6.2.39) shall be set to the value in the homeProvidedSmfChargingId IE if received from the H-SMF.

6.1.6.2.11 Type: HsmfUpdateData

Table 6.1.6.2.11-1: Definition of type HsmfUpdateData

Attribute name	Data type	P	Cardinality	Description	Applicability
requestIndication	RequestIndication	M	1	This IE shall indicate the request type.	
pei	Pei	C	0..1	This IE shall be present if it is available and has not been provided earlier to the H-SMF or SMF. When present, this IE shall contain the permanent equipment identifier.	
vcnTunnelInfo	TunnelInfo	C	0..1	This IE shall be present if: - the N9 tunnel information on the visited CN side provided earlier to the H-SMF has changed; or - during an EPS to 5GS handover execution using N26 interface. When present, this IE shall contain the new N9 tunnel information on the visited CN side.	
icnTunnelInfo	TunnelInfo	C	0..1	This IE shall be present if: - the N9 tunnel information of the I-UPF for DL traffic provided earlier by the I-SMF to the SMF has changed; or - during an EPS to 5GS handover execution using N26 interface with I-SMF insertion. When present, this IE shall contain the new N9 tunnel information of the I-UPF.	DTSSA
additionalCnTunnelInfo	TunnelInfo	C	0..1	This IE shall be present if additional N9 tunnel information provided earlier has changed, or if the UE requests to establish resources for a MA PDU session over the other access. When present, it shall contain additional N9 tunnel information of the UPF controlled by the V-SMF or I-SMF.	MAPDU
servingNetwork	PlmnIdNid	C	0..1	This IE shall contain the serving core network operator PLMN ID, and, for an SNPN, the NID that together with the PLMN ID identifies the SNPN, if the serving network has changed.	
anType	AccessType	C	0..1	This IE shall be present if the Access Network Type provided earlier to the H-SMF or SMF has changed, e.g. during a handover of the PDU session between 3GPP access and untrusted non-3GPP access (see clause 5.2.2.8.2.5). When present, this IE shall indicate the new Access Network Type to which the PDU session is to be associated.	
additionalAnType	AccessType	C	0..1	This IE shall indicate the additional Access Network Type to which the PDU session is to be associated. This IE shall be present when the UE requests to establish resources for MA PDU session over the other access.	MAPDU
ratType	RatType	C	0..1	This IE shall be present and indicate the RAT Type used by the UE, if available, upon a change of RAT Type.	
ueLocation	UserLocation	C	0..1	This IE shall be present if it is available, the UE Location has changed and needs to be reported to the H-SMF or SMF. See the pendingUpdateInfoList IE in Table 6.1.6.2.10-1 and Table 6.1.6.2.12-1. When present, this IE shall contain: - the new UE location information (see clause 5.2.3.4); and - the timestamp, if available, indicating the UTC time when the ueLocation information was acquired. (NOTE 1)	
ueTimeZone	TimeZone	C	0..1	This IE shall be present if it is available, the UE Time Zone has changed and needs to be reported to the H-SMF or SMF. When present, this IE shall contain the new UE Time Zone.	

addUeLocation	UserLocation	O	0..1	Additional UE location. This IE may be present, if anType indicates a non-3GPP access and a valid 3GPP access user location information is available. When present, it shall contain: - the last known 3GPP access user location (see clause 5.2.3.4); and - the timestamp, if available, indicating the UTC time when the addUeLocation information was acquired. (NOTE 1)	
pauseCharging	boolean	C	0..1	This IE shall be present if the H-SMF or SMF enabled the use of Pause Pause of Charging for the PDU session during the PDU session establishment and Pause of Charging needs to be started or stopped (see clause 4.4.4 of 3GPP TS 23.502 [3]). When present, it shall be set as follows: - true: to Start Pause of Charging; - false: to Stop Pause of Charging.	
pti	ProcedureTransactionId	C	0..1	This IE shall be present if the requestIndication indicates a UE requested PDU session modification or release. When present, it shall contain the PTI value received from the UE.	
n1SmInfoFromUe	RefToBinaryData	C	0..1	This IE shall be present if the V-SMF or I-SMF has received known N1 SM information from the UE that does not need to be interpreted by the V-SMF or I-SMF. When present, this IE shall reference the n1SmInfoFromUe binary data (see clause 6.1.6.4.4). (NOTE 5)	
unknownN1SmInfo	RefToBinaryData	C	0..1	This IE shall be present if the V-SMF or I-SMF has received unknown N1 SM information from the UE. When present, this IE shall reference the unknownN1SmInfo binary data (see clause 6.1.6.4.4).	
qosFlowsRelNotifyList	array(QosFlowItem)	C	1..N	This IE shall be present if QoS flows have been released. This IE shall also be present if QoS flow(s) have been rejected by the RAN or rejected by the V-SMF, during PDU session establishment procedure.	
qosFlowsVsmfRejectedList	array(Qfi)	O	1..N	This IE may be present from V-SMF to H-SMF when qosFlowsRelNotifyList is present. When present, this IE shall include the QFIs of the QoS flows that were rejected by the V-SMF. When the H-SMF subsequently send N1 Message to the UE to remove the QoS rules and QoS Flow level QoS parameters associated with the rejected QoS Flow(s) as indicated in the qosFlowsRelNotifyList IE, the H-SMF should exclude the V-SMF rejected QoS flow(s). If all the rejected QoS flow(s) were rejected by the V-SMF, the H-SMF should skip the subsequent N1 message update to the UE.	
qosFlowsNotifyList	array(QosFlowNotifyItem)	C	1..N	This IE shall be present if the QoS targets for GBR QoS flow(s) are not fulfilled anymore or when they are fulfilled again. For each GBR QoS flow indicated as not fulfilled anymore, the V-SMF/I-SMF may also indicate an alternative QoS profile which the NG-RAN currently fulfils in the currentQosProfileIndex IE or indicate that the NG-RAN cannot even fulfil the lowest alternative QoS profile.	

NotifyList	array(PduSessionNotifyItem)	C	1..N	Description of notifications related to the PDU session. This IE shall be present if the NG-RAN has established user plane resources for the PDU session that do not fulfil the User Plane Security Enforcement with a value Preferred, or when the user plane security enforcement is fulfilled again. This IE shall also be present when the V-SMF or the I-SMF informs the (H-)SMF about a handover failure, if the PDU Session was rejected by the Target NG-RAN because the User Plane Security Enforcement is not supported in the Target NG-RAN and the User Plane Enforcement Policy indicates "Required" (see clauses 5.2.2.8.2.4 and 5.2.2.8.2.12). When present, this IE shall include the notification cause "UP_SEC_NOT_FULFILLED" if at least one of the UP integrity protection or UP ciphering security enforcement is not fulfilled. If the securityResult IE is present in the message, it provides additional details on the security enforcement results. (NOTE 4)	
epsBearerId	array(EpsBearerId)	C	0..N	This IE shall be present during an EPS to 5GS handover execution using the N26 interface. When present, it shall contain the list of EPS bearer Id(s) successfully handed over to 5GS. The array shall be empty if no resource was successfully allocated in 5GS for any PDU session.	
hoPreparationIndication	boolean	C	0..1	This IE shall be present during an EPS to 5GS handover preparation and handover execution using the N26 interface or during N2 handover execution with I-SMF insertion. When present, it shall be set as follows: - true: an EPS to 5GS handover preparation or N2 handover preparation with I-SMF is in progress; the PGW-C/SMF shall not switch the DL user plane of the PDU session yet. - false: there is no on-going EPS to 5GS handover preparation or N2 handover preparation with I-SMF in progress. If a handover preparation was in progress, the handover has been completed. The PGW-C/SMF shall switch the DL user plane of the PDU session using the N9 tunnel information that has been received in the vcnTunnelInfo or icnTunnelInfo. It shall be set to "true" during an EPS to 5GS handover preparation using the N26 interface. It shall be set to "false" during an EPS to 5GS handover execution using the N26 interface or during N2 handover execution with I-SMF insertion.	
revokeEbiList	array(EpsBearerId)	C	1..N	This IE shall be present to request the H-SMF or SMF to revoke some EBIs (see clause 4.11.1.4.1 of 3GPP TS 23.502 [3]). When present, it shall contain the EBIs to revoke.	

cause	Cause	C	0..1	This IE shall be present and set as specified in clause 5.2.2.8.2.6 during P-CSCF restoration procedure, clause 5.2.2.8.2.3 during 5G-AN requested PDU session resource release procedure and clause 5.2.2.3.26 during AMF requested PDU Session Release due to Network Slice instance not available. When present, this IE shall indicate the NF Service Consumer cause of the requested modification.	
ngApCause	NgApCause	C	0..1	The V-SMF or I-SMF shall include this IE if it received it from the 5G-AN and, for a HR PDU session, if this information is permitted to be sent to the H-SMF operator according to the V-SMF operator's policy. When present, this IE shall indicate the NGAP cause for the requested modification.	
5gMmCauseValue	5GMmCause	C	0..1	The V-SMF or I-SMF shall include this IE if it received it from the AMF and, for a HR PDU session, if this information is permitted to be sent to the H-SMF operator according to the V-SMF operator's policy.	
alwaysOnRequested	boolean	C	0..1	This IE shall be present and set to true if the UE requests to change the PDU session to an always-on PDU session and this is allowed by local policy in the V-SMF or I-SMF. When present, it shall be set as follows: - true: request for an always-on PDU session - false (default): not a request for an always-on PDU session	
epsInterworkingInd	EpsInterworkingIndication	O	0..1	This IE may be present if the indication has been received from AMF and, for a HR PDU session, it is allowed to be forwarded to H-SMF by operator configuration. When present, this IE shall indicate whether the PDU session may possibly be moved to EPS or EPC/ePDG and whether N26 interface to be used during EPS interworking procedures.	
secondaryRatUsageReport	array(SecondaryRatUsageReport)	O	1..N	This IE may be present to report usage data for a secondary RAT for QoS flows. (NOTE 2)	
secondaryRatUsageInfo	array(SecondaryRatUsageInfo)	O	1..N	This IE may be present to report usage data for a secondary RAT for QoS flows and/or the whole PDU session.	
anTypeCanBeChanged	boolean	C	0..1	This IE shall be present and set to true to indicate that the Access Network Type associated to the PDU session can be changed (see clause 5.2.2.8.2.2), during a Service Request procedure (see clauses 4.2.3.2 and 4.3.3.3 of 3GPP TS 23.502 [3])), in response to paging or NAS notification indicating non-3GPP access, when the PDU Session for which the UE was paged or notified is in the List Of Allowed PDU Sessions provided by the UE, and the AMF received N2 SM Information only or N1 SM Container and N2 SM Information from the SMF in step 3a of clause 4.2.3.3 of 3GPP TS 23.502 [3]. When present, it shall be set as follows: - true: the access type of the PDU session can be changed. - false (default): the access type of the PDU session cannot be changed.	
maReleaseInd	MaReleaseIndication	C	0..1	This IE shall be present if a MA PDU session is requested to be released over a single access, in the following cases: - when UE/AMF/V-SMF initiates MA PDU session release over one access; or - when UE deregisters from one access. When present, it shall indicate the access to be released.	MAPDU

maNwUpgradeInd	boolean	C	0..1	This IE shall be present if the PDU session is allowed to be upgraded to MA PDU session (see clause 6.4.2.2 of 3GPP TS 24.501 [7]). When present, it shall be set as follows: - true: the PDU session is allowed to be upgraded to MA PDU session - false (default): the PDU session is not allowed to be upgraded to MA PDU session	MAPDU
maRequestInd	boolean	C	0..1	This IE shall be present if a MA-PDU session is requested to be established (see clause 4.22.6.3 of 3GPP TS 23.502 [3]). When present, it shall be set as follows: - true: a MA-PDU session is requested - false (default): a MA-PDU session is not requested	MAPDU
unavailableAccessInd	UnavailableAccessIndication	C	0..1	This IE shall be present if an access of a MA-PDU session is unavailable (see clause 4.22.7 of 3GPP TS 23.502 [3]). When present, it shall indicate the access that is unavailable.	MAPDU
psaInfo	array(PsaInformation)	C	1..N	This IE shall be present, for a PDU session with an I-SMF, if one or more PSAs UPF are inserted and/or removed by the I-SMF.	DTSSA
ulclBpInfo	UlclBpInformation	C	0..1	This IE shall be present, for a PDU session with an I-SMF, if an UL CL or BP UPF separate from the local PSA is inserted.	DTSSA
n4Info	N4Information	O	0..1	This IE may be present if the I-SMF needs to send N4 information (e.g. traffic usage reporting) to the SMF for traffic offloaded at a PSA controlled by an I-SMF.	DTSSA
n4InfoExt1	N4Information	O	0..1	This IE may be present if the I-SMF needs to send additional N4 information (e.g. traffic usage reporting) to the SMF for traffic offloaded at a PSA controlled by an I-SMF.	DTSSA
n4InfoExt2	N4Information	O	0..1	This IE may be present if the I-SMF needs to send additional N4 information to the SMF (e.g. during a change of PSA).	DTSSA
presenceInLadn	PresenceState	C	0..1	This IE shall be present during Xn based handover with I-SMF change, if the DNN corresponds to a LADN. When present, it shall be set to "IN" or "OUT" to indicate that the UE is in or out of the LADN service area.	DTSSA
vsmfPduSessionUri	Uri	C	0..1	This IE shall be present during any procedure when the V-SMF has changed, as specified in clause 4.23.4.3 of 3GPP TS 23.502 [3]. When present, it shall include the callback URI representing the PDU session in the new V-SMF.	DTSSA
ismfPduSessionUri	Uri	C	0..1	This IE shall be present during any procedure when the I-SMF has changed, as specified in clause 4.23.4.3 of 3GPP TS 23.502 [3]. When present, it shall include the callback URI representing the PDU session in the new I-SMF.	DTSSA
vsmfId	NfInstanceId	C	0..1	This IE shall be present during any procedure when the V-SMF has changed, as specified in clause 4.23.4.3 of 3GPP TS 23.502 [3]. When present, it shall contain the identifier of the new V-SMF.	DTSSA
ismfId	NfInstanceId	C	0..1	This IE shall be present during any procedure when the I-SMF has changed, as specified in clause 4.23.4.3 of 3GPP TS 23.502 [3]. When present, it shall contain the identifier of the new I-SMF.	DTSSA

iupfId	NfInstanceId	C	0..1	This IE shall be present if the I-SMF has inserted an I-UPF without a UL CL, Branching Point, or local PSA, or if the I-UPF previously inserted has changed. When present, this IE shall contain the NF instance ID of the I-UPF.	
vSmfServiceInstanceId	string	O	0..1	This IE may be present during any procedure when the V-SMF has changed, as specified in clause 4.23.4.3 of 3GPP TS 23.502 [3]. When present, this IE shall contain the serviceInstanceId of the new V-SMF service instance serving the PDU session. This IE may be used by the H-SMF to identify PDU sessions affected by a failure or restart of the V-SMF service (see clauses 6.2 and 6.3 of 3GPP TS 23.527 [24]).	DTSSA
iSmfServiceInstanceId	string	O	0..1	This IE may be present during any procedure when the I-SMF has changed, as specified in clause 4.23.4.3 of 3GPP TS 23.502 [3]. When present, this IE shall contain the serviceInstanceId of the new I-SMF service instance serving the PDU session. This IE may be used by the SMF to identify PDU sessions affected by a failure or restart of the I-SMF service (see clauses 6.2 and 6.3 of 3GPP TS 23.527 [24]).	DTSSA
dlServingPlmnRateCtl	integer	C	0..1	The IE shall be present when the Serving PLMN Rate Control for Downlink data packets has changed since last update to the H-SMF (for HR PDU session) or SMF (for PDU sessions with an I-SMF). When present, this IE shall contain the maximum allowed number of Downlink NAS Data PDUs per deci hour of the serving PLMN, as specified in clause 5.31.14.2 of 3GPP TS 23.501 [2]. If Serving PLMN Rate Control is disabled, the IE shall be set to null value. Minimum: 10	CIOT
dnaiList	array(Dnai)	C	1..N	This IE shall be present over N16a during UE Triggered Service Request procedure with I-SMF change, Xn based handover and Inter NG-RAN node N2 based handover with I-SMF change (see clauses 4.23.4.3, 4.23.11.3 and 4.23.7.3.3 in 3GPP TS 23.502 [3]). When present, it shall include the list of DNAIs supported by the new I-SMF.	DTSSA
supportedFeatures	SupportedFeatures	C	0..1	This IE shall be present if the vsmfId or the ismfId is present (i.e. during a change of V-SMF or I-SMF) and at least one feature defined in clause 6.1.8 is supported by the new V-SMF or I-SMF. If this IE is absent when the vsmfId or the ismfId is present, the new V-SMF or I-SMF respectively shall be considered as not supporting any feature.	
roamingChargingProfile	RoamingChargingProfile	O	0..1	This IE may be present during an inter-PLMN V-SMF change (including the inter-PLMN mobility from HPLMN with I-SMF to VPLMN). When present, it shall contain the Roaming Charging Profile applicable in the VPLMN (see clauses 5.1.9.1, 5.2.1.7 and 5.2.2.12.2 of 3GPP TS 32.255 [25]).	
moExpDataCounter	MoExpDataCounter	C	0..1	This IE shall be present if received from AMF. When present, this IE shall contain the MO Exception Data Counter.	CIOT

vplmnQos	VplmnQos	O	0..1	When present, this IE shall contain the VPLMN QoS to be applied to the QoS flow with default QoS of the PDU Session.	VQOS
securityResult	SecurityResult	C	0..1	This IE shall be present if received from NG-RAN. When present, this IE shall contain the Security Result associated to the PDU session. See clause 9.3.1.59 of 3GPP TS 38.413 [9].	
upSecurityInfo	UpSecurityInfo	C	0..1	This IE shall be present if received from NG-RAN during Xn handover procedure (see clause 5.2.2.8.2.16). When present, this IE shall contain the User Plane Security Information associated to the PDU session. See clause 9.3.1.60 of 3GPP TS 38.413 [9].	
amfNfId	NfInstanceId	C	0..1	This IE shall be present if it is received in the Update SM Context request. When present, it shall contain the identifier of the serving AMF.	
guami	Guami	C	0..1	This IE shall be present if the amfNfId is present. When present, it shall contain the serving AMF's GUAMI.	
secondaryRatUsageDataReportContainer	array(SecondaryRatUsageDataReportContainer)	C	1..N	The IE shall be present during an EPS to 5GS handover procedure, if one or more instance of Secondary RAT Usage Data Report IE(s) are present and applicable to the PDU session. The V-/I-SMF may determine to pass or not the information to the (H-)SMF based on operator policy; if the V-/I-SMF determines to pass the information, the V-/I-SMF shall transparently forward this information to the (H-)SMF. When present, it shall contain Base64-encoded characters, encoding the Secondary RAT Usage Data Report in the Forward Relocation Complete Acknowledge message, as specified in Figure 8.132-1 of 3GPP TS 29.274 [16] (starting from octet 1).	
smPolicyNotifyInd	boolean	C	0..1	This IE shall be included by I-SMF to SMF, if it is received from AMF and it is not previously provided to the SMF. When present, this IE shall indicate that the SM Policy Association Establishment and Termination events shall be reported for the PDU session by the PCF for the SM Policy to the PCF for the UE: - true: SM Policy Association Establishment and Termination events shall be reported Presence of this IE with the value false shall be prohibited. (NOTE 3)	SPAE
pcfUeCallbackInfo	PcfUeCallbackInfo	C	0..1	This IE shall be present when the smPolicyNotifyInd IE is present with value true. When present, this IE shall contain the callback information (callback URI and binding information, if available) of the PCF for the UE to receive SM Policy Association Establishment and Termination events notification from the PCF for the SM Policy. (NOTE 3)	SPAE

satelliteBackhaulCat	SatelliteBackhaulCategory	C	0..1	This IE shall be present if the V-SMF/I-SMF and the anchor SMF supports the 5GSAT feature and: - the satelliteBackhaulCat IE has been received from the AMF and there is a change of the satelliteBackhaulCat IE compared to what has been signalled earlier to the (H-)SMF (as determined from the SmContext); or - upon inter-AMF mobility (when a target AMF is taking over the control of the PDU session), the new AMF does not include the satelliteBackhaulCat IE and a satellite backhaul category had been signalled to the SMF (as determined from the SmContext). When present, this IE shall indicate the value received from the AMF or, in the latter case, the value "NON_SATELLITE" to indicate that there is no longer any satellite backhaul towards the new 5G AN serving the UE.	5GSAT
maxIntegrityProtectedDataRateUl	MaxIntegrityProtectedDataRate	C	0..1	This IE shall be present if received from the UE during PDU session modification procedure, see clause 4.3.3.2 of 3GPP TS 23.502 [3]. When present, it shall indicate the maximum integrity protected data rate supported by the UE for uplink. (NOTE 5)	
maxIntegrityProtectedDataRateDl	MaxIntegrityProtectedDataRate	C	0..1	This IE shall be present if received from the UE during PDU session modification procedure, see clause 4.3.3.2 of 3GPP TS 23.502 [3]. When present, it shall indicate the maximum integrity protected data rate supported by the UE for downlink. (NOTE 5)	
upCnxState	UpCnxState	C	0..1	This IE shall be present to indicate the User Plane resource establishment status in the I-SMF/V-SMF, if an Update or Create request is required to be sent to the (H-)SMF before the User Plane resource for the PDU session is established during a service request procedure for a PDU session with an I-SMF/V-SMF (see clause 4.23.4.2 and clause 4.23.4.3 of 3GPP TS 23.502 [3]). This IE shall also be present to indicate the User Plane is activated in the I-SMF/V-SMF, during a service request procedure for a PDU session with an I-SMF/V-SMF, if the I-SMF/V-SMF has marked that the status of one or more QoS Flow(s) is to be deleted in the 5GC and synchronized with the UE (see clause 4.2.3.2 of 3GPP TS 23.502 [3]). When present, this IE shall be set as specified in clause 5.2.2.8.2.23. This IE shall be present to indicate to the (H-)SMF if the corresponding PDU session resource has been established or released in the NG-RAN if QoS Monitoring for packet delay per QoS flow has been activated for at least one QoS flow of the PDU session and the noQosMonPdWoN3DlTeid IE is set to true for at least one of the QoS flow(s) to be monitored. See also clause 5.2.2.8.2.28.	
ecsAddrConfigInfos	array(EcsAddrConfigInfo)	C	1..N	This IE shall be sent if the information is modified by the NEF. When present, this IE shall replace any earlier received ECS Address Configuration Information Parameters in SMF.	HR-SBO

hrsboInfo	HrsboInfoFromVplmn	C	0..1	This IE shall be present in the following scenarios, for a HR PDU session, if the new V-SMF requests HR SBO authorization: - V-SMF insertion (i.e. H-PLMN to V-PLMN mobility); and - Inter-PLMN V-SMF change (i.e. mobility between different V-PLMNs). This IE shall also be present, for a HR PDU session, if the HR-SBO information signaled earlier by the V-SMF to the H-SMF needs to be changed, e.g. to signal a new V-EASDF IP address or the EAS IP Replacement capability of the new V-SMF upon a change of V-SMF. When present, this IE shall Include the information for HR-SBO as defined in clause 6.1.6.2.72.	HR-SBO
localOffloadMgtInfo	LocalOffloadingMgtInfoFromIsmf	C	0..1	This IE shall be present if I-SMF based Local Offloading Management applies and any information defined in clause 6.1.6.2.81 needs to be signaled to the SMF.	ISMF-LOM
altSnssai	Snssai	C	0..1	This IE shall be present when the PDU Session is to be transferred to an alternative S-NSSAI. When present, this IE shall indicate the alternative network slice to be used by the PDU session. See clause 5.15.19 of 3GPP TS 23.501 [2].	NSRP
nsReplTerminInd	boolean	C	0..1	This IE shall be present for a notification of termination of Network Slice Replacement, if the PDU Session is associated with the Alternative S-NSSAI and the replaced S-NSSAI is available again. The SMF shall transfer the PDU Session to the replaced S-NSSAI. When present, it shall be set as follows: - true: the network slice replacement is terminated The presence of this IE with false value shall be prohibited. See clause 5.15.19 of 3GPP TS 23.501 [2].	NSRP
disasterRoamingInd	boolean	O	0..1	This IE may be set if the V-SMF is indicated by the AMF that the UE is registered for Disaster Roaming service during a V-SMF change procedure. (NOTE 6) When present, this IE shall be set as follows: - true: the UE is registered for Disaster Roaming service	
pduSetSupportInd	boolean	C	0..1	This IE shall be included by I-SMF/V-SMF to SMF/H-SMF for a PDU session with an I-SMF or a Home-Routed PDU session if the support of the PDU Set based handling in the 5G-AN has been changed and during a V-SMF change. (NOTE 7) When present, this IE shall indicate whether the PDU Set based handling is supported by the 5G-AN: - true: the PDU Set based handling is supported - false: the PDU Set based handling is not supported	PDUSH

ecnMarkingCongestionInfoStatus	array(EcnMarkingCongestionInfoStatus)	C	1..N	This IE shall be present: - when the (target) V/I-SMF receives the ECN Marking or Congestion Monitoring Reporting Status from the (target) 5G-AN, e.g. during an PDU Session Establishment, an N2 based handover, an Xn based handover procedure or an 5G-AN requested PDU Session Modification; - during an N2 based handover or an Xn based handover procedure without V-SMF/ I-SMF change, when the V-SMF/I-SMF does not receive the ECN Marking or Congestion Monitoring Reporting Status from the target NG-RAN node, if QoS monitoring for congestion information or ECN marking for L4S was active before the handover, to report that QoS monitoring for congestion information and ECN marking for L4S are no longer active; and - during an N2 based handover or an Xn based handover procedure with V-SMF/ I-SMF change, when the target V-SMF/I-SMF does not receive the ECN Marking or Congestion Monitoring Reporting Status, to report that QoS monitoring for congestion information and ECN marking for L4S are no longer active. When present, this IE shall contain a list of QoS flows with status for QoS monitoring for congestion information or for ECN marking for L4S.	EMECI
qosMonitoringPdSupported	QosMonitoringPdSupported	C	0..1	The IE shall be present if the QME feature is supported by I-SMF/V-SMF and the SMF, and: - the value of the qosMonitoringPdSupported attribute has changed since last update to the H-SMF (for HR PDU session) or SMF (for PDU sessions with an I-SMF); or - during an I-SMF/V-SMF change procedure, if the information is available; or - in Inter-AMF mobility with I-SMF/V-SMF change with the target AMF not supporting the QME feature, in which case the attribute with the value "UNKNOWN" shall be sent. When present, this IE shall indicate whether the NG-RAN supports the QoS monitoring for packet delay feature. See clause 5.45.1 of 3GPP TS 23.501 [2].	QME
qosMonitoringPdMethods	array(QosMonitoringPdMethod)	O	1..N	This IE should be present when the qosMonitoringPdSupported IE is present and set to SUPPORTED. When present, this IE shall indicate the supported method(s) for QoS Monitoring for packet delay in the NG-RAN.	QME

qosMonitoringCongestionSupported	QosMonitoringCongestionSupported	C	0..1	This IE shall be present if the QME feature and the EMECI feature are supported by the I-SMF/V-SMF and the SMF, and: - the value of the qosMonitoringCongestionSupported attribute has changed since last update to the H-SMF (for HR PDU session) or SMF (for PDU sessions with an I-SMF); or - during an I-SMF/V-SMF change procedure, if the information is available; or - in Inter-AMF mobility with I-SMF/V-SMF change with the target AMF not supporting the QME feature, in which case the attribute with the value "UNKNOWN" shall be sent. When present, this IE shall indicate whether the NG-RAN supports the QoS monitoring for congestion feature. See clause 5.45.1 of 3GPP TS 23.501 [2]. If the SMF receives the IE, it shall replace any earlier received value with the new value.	QME
availBitRateMonSupported	AvailBitRateMonSupported	C	0..1	The IE shall be present if the AVABIT feature is supported by I-SMF/V-SMF and the SMF, and: - the value of the availBitRateMonSupported attribute has changed since last update to the H-SMF (for HR PDU session) or SMF (for PDU sessions with an I-SMF); or - during an I-SMF/V-SMF change procedure, if the information is available; or - in Inter-AMF mobility with I-SMF/V-SMF change with the target AMF not supporting the AVABIT feature, in which case the attribute with the value "UNKNOWN" shall be sent. When present, this IE shall indicate whether the NG-RAN supports the available bitrate monitoring feature. See clause 5.45.1 of 3GPP TS 23.501 [2]. If the SMF receives the IE, it shall replace any earlier received value with the new value.	AVABIT
udmGroupId	NfGroupId	C	0..1	This IE shall be present if received from the AMF. When present, it shall indicate the identity of the new UDM group that is re-discovered by the AMF to serve the UE.	SUBDMIG
amfResynchedInd	boolean	C	0..1	This IE shall be present if the AMF has initiated data resynchronization for the corresponding UE, as a result of the processing of the Data Restoration Notification received from the UDM, as specified in clause 6.7.4 of 3GPP TS 23.527 [24]. Presence of this IE with the value false shall be prohibited.	AMF-RESYNCHED

NOTE 1: In shared networks, the PLMN ID that is communicated in this IE shall be that of the selected Core Network Operator.
NOTE 2: An SMF complying with this version of the specification should report secondary RAT usage using the secondaryRatUsageInfo attribute that replaces the secondaryRatUsageReport attribute.
NOTE 3: If the smPolicyNotifyInd IE is received with the value "true", the SMF shall forward the callback information of the PCF for the UE to the PCF for SM Policy if exists via SM Policy Association Modification. See clause 4.3.3.2 of 3GPP TS 23.502 [3].
NOTE 4: The attribute name does not follow the naming conventions specified in 3GPP TS 29.501 [5]. The attribute name is kept though as defined in the current specification for backward compatibility reason.
NOTE 5: The maxIntegrityProtectedDataRateUl and maxIntegrityProtectedDataRateDl IEs shall be ignored by the H-SMF or SMF if the Integrity protection maximum data rate in n1SmInfoFromUe IE is received.
NOTE 6: The H-SMF shall determine that the UE is not registered for Disaster Roaming service if the disasterRoamingInd is not present during a V-SMF change procedure.
NOTE 7: The (H-)SMF shall consider the PDU Set based handling is not supported if the pduSetSupportInd IE is absent during a V-SMF change.

6.1.6.2.12 Type: HsmfUpdatedData

Table 6.1.6.2.12-1: Definition of type HsmfUpdatedData

Attribute name	Data type	P	Cardinality	Description	Applicability
n1SmInfoToUe	RefToBinaryData	C	0..1	This IE shall be present if the H-SMF/SMF needs to send N1 SM information to the UE that does not need to be interpreted by the V-SMF/I-SMF. When present, this IE shall reference the n1SmInfoToUe binary data (see clause 6.1.6.4.4).	
n4Info	N4Information	O	0..1	This IE may be present if the SMF needs to send N4 response information to the I-SMF (e.g. related with traffic usage reporting).	DTSSA
n4InfoExt1	N4Information	O	0..1	This IE may be present if the SMF needs to send additional N4 response information to the I-SMF(e.g. related with traffic usage reporting).	DTSSA
n4InfoExt2	N4Information	O	0..1	This IE may be present if the SMF needs to send additional N4 response information to the I-SMF (e.g. related with traffic usage reporting).	DTSSA
dnaiList	array(Dnai)	C	1..N	This IE shall be present over N16a during UE Triggered Service Request procedure with I-SMF change, Xn based handover and Inter NG-RAN node N2 based handover with I-SMF change (see clauses 4.23.4.3, 4.23.11.3 and 4.23.7.3.3 in 3GPP TS 23.502 [3]). When present, it shall include the DNAI(s) of interest for this PDU Session. If the I-SMF and the SMF support the DTSSA-Ext1 feature, when present, this IE should include the full list of DNAIs of interest for PDU session, including DNAIs that may not be supported by the I-SMF and excluding the ones supported by the Anchor SMF.	DTSSA DTSSA-Ext1
supportedFeatures	SupportedFeatures	C	0..1	This IE shall be present if the supportedFeatures IE was received in the request and at least one feature defined in clause 6.1.8 is supported by the updated PDU session resource.	
roamingChargingProfile	RoamingChargingProfile	O	0..1	This IE may be present during an inter-PLMN V-SMF change (including the inter-PLMN mobility from HPLMN with I-SMF to VPLMN). When present, it shall contain the Roaming Charging Profile selected by the HPLMN (see clauses 5.1.9.1, 5.2.1.7 and 5.2.2.12.2 of 3GPP TS 32.255 [25]).	
homeProvidedChargingId	string	C	0..1	When present, this IE shall contain the Home provided Charging ID (see 3GPP TS 32.255 [25]). This IE shall be present during a HPLMN to VPLMN mobility of a PDU session with I-SMF in HPLMN. The string shall encode the Charging ID (32-bit unsigned integer value, with maximum value "4294967295") in decimal representation. Pattern: '^(0|([1-9]{1}[0-9]{0,9}))$' (NOTE 3, NOTE 4)	DTSSA
homeProvidedSmfChargingId	SmfChargingId	C	0..1	When present, this IE shall contain the Home provided String based Charging ID (see 3GPP TS 32.255 [25]). This IE shall be present during a HPLMN to VPLMN mobility of a PDU session with I-SMF in HPLMN, if both the V-SMF and the H-SMF support the "SCID" feature. This IE shall also be included when the V-SMF changes, if the new V-SMF supports the "SCID" feature. (NOTE 5)	DTSSA, SCID

ipv6MultiHomingInd	boolean	C	0..1	This IE shall be present over N16a, if available and an I-SMF has been changed during the following procedures: Registration, Service Request, Xn based handover, Inter NG-RAN node N2 based handover (see clause 4.23 of 3GPP TS 23.502 [3]). When present, it shall be set as follows: - true: IPv6 multi-homing is permitted. - false (default): IPv6 multi-homing is not allowed.	DTSSA
upSecurity	UpSecurity	C	0..1	This IE shall be present if the "upSecurityInfo" IE was received in the request (i.e. during an Xn handover), and there is a mismatch between security policy received and stored (see clause 5.2.2.8.2.16). When present, this IE shall indicate the security policy for integrity protection and encryption for the user plane of the PDU session. This IE may be present during a handover from non-3GPP access to 3GPP access, to indicate the security policy for integrity protection and encryption for the user plane of the PDU session in the target access type. This IE may be present when UE Integrity Protection Maximum Data Rate was received in the request, during a UE triggered PDU session modification procedure. (NOTE 1, NOTE 2)	
maxIntegrityProtectedDataRateUl	MaxIntegrityProtectedDataRate	C	0..1	This IE shall be present if the upSecurity IE is present and indicates that integrity protection is preferred or required. When present, it shall indicate the maximum integrity protected data rate supported by the UE for uplink. (NOTE 1)	
maxIntegrityProtectedDataRateDl	MaxIntegrityProtectedDataRate	C	0..1	This IE shall be present if the upSecurity IE is present and indicates that integrity protection is preferred or required. When present, it shall indicate the maximum integrity protected data rate supported by the UE for downlink. (NOTE 1)	
qosFlowsSetupList	array(QosFlowSetupItem)	C	1..N	This IE shall be present during a handover between 3GPP and non-3GPP accesses. When present, it shall contain the set of QoS flow(s) to establish for the PDU session for the target access type. (NOTE 1)	
sessionAmbr	Ambr	C	0..1	This IE shall be present during a handover between 3GPP and non-3GPP accesses. When present, this IE shall contain the Session AMBR authorized for the PDU session for the target access type. (NOTE 1)	
epsPdnCnxInfo	EpsPdnCnxInfo	C	0..1	This IE shall be present during a handover from non-3GPP access to 3GPP access, if the PDU session may be moved to EPS during its lifetime. (NOTE 1) The IE shall also be included when the EPS PDN Connection Context Information of the PDU session is changed, e.g. due to reselection of anchor SMF.	

epsBearerInfo	array(EpsBearerInfo)	C	1..N	This IE shall be present during a handover from non-3GPP access to 3GPP access, if the PDU session may be moved to EPS during its lifetime. When present, it shall include the complete epsBearerInfo IE(s) for all EBIs. (NOTE 1)	
pti	ProcedureTransactionId	C	0..1	This IE shall be present during a handover between 3GPP and non-3GPP accesses. When present, it shall contain the PTI value received in the corresponding request.	
interPlmnApiRoot	Uri	O	0..1	This IE should be present if the information has changed. When present, it shall contain the apiRoot of the PDU session context to be used in inter-PLMN signalling request targeting the PDU session context.	
intraPlmnApiRoot	Uri	O	0..1	This IE should be present if the information has changed. When present, it shall contain the apiRoot of the PDU session context to be used in intra-PLMN signalling request targeting the PDU session context.	
hrsboInfo	HrsboInfoFromHplmn	C	0..1	This IE shall be present in the following scenarios if the H-SMF supports the HR-SBO feature and if it receives a request for HR-SBO authorization in the Update request: - V-SMF insertion (i.e. H-PLMN to V-PLMN mobility); and - Inter-PLMN V-SMF change (i.e. mobility between different V-PLMNs). This IE shall also be present, for a HR PDU session, if the HR-SBO information signaled earlier by the H-SMF to the V-SMF needs to be changed, e.g. to signal a new Home DNS Server address. When present, this IE shall Include the information for HR-SBO as defined in clause 6.1.6.2.73. The absence of this IE in an Update response when the Update request includes a request for HR SBO authorization shall be interpreted as indicating that HR-SBO is not allowed.	HR-SBO
localOffloadMgtInfo	LocalOffloadingMgtInfoToIsmf	C	0..1	This IE shall be present if I-SMF based Local Offloading Management applies and any information defined in clause 6.1.6.2.82 needs to be signaled to the I-SMF.	ISMF-LOM
uliChangeGranularity	UliChangeGranularity	O	0..1	This IE may be present to indicate the needed ULI change granularity for UE Location Information (ULI) reporting, when the V/I-SMF sends an Update Request to the anchor SMF for the purpose of reporting immediately a ULI change (i.e. when the anchor SMF did not provide the pendingUpdateInfoList with "UE_LOCATION"). When present, the V/I-SMF shall report immediate ULI change to the (H-)SMF when a ULI change at the indicated ULI change granularity (e.g. upon a change of gNB or TAI) occurs. See clause 5.51.2.2.2 of 3GPP TS 23.501 [2].	

NOTE 1: During a handover between 3GPP and non-3GPP accesses, the V-SMF or I-SMF shall delete any corresponding information received earlier for the source access type and use the new information received for the target access type.
NOTE 2: During inter-system mobility from EPS to 5GS, the UE Integrity Protection Maximum Data Rate is not available at the SMF during PDU Session Creation. The UE will provide UE Integrity Protection Maximum Data Rate to the network within a subsequent UE triggered PDU session modification procedure, as specified in clause 4.3.3.2 of 3GPP TS 23.502 [3].
NOTE 3: The chargingId IE in SmContext (see clause 6.1.6.2.39) shall be set to the value received in the homeProvidedChargingId IE during a HPLMN to VPLMN mobility of a PDU session with I-SMF in HPLMN.
NOTE 4: Usage of Charging ID with Uint32 value for roaming scenarios may lead to Charging ID collision between SMFs.
NOTE 5: The smfChargingId IE in SmContext (see clause 6.1.6.2.39) shall be set to the value in the homeProvidedSmfChargingId IE if received from the H-SMF.

6.1.6.2.13 Type: ReleaseData

Table 6.1.6.2.13-1: Definition of type ReleaseData

Attribute name	Data type	P	Cardinality	Description	Applicability
cause	Cause	C	0..1	This IE shall be present, if the information is available. When present, this IE shall indicate the NF Service Consumer cause for the requested PDU session release.	
ngApCause	NgApCause	C	0..1	The V-SMF or I-SMF shall include this IE, if it is available and, for a HR PDU session, if this information is permitted to be sent to the H-SMF operator according to the V-SMF operator's policy. When present, this IE shall indicate the NGAP cause for the requested PDU session release.	
5gMmCauseValue	5GMmCause	C	0..1	The V-SMF or I-SMF shall include this IE if it received it from the AMF and, for a HR PDU session, if this information is permitted to be sent to the H-SMF operator according to the V-SMF operator's policy.	
ueLocation	UserLocation	C	0..1	This IE shall be present, if available. When present, it shall contain the UE location information (see clause 5.2.3.4).	
ueTimeZone	TimeZone	C	0..1	This IE shall be present, if available. When present, it shall contain the UE Time Zone.	
addUeLocation	UserLocation	O	0..1	Additional UE location. This IE may be present, if anType previously reported is a non-3GPP access and a valid 3GPP access user location information is available. When present, it shall contain: - the last known 3GPP access user location (see clause 5.2.3.4); and - the timestamp, if available, indicating the UTC time when the addUeLocation information was acquired.	
secondaryRatUsageReport	array(SecondaryRatUsageReport)	O	1..N	This IE may be present to report usage data for a secondary RAT for QoS flows. (NOTE)	
secondaryRatUsageInfo	array(SecondaryRatUsageInfo)	O	1..N	This IE may be present to report usage data for a secondary RAT for QoS flows and/or the whole PDU session.	
n4Info	N4Information	O	0..1	This IE may be present if the I-SMF needs to send N4 information (e.g. traffic usage reporting) to the SMF for traffic offloaded at a PSA controlled by an I-SMF.	DTSSA
n4InfoExt1	N4Information	O	0..1	This IE may be present if the I-SMF needs to send additional N4 information (e.g. traffic usage reporting) to the SMF for traffic offloaded at a PSA controlled by an I-SMF.	DTSSA
n4InfoExt2	N4Information	O	0..1	This IE may be present if the I-SMF needs to send additional N4 information (e.g. traffic usage reporting) to the SMF for traffic offloaded at a PSA controlled by an I-SMF.	DTSSA
NOTE: An SMF complying with this version of the specification should report secondary RAT usage using the secondaryRatUsageInfo attribute that replaces the secondaryRatUsageReport attribute.					

6.1.6.2.14 Type: HsmfUpdateError

Table 6.1.6.2.14-1: Definition of type HsmfUpdateError

Attribute name	Data type	P	Cardinality	Description
error	ProblemDetails	M	1	More information on the error shall be provided in the "cause" attribute of the "ProblemDetails" structure.
pti	ProcedureTransactionId	C	0..1	This IE shall be present if this is a response sent to a UE requested PDU session modification. When present, it shall contain the PTI value received in the corresponding request.
n1smCause	string	C	0..1	This IE shall be present if the request included n1SmInfoFromUe. When present, it shall contain the 5GSM cause the H-SMF or SMF proposes the V-SMF or I-SMF to return to the UE. It shall be encoded as two characters in hexadecimal representation with each character taking a value of "0" to "9" or "A" to "F", and represent the cause value of the 5GSM cause IE specified in clause 9.11.4.2 of 3GPP TS 24.501 [7]. Pattern: "^[A-F0-9]{2}$" Example: the cause "Invalid mandatory information" shall be encoded as "60". See NOTE.
n1SmInfoToUe	RefToBinaryData	C	0..1	This IE shall be present if the H-SMF or SMF needs to send N1 SM information to the UE that does not need to be interpreted by the V-SMF or I-SMF. When present, this IE shall reference the n1SmInfoToUe binary data (see clause 6.1.6.4.4).
backOffTimer	DurationSec	O	0..1	When present, this IE shall indicate a Back-off timer value, in seconds, that the V-SMF or I-SMF may use when rejecting the NAS message towards the UE.
recoveryTime	DateTime	O	0..1	Timestamp (in UTC) when the H-SMF or SMF service instance was (re)started (see clause 6.3 of 3GPP TS 23.527 [24]).
NOTE: This IE contains information that the V-SMF or I-SMF shall transfer to the UE without interpretation. It is sent as a separate IE rather than within the n1SmInfoToUE binary data because the 5GSM cause IE is defined as a "V" IE (i.e. without a Type field) in the NAS PDU Session Modification Reject message.				

6.1.6.2.15 Type: VsmfUpdateData

Table 6.1.6.2.15-1: Definition of type VsmfUpdateData

Attribute name	Data type	P	Cardinality	Description	Applicability
requestIndication	RequestIndication	M	1	This IE shall indicate the request type.	
sessionAmbr	Ambr	C	1	This IE shall be present if the Session AMBR authorized for the PDU session is modified. When present, it shall contain the new Session AMBR authorized for the PDU session.	
qosFlowsAddModRequestList	array(QosFlowAddModifyRequestItem)	C	1..N	This IE shall be present if QoS flows are requested to be established or modified.	
qosFlowsRelRequestList	array(QosFlowReleaseRequestItem)	C	1..N	This IE shall be present if QoS flows are requested to be released.	
epsBearerInfo	array(EpsBearerInfo)	C	1..N	This IE shall be present if the PDU session may be moved to EPS during its lifetime and the ePSBearerInfo has changed. When present, it shall only include epsBearerInfo IE(s) for new EBI or for EBIs for which the epsBearerInfo has changed. The complete epsBearerInfo shall be provided for an EBI that is included (i.e. the epsBearerInfo newly received for a given EBI replaces any epsBearerInfo previously received for this EBI).	
assignEbiList	array(Arp)	C	1..N	This IE shall be present if the H-SMF requests EBIs to be assigned.	
revokeEbiList	array(EpsBearerId)	C	1..N	This IE shall be present if the H-SMF/SMF requests the V-SMF/I-SMF to revoke some EBI(s). When present, it shall contain the EBIs to revoke.	
modifiedEbiList	array(EbiArpMapping)	C	1..N	This IE shall be present if a PDU session modification procedure resulted in the change of ARP for a QoS flow that was already allocated an EBI.	
pti	ProcedureTransactionId	C	0..1	This IE shall be present if the request is sent in response to a UE requested PDU session modification or release. When present, it shall contain the PTI value received in the corresponding request.	
n1SmInfoToUe	RefToBinaryData	C	0..1	This IE shall be present if the H-SMF/SMF needs to send N1 SM information to the UE that does not need to be interpreted by the V-SMF/I-SMF. When present, this IE shall reference the n1SmInfoToUe binary data (see clause 6.1.6.4.4).	
alwaysOnGranted	boolean	C	0..1	This IE shall be present if: - an alwaysOnRequested IE was received in an earlier V-SMF/I-SMF initiated Update request to change the PDU session to an always-on PDU session; or - the H-SMF/SMF determines, based on local policy, that the PDU session needs to be established as an always-on PDU session. When present, it shall be set as follows: - true: always-on PDU session granted. - false (default): always-on PDU session not granted.	

hsmfPduSessionUri	Uri	C	0..1	This IE shall be included if: - an Update Request is sent to the V-SMF/I-SMF before the Create Response (e.g. for EPS bearer ID allocation as specified in clause 4.11.1.4.1 of 3GPP TS 23.502 [3], or for Secondary authorization/authentication as specified in clause 4.3.2.3 of 3GPP TS 23.502 [3]), and - the H-SMF PDU Session Resource URI has not been previously provided to the V-SMF/I-SMF. This IE shall not be included otherwise. When present, this IE shall include the URI representing the PDU session resource in the H-SMF.	
newSmfId	NfInstanceId	O	0..1	This IE may be present if the anchor SMF has changed and the SMF Instance ID of the new anchor SMF has not been already signalled to the I-SMF or V-SMF. When present, it shall carry the NF instance identifier of the new anchor SMF handling the PDU session.	
newSmfPduSessionUri	Uri	C	0..1	This IE shall be present if the newSmfId is present. When present, it shall carry the URI representing the updated PDU session resource in the new anchor SMF.	
supportedFeatures	SupportedFeatures	C	0..1	This IE shall be present if "hsmfPduSessionUri" IE is present and at least one feature defined in clause 6.1.8 is supported.	
cause	Cause	O	0..1	When present, this IE shall indicate the cause for the requested modification.	
n1smCause	string	O	0..1	When present, this IE shall contain the 5GSM cause the H-SMF proposes the V-SMF/I-SMF to send to the UE. It shall be encoded as two characters in hexadecimal representation with each character taking a value of "0" to "9" or "A" to "F", and represent the cause value of the 5GSM cause IE specified in clause 9.11.4.2 of 3GPP TS 24.501 [7]. Example: the cause "Invalid mandatory information" shall be encoded as "60". See NOTE.	
backOffTimer	DurationSec	O	0..1	When present, this IE shall indicate a Back-off timer value, in seconds, that the V-SMF/I-SMF may use when sending the NAS message (PDU Session Release Command) towards the UE.	
maReleaseInd	MaReleaseIndication	C	0..1	This IE shall be present if one access of a MA PDU session is to be released, when H-SMF or SMF initiates MA PDU session release over one access. When present, it shall indicate the access requested to be released.	MAPDU
maAcceptedInd	boolean	C	0..1	This IE shall be present if a request to modify a single access PDU session into a MA PDU session was accepted (see clause 4.22.6.3 of 3GPP TS 23.502 [3]). When present, it shall be set as follows: - true: MA PDU session - false (default): single access PDU session	MAPDU
additionalCnTunnelInfo	TunnelInfo	C	0..1	This IE shall be present for a MA-PDU session if the UE requested to establish resources for a MA PDU session over the other access. When present, it shall contain additional N9 tunnel information of the UPF controlled by the H-SMF or SMF.	MAPDU

dnaiList	array(Dnai)	C	0..N	This IE shall be present if received from PCF during I-SMF Related Procedures with PCF (see clause 4.23.6.2 in 3GPP TS 23.502 [3]). When present, the IE shall include a list of DNAI(s) the SMF deems relevant for the PDU Session. If the I-SMF and the SMF support the DTSSA-Ext1 feature, when present, this IE should include the full list of DNAIs of interest for PDU session, including DNAIs that may not be supported by the I-SMF and excluding the ones supported by the Anchor SMF. If this IE is not present, the I-SMF shall consider that the dnaiList has not changed. If there is no more DNAI of interest for the PDU session, the dnaiList attribute shall be present and be encoded as an empty array.	DTSSA DTSSA-Ext1
n4Info	N4Information	O	0..1	This IE may be present if the SMF needs to send N4 information to the I-SMF for the control of traffic offloaded at a PSA/BP/ULCL controlled by an I-SMF.	DTSSA
n4InfoExt1	N4Information	O	0..1	This IE may be present if the SMF needs to send additional N4 information to the I-SMF for the control of traffic offloaded at a PSA/BP/ULCL controlled by an I-SMF.	DTSSA
n4InfoExt2	N4Information	O	0..1	This IE may be present if the SMF needs to send additional N4 information to the I-SMF for the control of traffic offloaded at a PSA/BP/ULCL controlled by an I-SMF (e.g. during a change of PSA).	DTSSA
n4InfoExt3	N4Information	O	0..1	This IE may be present if the SMF needs to send additional N4 information to the I-SMF for the control of traffic offloaded at a PSA/BP/ULCL controlled by an I-SMF (e.g. during simultaneous change of BP/ULCL and PSA).	SCPBU
smallDataRateControlEnabled	boolean	C	0..1	This IE shall be present if the applicability of small data rate control on the PDU session changes. When present, it shall be set as follows: - true: small data rate control is applicable. - false: small data rate control is not applicable.	CIOT
qosMonitoringInfo	QosMonitoringInfo	O	0..1	This IE may be present if QoS monitoring has been activated for at least one QoS flow of the PDU session (see the qosMonitoringReq attribute in clause 6.1.6.2.22).	DTSSA
epsPdnCnxInfo	EpsPdnCnxInfo	C	0..1	This IE shall be present if the PDU session may be moved to EPS during its lifetime and the EpsInterworkingIndication is changed to "WITH_N26". The IE shall also be present when the EPS PDN Connection Context Information of the PDU session is changed, e.g. due to change of anchor SMF.	
n9DataForwardingInd	boolean	C	0..1	This IE shall be present and set as specified in clauses 4.23.9.4 and 4.23.9.5 of 3GPP TS 23.502 [3] during simultaneous change of Branching Points or UL CLs controlled by I-SMF or controlled by different I-SMFs. When present, it shall be set as follows: - true: setup N9 forwarding tunnels between Branching Points or UL CLs; - false (default): N9 forwarding tunnels between Branching Points or UL CLs are not required to be setup (see clauses 5.2.2.8.3.6 and 5.2.2.8.3.10).	N9FSC

n9InactivityTimer	DurationSec	O	0..1	When present, this IE shall indicate an inactivity detection timer, in seconds, that the I-SMF may use to set the N9 forwarding tunnel inactive traffic detection timer in Branching Point or UL CL as specified in clauses 4.23.9.4 and 4.23.9.5 of 3GPP TS 23.502 [3].	N9FSC
hrsboInfo	HrsboInfoFromHplmn	O	0..1	This IE may be present if the H-SMF and the V-SMF supports the HR-SBO feature and if the H-SMF needs to update the HR-SBO information towards the V-SMF, e.g. due to a change of the user subscription data or policy information. When present, this IE shall include the complete information for HR-SBO as defined in clause 6.1.6.2.73 and the V-SMF shall replace any earlier received HR-SBO information by the new HR-SBO information.	HR-SBO
localOffloadMgtInfo	LocalOffloadingMgtInfoToIsmf	O	0..1	This IE may be present if I-SMF based Local Offloading Management applies and any information defined in clause 6.1.6.2.82 needs to be signaled to the I-SMF. When present, this IE shall include the complete localOffloadMgtInfo information as defined in clause 6.1.6.2.82 and the I-SMF shall replace any earlier received localOffloadMgtInfo information by the new localOffloadMgtInfo information.	ISMF-LOM
altHplmnSnssai	Snssai	C	0..1	This IE shall be present for a HR PDU session if the H-SMF determines to retain the PDU session for the alternative HPLMN S-NSSAI, during network slice replacement. When present, this IE shall indicate the alternative HPLMN S-NSSAI to be used by the HR PDU session. See clause 5.15.19 of 3GPP TS 23.501 [2].	NSRP
pduSessionRetainInd	boolean	C	0..1	This IE shall be present and set to true, if the H-SMF determines to retain the PDU session for the alternative HPLMN S-NSSAI during network slice replacement. When present with true value, this IE indicates the PDU session is retained for the alternative HPLMN S-NSSAI. Present with false value shall be prohibited. See clause 4.3.3.3 of 3GPP TS 23.502 [3].	NSRP
pendingUpdateInfoList	array(PendingUpdateInfo)	O	0..N	When present, this IE shall indicate the updated list of information that are not required to be updated in real-time to the (H-)SMF, i.e. the change of the listed information (e.g. UE location or Timezone) may be piggybacked in a subsequent essential update (e.g. to exchange the N1 message from the UE) to the (H-)SMF. The NF service consumer (i.e. I-SMF/V-SMF) should not trigger an Update to the (H-)SMF including only the change(s) of the listed information. When present, the NF service consumer (i.e. I-SMF/V-SMF) shall replace any pendingUpdateInfoList received earlier by the new information received in this IE.	

netLocInfoReqInd	boolean	C	0..1	This IE shall be present with the value true when the (H-)SMF requires the V-SMF or I-SMF to provide the current NetLoc information (UE Location and Time Zone). The presence of this IE with the value "false" shall be prohibited.	NLIRN16
uliChangeGranularity	UliChangeGranularity	O	0..1	This IE may be present to indicate the needed ULI change granularity for UE Location Information (ULI) reporting, when the V/I-SMF sends an Update Request to the anchor SMF for the purpose of reporting immediately a ULI change (i.e. when the anchor SMF did not provide the pendingUpdateInfoList with "UE_LOCATION"). When present, the V/I-SMF shall report immediate ULI change to the (H-)SMF when a ULI change at the indicated ULI change granularity (e.g. upon a change of gNB or TAI) occurs. See clause 5.51.2.2.2 of 3GPP TS 23.501 [2].	
serviceLevelAaContainer	ServiceLevelAaContainer	O	0..1	The IE may be present to convey the Service-level-AA container included in the SERVICE-LEVEL AUTHENTICATION COMMAND message.	
NOTE: This IE contains information that the V-SMF shall transfer to the UE without interpretation. It is sent as a separate IE rather than within the n1SmInfoToUE binary data because the 5GSM cause IE is defined as a "V" IE (i.e. without a Type field) in the NAS PDU Session Release Command message.					

6.1.6.2.16 Type: VsmfUpdatedData

Table 6.1.6.2.16-1: Definition of type VsmfUpdatedData

Attribute name	Data type	P	Cardinality	Description	Applicability
qosFlowsAddModList	array(QosFlowItem)	C	1..N	This IE shall be present if QoS flows have been successfully established or modified. For each GBR QoS flow, the V-SMF/I-SMF may also indicate an alternative QoS profile which the NG-RAN currently fulfils in the currentQosProfileIndex IE or indicate that the NG-RAN cannot even fulfil the lowest alternative QoS profile.	
qosFlowsRelList	array(QosFlowItem)	C	1..N	This IE shall be present if QoS flows have been successfully released.	
qosFlowsFailedtoAddModList	array(QosFlowItem)	C	1..N	This IE shall be present if QoS flows failed to be established or modified.	
qosFlowsVsmfRejectedAddModList	array(Qfi)	O	1..N	This IE may be present from V-SMF to H-SMF when the qosFlowsFailedtoAddModList IE is present. When present, this IE shall include the QFIs of the QoS flows failed to be established or modified due to rejection by the V-SMF. When the H-SMF subsequently send N1 Message to the UE to revert the update of QoS rules and QoS Flow level QoS parameters associated with the failed QoS Flow(s) indicated in the qosFlowsFailedtoAddModList IE, the H-SMF should exclude the QoS flow(s) that were failed to be established or modified due to rejection by the V-SMF. If all the failed QoS flow(s) were due to rejection by the V-SMF, the H-SMF should skip the subsequent N1 message update to the UE.	
qosFlowsFailedtoRelList	array(QosFlowItem)	C	1..N	This IE shall be present if QoS flows failed to be released.	
n1SmInfoFromUe	RefToBinaryData	C	0..1	This IE shall be present if the V-SMF/I-SMF has received known N1 SM information from the UE that does not need to be interpreted by the V-SMF/I-SMF. When present, this IE shall reference the n1SmInfoFromUe binary data (see clause 6.1.6.4.4).	
unknownN1SmInfo	RefToBinaryData	C	0..1	This IE shall be present if the V-SMF/I-SMF has received unknown N1 SM information from the UE. When present, this IE shall reference the unknownN1SmInfo binary data (see clause 6.1.6.4.4).	
ueLocation	UserLocation	C	0..1	This IE shall be present if it is available and QoS flows have been successfully established, modified or released. This IE shall also be present if the "netLocInfoReqInd" IE is present in the request and if the UE location is available. When present, this IE shall contain the UE location information (see clause 5.2.3.4).	
ueTimeZone	TimeZone	C	0..1	This IE shall be present if it is available and QoS flows have been successfully established, modified or released. This IE shall also be present if the "netLocInfoReqInd" IE is present in the request and if the Time Zone of the UE is available. When present, this IE shall contain the new UE Time Zone.	

addUeLocation	UserLocation	O	0..1	Additional UE location. This IE may be present, if anType previously reported is a non-3GPP access and a valid 3GPP access user location information is available. When present, it shall contain: - the last known 3GPP access user location (see clause 5.2.3.4); and - the timestamp, if available, indicating the UTC time when the addUeLocation information was acquired.	
assignedEbiList	array(EbiArpMapping)	C	1..N	This IE shall be present if the AMF assigned the requested EBI(s). When present, it shall contain the EBIs that were successfully assigned.	
failedToAssignEbiList	array(Arp)	C	1..N	This IE shall be present if the AMF failed to assign EBIs for a set of ARPs.	
releasedEbiList	array(EpsBearerId)	C	1..N	This IE shall be present if the NF Service Consumer requested the revoke EBI(s) or if the AMF revoked already assigned EBI(s) for this PDU session towards the V-SMF. This IE shall contain the list of EBI(s) released for this PDU session at the AMF.	
secondaryRatUsageReport	array(SecondaryRatUsageReport)	O	1..N	This IE may be present to report usage data for a secondary RAT for QoS flows. (NOTE)	
secondaryRatUsageInfo	array(SecondaryRatUsageInfo)	O	1..N	This IE may be present to report usage data for a secondary RAT for QoS flows and/or the whole PDU session.	
n4Info	N4Information	O	0..1	This IE may be present if the I-SMF needs to send N4 response information to the SMF for the control of traffic offloaded at a PSA/BP/ULCL controlled by an I-SMF.	DTSSA
n4InfoExt1	N4Information	O	0..1	This IE may be present if the I-SMF needs to send additional N4 response information to the SMF for the control of traffic offloaded at a PSA/BP/ULCL controlled by an I-SMF.	DTSSA
n4InfoExt2	N4Information	O	0..1	This IE may be present if the I-SMF needs to send additional N4 response information to the SMF for the control of traffic offloaded at a PSA/BP/ULCL controlled by an I-SMF (e.g. during a change of PSA).	DTSSA
n4InfoExt3	N4Information	O	0..1	This IE may be present if the I-SMF needs to send additional N4 response information to the SMF for the control of traffic offloaded at a PSA/BP/ULCL controlled by an I-SMF (e.g. during simultaneous change of BP/ULCL and PSA).	SCPBU
modifiedEbiListNotDelivered	boolean	O	0..1	This IE should be present with the value true when the modifiedEbiList IE was received in VsmfUpdateData in request but cannot be updated to the AMF, e.g., during (H-)SMF triggered PDU session modification procedure and the AMF doesn't support the EAEA feature. When present, the IE shall be set as following: - true: the received modifiedEbiList was not delivered to the AMF. - false: the received modifiedEbiList was delivered to the AMF. Absence of this IE means whether modifiedEbiList was delivered or not is unknown.	

ecnMarkingCongestionInfoStatus	array(EcnMarkingCongestionInfoStatus)	C	1..N	This IE shall be present when the V/I-SMF receives the ECN Marking or Congestion Monitoring Reporting Status, e.g. during an PDU Session Modification procedure. When present, this IE shall contain a list of QoS flows with status for QoS monitoring for congestion information or for ECN marking for L4S.	EMECI
pduSetSupportInd	boolean	C	0..1	This IE shall be included when the V/I-SMF receives the PDU Set based Handling Indicator from 5G-AN, e.g. during an PDU Session Modification procedure. When present, this IE shall indicate whether the PDU Set based handling is supported by the 5G-AN: - true: the PDU Set based handling is supported. - false: the PDU Set based handling is not supported.	PDUSH
qosMonitoringPdSupported	QosMonitoringPdSupported	C	0..1	The IE shall be present if the QME feature is supported by the I-SMF/V-SMF and SMF and the value of the qosMonitoringPdSupported attribute has changed since last update to the H-SMF (for HR PDU session) or SMF (for PDU sessions with an I-SMF). When present, this IE shall indicate whether the NG-RAN supports the QoS monitoring for packet delay feature. See clause 5.45.1 of 3GPP TS 23.501 [2].	QME
qosMonitoringPdMethods	array(QosMonitoringPdMethod)	O	1..N	This IE should be present when the qosMonitoringPdSupported IE is present and set to SUPPORTED. When present, this IE shall indicate the supported method(s) for QoS Monitoring for packet delay in the NG-RAN.	QME
qosMonitoringCongestionSupported	QosMonitoringCongestionSupported	C	0..1	This IE shall be present if the QME feature and the EMECI feature are is supported by the I-SMF/V-SMF and the SMF and the value of the qosMonitoringCongestionSupported attribute has changed since last update to the H-SMF (for HR PDU session) or SMF (for PDU sessions with an I-SMF). When present, this IE shall indicate whether the NG-RAN supports the QoS monitoring for congestion feature. See clause 5.45.1 of 3GPP TS 23.501 [2].	QME
availBitRateMonSupported	AvailBitRateMonSupported	C	0..1	The IE shall be present if the AVABIT feature is supported by I-SMF/V-SMF and the SMF and the value of the availBitRateMonSupported attribute has changed since last update to the H-SMF (for HR PDU session) or SMF (for PDU sessions with an I-SMF). When present, this IE shall indicate whether the NG-RAN supports the available bitrate monitoring feature. See clause 5.45.1 of 3GPP TS 23.501 [2].	AVABIT
serviceLevelAaContainer	ServiceLevelAaContainer	O	0..1	The IE may be present to convey the Service-level-AA container included in the SERVICE-LEVEL AUTHENTICATION COMPLETE message.	
NOTE: An SMF complying with this version of the specification should report secondary RAT usage using the secondaryRatUsageInfo attribute that replaces the secondaryRatUsageReport attribute.					

6.1.6.2.17 Type: StatusNotification

Table 6.1.6.2.17-1: Definition of type StatusNotification

Attribute name	Data type	P	Cardinality	Description	Applicability
statusInfo	StatusInfo	M	1	This IE shall contain status information about the PDU session.	
smallDataRateStatus	SmallDataRateStatus	C	0..1	This IE shall be present, if the NF Service Consumer has indicated support of CIoT and if the status is available. When present, it shall indicate the current small data rate control status for the PDU session.	CIOT
apnRateStatus	ApnRateStatus	C	0..1	This IE shall be present, if the NF Service Consumer has indicated support of CIoT and if the status is available. When present, it shall indicate the current APN rate control status for the PDN connection (APN rates are shared by all PDN connections of the UE to this APN).	CIOT
targetDnaiInfo	TargetDnaiInfo	C	0..1	This IE shall be present if the I-SMF selection or removal for the current PDU session, or SMF selection during PDU Session re-establishment for SSC mode 2/3 is needed. When present, this IE shall include the target DNAI Information.	EnEDGE
oldPduSessionRef	Uri	C	0..1	This IE shall be present if resourceStatus in statusInfo is "UNCHANGED", the SMF selection during PDU Session re-establishment for SSC mode 3 is needed and the runtime coordination between old SMF and AF is enabled. When present, this IE shall contain the URI of the PDU session resource in the old SMF. The URI shall be an absolute URI, including apiRoot (see clause 6.1.3.6.2).	EnEDGE
newSmfId	NfInstanceId	O	0..1	This IE may be present if the resourceStatus attribute in statusInfo is set to "UPDATED" and the cause IE in statusInfo is set to "CHANGED_ANCHOR_SMF". When present, it shall include the NF instance identifier of the new H-SMF or SMF (for a PDU session with an I-SMF) handling the PDU session, when it is changed within an SMF set.	ES3XX
epsPdnCnxInfo	EpsPdnCnxInfo	C	0..1	This IE shall be present when the EPS PDN Connection Context Information of the PDU session is changed, e.g. due to change of anchor SMF. When present, this IE shall include the EPS PDN Connection Context Information of the PDU session on the new anchor SMF.	ES3XX
interPlmnApiRoot	Uri	O	0..1	This IE should be present if the information has changed and, within the statusInfo IE, the resourceStatus IE is set to "UPDATED" and the cause IE set to "CHANGED_ANCHOR_SMF". When present, it shall contain the apiRoot of the PDU session context to be used in inter-PLMN signalling request targeting the PDU session context.	
intraPlmnApiRoot	Uri	O	0..1	This IE should be present if the information has changed and, within the statusInfo IE, the resourceStatus IE is set to "UPDATED" and the cause IE set to "CHANGED_ANCHOR_SMF". When present, it shall contain the apiRoot of the PDU session context to be used in intra-PLMN signalling request targeting the PDU session context.	

6.1.6.2.18 Type: QosFlowItem

Table 6.1.6.2.18-1: Definition of type QosFlowItem

Attribute name	Data type	P	Cardinality	Description
qfi	Qfi	M	1	This IE shall contain the QoS Flow Identifier.
cause	Cause	O	0..1	When present, this IE shall contain cause information.
currentQosProfileIndex	Integer	O	0..1	When present, this IE shall indicate the index of the currently fulfilled alternative QoS profile. This IE shall not be present if the nullQoSProfileIndex IE is present.
nullQoSProfileIndex	boolean	C	0..1	This IE shall be present and set to "true" if the NG-RAN cannot even fulfil the lowest alternative QoS profile. This IE shall not be present if the currentQosProfileIndex IE is present.
ngApCause	NgApCause	C	0..1	The V-SMF or I-SMF shall include this IE if it is available and, for a HR PDU session, if this information is permitted to be sent to the H-SMF operator according to the V-SMF operator's policy. When present, this IE shall indicate the NGAP cause for the requested QoS Flow setup or modification failure.

6.1.6.2.19 Type: QosFlowSetupItem

Table 6.1.6.2.19-1: Definition of type QosFlowSetupItem

Attribute name	Data type	P	Cardinality	Description	Applicability
qfi	Qfi	M	1	This IE shall contain the QoS Flow Identifier.	
qosRules	Bytes	M	1	This IE shall contain the QoS Rule(s) associated to the QoS flow to be sent to the UE. It shall be encoded as the Qos rules IE specified in clause 9.11.4.13 of 3GPP TS 24.501 [7] (starting from octet 4).	
protocDesc	Bytes	O	0..1	When present, this IE shall contain the protocol description for PDU Set handling associated with the QoS Rule(s) to be sent to the UE. It shall be encoded as the Protocol description IE specified in clause 9.11.4.39 of 3GPP TS 24.501 [7] (starting from octet 4).	PDUSH
ebi	EpsBearerId	C	0..1	This IE shall be included when an EPS Bearer ID is allocated for the QoS Flow for interworking with EPS. When present, this IE shall contain the allocated EPS Bearer ID.	
qosFlowDescription	Bytes	O	0..1	When present, this IE shall contain the description of the QoS Flow level Qos parameters to be sent to the UE. It shall be encoded as the Qos flow descriptions IE specified in clause 9.11.4.12 of 3GPP TS 24.501 [7] (starting from octet 1), encoding one single Qos flow description for the QoS flow to be set up.	
qosFlowProfile	QosFlowProfile	O	0..1	When present, this IE shall contain the description of the QoS Flow level Qos parameters.	
associatedAnType	QosFlowAccessType	O	0..1	This IE may be present if the QoS Flow belongs to MA PDU session. When present, this IE shall contain the indicated access type associated with the QoS Flow.	MAPDU
defaultQosRuleInd	boolean	C	0..1	This IE shall be present if available. When present, it shall be set as follows: - true: QoS Flow is associated with the default QoS Rule. - false: QoS Flow is not associated with the default QoS Rule. (NOTE)	
ecnMarkingCongestInfoReq	EcnMarkingCongestionInfoReq	O	0..1	When present, this IE shall indicate that ECN marking for the L4S or QoS monitoring for congestion information is requested in the 5G-AN.	EMECI
transpLevelMarkInd	boolean	O	0..1	This IE may be present and set to true to indicate that transport level marking is being applied for the QoS Flow. When received, the I-SMF may instruct the I-UPF to perform transport level marking as specified in clause 5.4.13 of 3GPP TS 29.244 [29]. Presence of this IE with the value false shall be prohibited.	

NOTE: Anchor SMF implementations complying with earlier versions of the specification may not support setting this Indication. If the attribute is absent, the I-SMF or V-SMF can determine whether the QoS Rule is the default QoS Rule by decoding the available qosRules IE. The absence of the attribute shall not be interpreted as meaning that the QoS flow is not associated with the default QoS Rule.

6.1.6.2.20 Type: QosFlowAddModifyRequestItem

Table 6.1.6.2.20-1: Definition of type QosFlowAddModifyRequestItem

Attribute name	Data type	P	Cardinality	Description	Applicability
qfi	Qfi	M	1	This IE shall contain the QoS Flow Identifier.	
ebi	EpsBearerId	C	0..1	This IE shall be included when the EPS Bearer ID associated with a QoS Flow is modified. When present, this IE shall contain the EPS Bearer ID.	
qosRules	Bytes	O	0..1	When present, this IE shall contain the QoS Rule(s) to be sent to the UE. It shall be encoded as the Qos rules IE specified in clause 9.11.4.13 of 3GPP TS 24.501 [7] (starting from octet 4).	
protocDesc	Bytes	O	0..1	When present, this IE shall contain the protocol description for PDU Set handling associated with the QoS Rule(s) to be sent to the UE. It shall be encoded as the Protocol description IE specified in clause 9.11.4.39 of 3GPP TS 24.501 [7] (starting from octet 4).	PDUSH
qosFlowDescription	Bytes	O	0..1	When present, this IE shall contain the description of the QoS Flow level Qos parameters to be sent to the UE. It shall be encoded as the Qos flow descriptions IE specified in clause 9.11.4.12 of 3GPP TS 24.501 [7] (starting from octet 1), encoding one single Qos flow description for the QoS flow to be added or modified.	
qosFlowProfile	QosFlowProfile	O	0..1	When present, this IE shall contain the description of the QoS Flow level QoS parameters. When modifying a QoS flow, the IE shall only contain the QoS Flow profile's attributes which are modified.	
associatedAnType	QosFlowAccessType	O	0..1	This IE may be present if the QoS Flow belongs to MA PDU session. When present, this IE shall contain the indicated access type associated with the QoS Flow.	MAPDU
ecnMarkingCongestInfoReq	EcnMarkingCongestionInfoReq	O	0..1	When present, this IE shall indicate that ECN marking for the L4S or QoS monitoring for congestion information is requested in the 5G-AN.	EMECI
tscaiUl	TscAssistanceInformation	O	0..1	When present, this IE shall indicate TSCAI input parameters at the uplink flow direction.	UEPSM
tscaiDl	TscAssistanceInformation	O	0..1	When present, this IE shall indicate TSCAI input parameters at the downlink flow direction.	UEPSM
transpLevelMarkInd	boolean	O	0..1	This IE may be present and set to true to indicate that transport level marking is being applied for the QoS Flow. When received, the I-SMF may instruct the I-UPF to perform transport level marking as specified in clause 5.4.13 of 3GPP TS 29.244 [29]. Presence of this IE with the value false shall be prohibited.	

6.1.6.2.21 Type: QosFlowReleaseRequestItem

Table 6.1.6.2.21-1: Definition of type QosFlowReleaseRequestItem

Attribute name	Data type	P	Cardinality	Description
qfi	Qfi	M	1	This IE shall contain the QoS Flow Identifier.
qosRules	Bytes	O	0..1	When present, this IE shall contain the QoS Rule(s) to be sent to the UE. It shall be encoded as the Qos rules IE specified in clause 9.11.4.13 of 3GPP TS 24.501 [7] (starting from octet 4).
qosFlowDescription	Bytes	O	0..1	When present, this IE shall contain the description of the QoS Flow level Qos parameters to be sent to the UE. It shall be encoded as the Qos flow descriptions IE specified in clause 9.11.4.12 of 3GPP TS 24.501 [7] (starting from octet 1), encoding one single Qos flow description for the QoS flow to be released.

6.1.6.2.22 Type: QosFlowProfile

Table 6.1.6.2.22-1: Definition of type QosFlowProfile

Attribute name	Data type	P	Cardinality	Description	Applicability
5qi	5Qi	M	1	This IE shall contain the 5G QoS Identifier (5QI) of the QoS flow.	
nonDynamic5Qi	NonDynamic5Qi	C	0..1	When present, this IE shall indicate the QoS Characteristics for a standardized or pre-configured 5QI for downlink and uplink. See NOTE 1.	
dynamic5Qi	Dynamic5Qi	C	0..1	When present, this IE shall indicate the QoS Characteristics for a Non-standardised or not pre-configured 5QI for downlink and uplink. See NOTE 1.	
arp	Arp	C	0..1	This IE shall be present when establishing a QoS flow; it may be present when modifying a QoS flow. When present, this IE shall contain the Allocation and Retention Priority (ARP) assigned to the QoS flow.	
gbrQosFlowInfo	GbrQosFlowInformation	C	0..1	This IE shall be present when establishing a GBR QoS flow or if the GBR QoS flow information is modified.	
rqa	ReflectiveQoSAttribute	O	0..1	This IE may be present for a non-GBR QoS flow and it shall be ignored otherwise. When present, it shall indicate whether certain traffic on this QoS flow may be subject to Reflective QoS.	
additionalQosFlowInfo	AdditionalQosFlowInfo	O	0..1	This IE may be present for a non-GBR QoS flow. When present, this IE indicates that traffic for this QoS flow is likely to appear more often than traffic for other flows established for the PDU session. See clause 9.3.1.12 of 3GPP TS 38.413 [9].	
qosMonitoringReq	QosMonitoringReq	O	0..1	This IE may be present to indicate the measurement of UL, or DL, or both UL/DL delays for the associated QoS flow. This IE may also be used to indicate the stop of corresponding measurement, by setting the value to "NONE". See clause 9.3.1.12 of 3GPP TS 38.413 [9].	
qosRepPeriod	DurationSec	O	0..1	This IE should be present if QoS monitoring is required. When present, this IE shall indicate the reporting period. See clause 4.23.5.3 of 3GPP TS 23.502 [3].	
pduSetQosDl	PduSetQosPara	O	0..1	This IE should be present if PDU Set based QoS handling is enabled on the QoS flow for the DL direction. See clause 5.37.5 of 3GPP TS 23.501 [2]. When present, this IE shall contain the PDU Set QoS parameters for the DL direction.	PDUSH
pduSetQosUl	PduSetQosPara	O	0..1	This IE should be present if PDU Set based QoS handling is enabled on the QoS flow for the UL direction. See clause 5.37.5 of 3GPP TS 23.501 [2]. When present, this IE shall contain the PDU Set QoS parameters for the UL direction.	PDUSH
dlPduSetMarkSupInd	boolean	C	0..1	The IE shall be present with the value true if PDU Set based handling is enabled on the QoS flow for the DL direction and if the pduSetQoSDl attribute is not present. Presence of this IE with the value false shall be prohibited.	
multiModalId	MultiModalId	O	0..1	This IE may be present if the QoS flow relates to a multi-modal service. When present, this IE shall indicate the multi-modal Service Identifier of the multi-modal service.	

ulBitrateAdaptInd	boolean	O	0..1	This IE may be present to indicate whether the QoS flow supports UL bitrate recommendation (adaptation) by NG-RAN (see clause 5.37.x of 3GPP TS 23.501 [2]). When present, it shall be set as follows: true: UL bitrate recommendation is supported false: UL bitrate recommendation is not supported The absence of this attribute shall be interpreted as: - the value false, during the creation of a QoS flow; - indicating that there is no change to this attribute, during the modification of a QoS flow.	
noQosMonPdWoN3DlTeid	boolean	O	0..1	This IE may be included by the (H-)SMF based on its local policies, e.g. when the QoS Monitoring for packet delay per QoS flow should not be performed for a PDU session without the corresponding PDU session resource allocated in the NG-RAN, i.e. no N3 NG-RAN DL F-TEID. When present, it shall indicate if the I/V-SMF shall report the PDU session resource status in the NG-RAN, i.e. whether the N3 NG-RAN DL F-TEID is allocated for the PDU session, when the QoS monitoring for packet delay per QoS flow is requested for the PDU session. See also clause 5.2.2.8.2.28. - true: the I/V-SMF is requested to report when the PDU session resource in the NG-RAN is established or released. Presence of this IE with the value false shall be prohibited.	
NOTE 1: Either the nonDynamic5Qi IE or the dynamic5Qi IE may be present when establishing a QoS flow. Either the nonDynamic5Qi IE or the dynamic5Qi IE may be present when modifying a QoS flow; when present, the received nonDynamic5Qi IE or dynamic5Qi IE shall replace any value received previously for this IE.					

6.1.6.2.23 Type: GbrQosFlowInformation

Table 6.1.6.2.23-1: Definition of type GbrQosFlowInformation

Attribute name	Data type	P	Cardinality	Description	Applicability
maxFbrDl	BitRate	M	1	This IE shall contain the Maximum Bit Rate in Downlink. See 3GPP TS 23.501 [2].	
maxFbrUl	BitRate	M	1	This IE shall contain the Maximum Bit Rate in Uplink. See 3GPP TS 23.501 [2].	
guaFbrDl	BitRate	M	1	This IE shall contain the Guaranteed Bit Rate in Downlink. See 3GPP TS 23.501 [2].	
guaFbrUl	BitRate	M	1	This IE shall contain the Guaranteed Bit Rate in Uplink. See 3GPP TS 23.501 [2].	
notifControl	NotificationControl	O	0..1	When present, this IE shall indicate whether notifications are requested from the RAN when the GBR QoS can no longer be fulfilled, or when it can be fulfilled again, for a QoS flow during the lifetime of the QoS flow. See clause 5.7.2.4 of 3GPP TS 23.501 [2].	
maxPacketLossRateDl	PacketLossRate	O	0..1	When present, this IE shall indicate the maximum rate for lost packets that can be tolerated in the downlink direction. See 3GPP TS 23.501 [2].	
maxPacketLossRateUl	PacketLossRate	O	0..1	When present, this IE shall indicate the maximum rate for lost packets that can be tolerated in the Uplink direction. See 3GPP TS 23.501 [2].	
alternativeQosProfileList	array(AlternativeQosProfile)	O	0..N	When present, this IE shall indicate alternative QoS profiles for the QoS flow. An empty array shall be interpreted as a request to delete any list of alternative QoS profiles associated with this QoS flow.	
availBitrateMonReq	AvailableBitrateMonitoringRequest	O	0..1	When present, this IE shall indicate that QoS monitoring for available bitrate is requested (or no longer requested) in NG-RAN.	AVABIT

6.1.6.2.24 Type: QosFlowNotifyItem

Table 6.1.6.2.24-1: Definition of type QosFlowNotifyItem

Attribute name	Data type	P	Cardinality	Description
qfi	Qfi	M	1	This IE shall contain the QoS Flow Identifier.
notificationCause	NotificationCause	M	1	
currentQosProfileIndex	Integer	O	0..1	When present, this IE shall indicate the index of the currently fulfilled alternative QoS profile. This IE shall not be present if the nullQoSProfileIndex IE is present.
nullQoSProfileIndex	boolean	C	0..1	This IE shall be present and set to "true" if the NG-RAN cannot even fulfil the lowest alternative QoS profile. This IE shall not be present if the currentQosProfileIndex IE is present.

6.1.6.2.25 Type: Void

6.1.6.2.26 Type: Void

6.1.6.2.27 Type: SmContextRetrievedData

Table 6.1.6.2.27-1: Definition of type SmContextRetrievedData

Attribute name	Data type	P	Cardinality	Description	Applicability
ueEpsPdnConnection	EpsPdnCnxContainer	M	1	This IE shall contain an MME/SGSN UE EPS PDN Connection including the mapped EPS bearer context(s), if the SM context type was not present in the request or if it was present and indicated a request to retrieve the UE EPS PDN Connection. This IE shall be set to an empty string if the SM context type was present in the request and indicated a request to retrieve the complete SM context or the AF Coordination Information.	
smContext	SmContext	C	0..1	This IE shall be present if the SM context type was present in the request and indicated a request to retrieve the complete SM context.	DTSSA
smallDataRateStatus	SmallDataRateStatus	C	0..1	This IE shall be present during N26 based Interworking Procedures, if in the request the smContextType is set to "EPS_PDN_CONNECTION" and if the status is available (see clauses 4.11.1.1 and 4.11.1.3.2 in 3GPP TS 23.502 [3]). When present, it shall indicate the small data rate control status for the PDU session.	CIOT
apnRateStatus	ApnRateStatus	C	0..1	This IE shall be present during N26 based Interworking Procedures, if in the request the smContextType is set to "EPS_PDN_CONNECTION" and if the status is available (see clauses 4.11.1.1 and 4.11.1.3.2 in 3GPP TS 23.502 [3]). When present, it shall indicate the APN rate control status for the PDN connection (APN rates are shared by all PDN connections of the UE to this APN).	CIOT
dlDataWaitingInd	boolean	C	0..1	This IE shall be present, if the SM context type was not present in the request or if it was present and indicated a request to retrieve the UE EPS PDN Connection, and if downlink data buffered in the SMF/UPF needs to be forwarded to EPS (see clause 4.11.1.3.2A of 3GPP TS 23.502 [3]). When present, it shall be set as follows: - true: DL data needs to be sent to the UE; - false (default): no DL data needs to be sent to the UE.	CIOT
afCoordinationInfo	AfCoordinationInfo	C	0..1	This IE shall be present if the SM context type was present in the request and indicated a request to retrieve the AF Coordination Information.	EnEDGE

6.1.6.2.28 Type: TunnelInfo

Table 6.1.6.2.28-1: Definition of type TunnelInfo

Attribute name	Data type	P	Cardinality	Description	Applicability
ipv4Addr	Ipv4Addr	C	0..1	When present, this IE shall contain the GTP tunnel IPv4 address. At least one of the ipv4Addr or ipv6Addr shall be present. Both may be present.	
ipv6Addr	Ipv6Addr	C	0..1	When present, this IE shall contain the GTP tunnel IPv6 address. At least one of the ipv4Addr or ipv6Addr shall be present. Both may be present.	
gtpTeid	Teid	M	1	This IE shall contain the 4-octet GTP tunnel endpoint identifier. If both ipv4Addr and ipv6Addr are present, the TEID shall be shared by both addresses.	
anType	AccessType	C	0..1	This IE shall be present over N16a/N16 in MA PDU session scenarios, to indicate the access type associated to the N9 tunnel.	MAPDU

6.1.6.2.29 Type: StatusInfo

Table 6.1.6.2.29-1: Definition of type StatusInfo

Attribute name	Data type	P	Cardinality	Description	Applicability
resourceStatus	ResourceStatus	M	1	This IE shall indicate the status of the SM context or PDU session resource.	
cause	Cause	O	0..1	When present, this IE shall indicate the cause for the resource status change.	
remoteError	boolean	O	0..1	This IE may be present in the SM context Status Notification sent from the V-SMF or I-SMF to the AMF. When present, this IE shall indicate whether the cause indicated in the cause IE is originated by the remote entity or by the entity sending the message, as follows: - true: the error is originated by the remote entity (i.e. H-SMF or SMF for a PDU session with an I-SMF). - false: the error is originated by the entity sending the message (i.e. V-SMF/I-SMF). This IE shall be present and set to true for a HR PDU session, or for a PDU session with an I-SMF, when the cause indicated in the cause IE is originated by the remote entity.	
cnAssistedRanPara	CnAssistedRanPara	C	0..1	This attribute shall be present when the cause value is "CN_ASSISTED_RAN_PARAMETER_TUNING". When present, this IE shall include the SMF derived CN assisted RAN parameters tuning.	CARPT
anType	AccessType	C	0..1	This IE shall indicate the access type of PDU session.	HOFAIL

6.1.6.2.30 Type: VsmfUpdateError

Table 6.1.6.2.30-1: Definition of type VsmfUpdateError

Attribute name	Data type	P	Cardinality	Description	Applicability
error	ExtProblemDetails	M	1	More information on the error shall be provided in the "cause" attribute of the "ProblemDetails" structure.	
pti	ProcedureTransactionId	C	0..1	This IE shall be present if available. When present, it shall contain the PTI value received from the UE.	
n1smCause	string	C	0..1	This IE shall be present if available. When present, it shall contain the 5GSM cause received from the UE. It shall be encoded as two characters in hexadecimal representation with each character taking a value of "0" to "9" or "A" to "F", and represent the cause value of the 5GSM cause IE specified in clause 9.11.4.2 of 3GPP TS 24.501 [7]. Pattern: "^[A-F0-9]{2}$" Example: the cause "Invalid mandatory information" shall be encoded as "60". See NOTE.	
n1SmInfoFromUe	RefToBinaryData	C	0..1	This IE shall be present if the V-SMF or I-SMF has received known N1 SM information from the UE that does not need to be interpreted by the V-SMF or I-SMF. When present, this IE shall reference the n1SmInfoFromUe binary data (see clause 6.1.6.4.4).	
unknownN1SmInfo	RefToBinaryData	C	0..1	This IE shall be present if the V-SMF or I-SMF has received unknown N1 SM information from the UE. When present, this IE shall reference the unknownN1SmInfo binary data (see clause 6.1.6.4.4).	
failedToAssignEbiList	array(Arp)	C	1..N	This IE shall be present if the AMF failed to assign the requested EBIs.	
ngApCause	NgApCause	C	0..1	The V-SMF or I-SMF shall include this IE, if it is available and, for a HR PDU session, if this information is permitted to be sent to the H-SMF operator according to the V-SMF operator's policy.	
5gMmCauseValue	5GMmCause	C	0..1	The V-SMF or I-SMF shall include this IE if it received it from the AMF and, for a HR PDU session, if this information is permitted to be sent to the H-SMF operator according to the V-SMF operator's policy.	
recoveryTime	DateTime	O	0..1	Timestamp (in UTC) when the V-SMF or I-SMF service instance was (re)started (see clause 6.3 of 3GPP TS 23.527 [24]).	
n4Info	N4Information	O	0..1	This IE may be present if the I-SMF needs to send N4 response information to the SMF for the control of traffic offloaded at a PSA/BP/ULCL controlled by an I-SMF.	DTSSA
n4InfoExt1	N4Information	O	0..1	This IE may be present if the I-SMF needs to send additional N4 response information to the SMF for the control of traffic offloaded at a PSA/BP/ULCL controlled by an I-SMF.	DTSSA
n4InfoExt2	N4Information	O	0..1	This IE may be present if the I-SMF needs to send additional N4 response information to the SMF for the control of traffic offloaded at a PSA/BP/ULCL controlled by an I-SMF (e.g. during a change of PSA).	DTSSA
n4InfoExt3	N4Information	O	0..1	This IE may be present if the I-SMF needs to send additional N4 response information to the SMF for the control of traffic offloaded at a PSA/BP/ULCL controlled by an I-SMF (e.g. during simultaneous change of BP/ULCL and PSA).	SCPBU

retryAfter	Uinteger	O	0..1	This IE may be included if received from the AMF within an error response, e.g., during N1N2MessageTransfer service operation when UE is not responding to paging. When present, this IE indicates the period in number of seconds. The NF consumer, i.e. the (H-)SMF, should not send new update request to the V-SMF/I-SMF during the indicated period.	
maxWaitingTime	DurationSec	C	0..1	This IE shall be present if the V/I-SMF received it from the AMF within an error response, e.g., during N1N2MessageTransfer service operation when UE is not reachable due to the UE in MICO mode or the UE using extended idle mode DRX. When present, this IE shall indicate the estimated maximum waiting time in seconds before the UE will be reachable. The NF consumer, i.e. the (H-)SMF, should not send new update request to the V-SMF/I-SMF during the indicated period.	
NOTE: This IE is sent as a separate IE rather than within the n1SmInfoFromUE binary data because the 5GSM cause IE is defined as a "V" IE (i.e. without a Type field) in the NAS PDU Session Modification Command Reject message.					

6.1.6.2.31 Type: EpsPdnCnxInfo

Table 6.1.6.2.31-1: Definition of type EpsPdnCnxInfo

Attribute name	Data type	P	Cardinality	Description
pgwS8cFteid	Bytes	M	1	Base64-encoded characters, encoding the PGW S8 F-TEID for Control Plane as specified in Figure 8.22-1 of 3GPP TS 29.274 [16] (starting from octet 1).
pgwNodeName	Bytes	C	0..1	Base64-encoded characters, encoding the PGW FQDN IE as specified in Figure 8.66-1 of 3GPP TS 29.274 [16] (starting from octet 1). It shall be present, if it is available.
pgwChangeInfo	Bytes	O	0..1	Base64-encoded characters, encoding the PGW Change Info IE as specified in Table 8.145-1 of 3GPP TS 29.274 [16] (starting from octet 1). See clause 31.5 of 3GPP TS 23.007 [45].
linkedBearerId	EpsBearerId	C	0..1	An implementation complying with this version of the specification shall include this attribute and set it to the default bearer ID associated with the PDU session moved to EPS.

6.1.6.2.32 Type: EpsBearerInfo

Table 6.1.6.2.32-1: Definition of type EpsBearerInfo

Attribute name	Data type	P	Cardinality	Description
ebi	EpsBearerId	M	1	EPS Bearer ID
pgwS8uFteid	Bytes	M	1	Base64-encoded characters, encoding the PGW S8 F-TEID for User Plane as specified in Figure 8.22-1 of 3GPP TS 29.274 [16] (starting from octet 1).
bearerLevelQoS	Bytes	M	1	Base64-encoded characters, encoding the Bearer QoS IE as specified in Figure 8.15-1 of 3GPP TS 29.274 [16] (starting from octet 1).

6.1.6.2.33 Type: PduSessionNotifyItem

Table 6.1.6.2.33-1: Definition of type PduSessionNotifyItem

Attribute name	Data type	P	Cardinality	Description
notificationCause	NotificationCause	M	1	

6.1.6.2.34 Type: EbiArpMapping

Table 6.1.6.2.34-1: Definition of type EbiArpMapping

Attribute name	Data type	P	Cardinality	Description
epsBearerId	EpsBearerId	M	1	This IE shall contain the EPS bearer identities.
arp	Arp	M	1	This IE shall contain the ARP corresponding to the EBI.

6.1.6.2.35 Type: SmContextCreateError

Table 6.1.6.2.35-1: Definition of type SmContextCreateError

Attribute name	Data type	P	Cardinality	Description
error	ExtProblemDetails	M	1	More information on the error shall be provided in the "cause" attribute of the "ProblemDetails" structure.
n1SmMsg	RefToBinaryData	C	0..1	This IE shall be present, if an N1 SM information is received in the request and the SMF is able to return N1 SM information to the UE. When present, it shall reference the N1 SM Message binary data (see clause 6.1.6.4.2).
n2SmInfo	RefToBinaryData	C	0..1	This IE shall be present, if N2 SM information needs to be returned to the NG-RAN during Xn based handover procedure with I-SMF/V-SMF insertion, change or removal. When present, it shall reference the N2 SM Message binary data (see clause 6.1.6.4.3).
n2SmInfoType	N2SmInfoType	C	0..1	This IE shall be present if "n2SmInfo" attribute is present. When present, this IE shall indicate the NG AP IE type for the NG AP SMF related IE container carried in "n2SmInfo" attribute.
recoveryTime	DateTime	O	0..1	Timestamp (in UTC) when the SMF service instance was (re)started (see clause 6.3 of 3GPP TS 23.527 [24]).

6.1.6.2.36 Type: SmContextUpdateError

Table 6.1.6.2.36-1: Definition of type SmContextUpdateError

Attribute name	Data type	P	Cardinality	Description
error	ExtProblemDetails	M	1	More information on the error shall be provided in the "cause" attribute of the "ProblemDetails" structure.
n1SmMsg	RefToBinaryData	C	0..1	This IE shall be present, if N1 SM Information needs to be returned to the UE. When present, it shall reference the N1 SM Message binary data (see clause 6.1.6.4.2).
n2SmInfo	RefToBinaryData	C	0..1	This IE shall be present, if N2 SM information needs to be returned to the NG-RAN. When present, it shall reference the N2 SM Message binary data (see clause 6.1.6.4.3).
n2SmInfoType	N2SmInfoType	C	0..1	This IE shall be present if "n2SmInfo" attribute is present. When present, this IE shall indicate the NG AP IE type for the NG AP SMF related IE container carried in "n2SmInfo" attribute.
upCnxState	UpCnxState	C	0..1	This IE shall be present if the SMF was requested to activate or deactivate the user plane connection of the PDU session in the corresponding request. When present, it shall be set as specified in clauses 5.2.2.3.2 and 5.2.2.3.16.
recoveryTime	DateTime	O	0..1	Timestamp (in UTC) when the SMF service instance was (re)started (see clause 6.3 of 3GPP TS 23.527 [24]).

6.1.6.2.37 Type: PduSessionCreateError

Table 6.1.6.2.37-1: Definition of type PduSessionCreateError

Attribute name	Data type	P	Cardinality	Description
error	ProblemDetails	M	1	More information on the error shall be provided in the "cause" attribute of the "ProblemDetails" structure.
n1smCause	string	C	0..1	This IE shall be present if the request included n1SmInfoFromUe. When present, it shall contain the 5GSM cause the H-SMF or SMF proposes the V-SMF or I-SMF to return to the UE. It shall be encoded as two characters in hexadecimal representation with each character taking a value of "0" to "9" or "A" to "F", and represent the cause value of the 5GSM cause IE specified in clause 9.11.4.2 of 3GPP TS 24.501 [7]. Pattern: "^[A-F0-9]{2}$" Example: the cause "Invalid mandatory information" shall be encoded as "60". (NOTE)
n1SmInfoToUe	RefToBinaryData	C	0..1	This IE shall be present if the H-SMF or SMF needs to send N1 SM information to the UE that does not need to be interpreted by the V-SMF or I-SMF. When present, this IE shall reference the n1SmInfoToUe binary data (see clause 6.1.6.4.4).
backOffTimer	DurationSec	O	0..1	When present, this IE shall indicate a Back-off timer value, in seconds, that the V-SMF or I-SMF may use when rejecting the NAS message towards the UE.
recoveryTime	DateTime	O	0..1	When present, this IE shall contain the timestamp (in UTC) of the event when the H-SMF or SMF service instance was (re)started (see clause 6.3 of 3GPP TS 23.527 [24]).
NOTE: This IE contains information that the V-SMF or I-SMF may transfer to the UE without interpretation. It is sent as a separate IE rather than within the n1SmInfoToUE binary data because the 5GSM cause IE is defined as a "V" IE (i.e. without a Type field) in the NAS PDU Session Establishment Reject message.				

6.1.6.2.38 Type: MmeCapabilities

Table 6.1.6.2.38-1: Definition of type MmeCapabilities

Attribute name	Data type	P	Cardinality	Description
nonIpSupported	boolean	C	0..1	This IE shall be present if non-IP PDN type is supported. It may be present otherwise. When present, this IE shall be set as follows: - true: non-IP PDN type is supported; - false (default): non-IP PDN type is not supported.
ethernetSupported	boolean	C	0..1	This IE shall be present if Ethernet PDN type is supported. It may be present otherwise. When present, this IE shall be set as follows: - true: Ethernet PDN type is supported; - false (default): Ethernet PDN type is not supported.
upipSupported	boolean	C	0..1	This IE shall be present if the MME supports User Plane Integrity Protection with EPS. It may be present otherwise. When present, this IE shall be set as follows: - true: User Plane Integrity Protection with EPS is supported; - false (default): User Plane Integrity Protection with EPS is not supported.
NOTE: The AMF should know the MME capability to support, or not, non-IP PDN type, Ethernet PDN type and User Plane Integrity Protection, through local configuration. Note however that the actual EPS support of User Plane Integrity Protection may depend on the target E-UTRAN coverage.				

6.1.6.2.39 Type: SmContext

Table 6.1.6.2.39-1: Definition of type SmContext

Attribute name	Data type	P	Cardinality	Description	Applicability
pduSessionId	PduSessionId	M	1	This IE shall contain the PDU Session ID.	
dnn	Dnn	M	1	This IE shall contain the UE requested DNN of the PDU session. The DNN shall be the full DNN (i.e. with both the Network Identifier and Operator Identifier) for a HR PDU session, and it should be the full DNN in LBO and non-roaming scenarios. If the Operator Identifier is absent, the serving core network operator shall be assumed.	
selectedDnn	Dnn	C	0..1	This IE shall be present, if another DNN other than the UE requested DNN is selected for this PDU session. When present, it shall contain the selected DNN. The DNN shall be the full DNN (i.e. with both the Network Identifier and Operator Identifier) for a HR PDU session, and it should be the full DNN in LBO and non-roaming scenarios. If the Operator Identifier is absent, the serving core network operator shall be assumed.	
sNssai	Snssai	M	1	This IE shall contain the S-NSSAI for the serving PLMN.	
altSnssai	Snssai	C	0..1	This IE shall be present if the network slice for the serving PLMN (as indicated in the sNssai IE) was replaced by an alternative S-NSSAI. When present, this IE shall indicate the alternative S-NSSAI for the serving PLMN. See clause 5.15.19 of 3GPP TS 23.501 [2].	NSRP
hplmnSnssai	Snssai	C	0..1	This IE shall be present for a HR PDU session, or a non-roaming PDU session if received from the AMF. When present, it shall contain the S-NSSAI for the HPLMN.	
altHplmnSnssai	Snssai	C	0..1	This IE shall be present if the network slice for the HPLMN (as indicated in the hplmnSnssai IE) was replaced by an alternative S-NSSAI for the HPLMN. When present, this IE shall indicate the alternative S-NSSAI for the HPLMN. See clause 5.15.19 of 3GPP TS 23.501 [2].	NSRP
pduSessionType	PduSessionType	M	1	This IE shall indicate the PDU session type.	
gpsi	Gpsi	C	0..1	This IE shall be present if it is available. When present, it shall contain the user's GPSI.	
hSmfUri	Uri	C	0..1	This IE shall be present in HR roaming scenarios. When present, it shall contain the API URI of the Nsmf_PDUSession service of the H-SMF. The API URI shall be formatted as specified in clause 6.1.1.	
smfUri	Uri	C	0..1	This IE shall be present for a PDU session with an I-SMF. When present, it shall contain the API URI of the Nsmf_PDUSession service of the SMF. The API URI shall be formatted as specified in clause 6.1.1.	
pduSessionRef	Uri	C	0..1	This IE shall be present for a HR PDU session or a PDU session with an I-SMF. When present, this IE shall include the absolute URI of the PDU Session in H-SMF or SMF, including apiRoot (see clause 6.1.3.6.2)	
interPlmnApiRoot	Uri	C	0..1	This IE shall be present, if available. When present, it shall contain the apiRoot of the PDU session context to be used in inter-PLMN signalling request targeting the PDU session context. (NOTE 2)	
intraPlmnApiRoot	Uri	C	0..1	This IE shall be present, if available. When present, it shall contain the apiRoot of the PDU session context to be used in intra-PLMN signalling request targeting the PDU session context. (NOTE 2)	

pcfId	NfInstanceId	O	0..1	When present, this IE shall contain the identifier of: - the H-PCF selected by the AMF (for UE Policy), for a HR PDU session; or - the V-PCF selected by the AMF (for Access and Mobility Policy), for a PDU session in LBO roaming scenarios; or - the PCF selected by the AMF (for Access and Mobility Policy and/or UE Policy), for a PDU session in non-roaming scenarios.	
pcfGroupId	NfGroupId	O	0..1	This IE may be present in non-roaming and HR roaming scenarios. When present, this IE shall contain the identity of the (home) PCF group serving the UE for Access and Mobility Policy and/or UE Policy.	
pcfSetId	NfSetId	O	0..1	This IE may be present if the pcfId IE is present. When present, it shall contain the NF Set ID of the PCF indicated by the pcfId IE.	
selMode	DnnSelectionMode	C	0..1	This IE shall be present if it is available. When present, it shall be set to: - "VERIFIED", if the requested DNN provided by UE or the selected DNN provided by the network corresponds to an explicitly subscribed DNN; or - "UE_DNN_NOT_VERIFIED", if the requested DNN provided by UE corresponds to the usage of a wildcard subscription; or - "NW_DNN_NOT_VERIFIED", if the selected DNN provided by network corresponds to the usage of a wildcard subscription. If both the requested DNN (i.e. dnn IE) and selected DNN (i.e. selected Dnn IE) are present, the selMode shall be related to the selected DNN.	
udmGroupId	NfGroupId	O	0..1	When present, it shall indicate the identity of the UDM group serving the UE.	
routingIndicator	string	O	0..1	When present, it shall indicate the Routing Indicator of the UE.	
hNwPubKeyId	integer	O	0..1	When present, it shall indicate the Home Network Public Key Identifier of the UE. (NOTE 1)	
sessionAmbr	Ambr	M	1	This IE shall contain the Session AMBR granted to the PDU session.	
qosFlowsList	array(QosFlowSetupItem)	M	1..N	This IE shall contain the set of QoS flow(s) established for the PDU session. It shall contain at least the Qos flow associated to the default Qos rule. The qosRules attribute of each QosFlowSetupItem shall be set to an empty string.	
hSmfInstanceId	NfInstanceId	C	0..1	This IE shall be present for a HR PDU session. When present, it shall contain the identifier of the home SMF.	
smfInstanceId	NfInstanceId	C	0..1	This IE shall be present for a PDU session with an I-SMF. When present, it shall contain the identifier of the SMF.	
pduSessionSmfSetId	NfSetId	C	0..1	This IE shall be present, if available. When present, this IE shall contain the NF Set ID of the home SMF as identified by hSmfInstanceId, or the SMF as identified by the smfInstanceId.	
pduSessionSmfServiceSetId	NfServiceSetId	C	0..1	This IE shall be present, if available. When present, this IE shall contain the NF Service Set ID of the PDUSession service instance (for this PDU session) in the home SMF or the SMF.	

pduSessionSmfBinding	SbiBindingLevel	C	0..1	This IE shall be present, if available. When present, this IE shall contain the SBI binding level of the PDU session resource in the home SMF or the SMF.	
enablePauseCharging	boolean	C	0..1	This IE shall be present for a HR PDU session, if available. When present, it shall indicate whether the use of Pause of Charging is enabled for the PDU session (see clause 4.4.4 of 3GPP TS 23.502 [3]). When present, it shall be set as follows: - true: enable Pause of Charging; - false (default): disable Pause of Charging.	
ueIpv4Address	Ipv4Addr	C	0..1	This IE shall be present if a UE IPv4 address has been assigned to the PDU session.	
ueIpv6Prefix	Ipv6Prefix	C	0..1	This IE shall be present if a UE IPv6 prefix has been assigned to the PDU session.	
epsPdnCnxInfo	EpsPdnCnxInfo	C	0..1	This IE shall be present if the PDU session may be moved to EPS during its lifetime.	
epsBearerInfo	array(EpsBearerInfo)	C	1..N	This IE shall be present if the PDU session may be moved to EPS during its lifetime.	
maxIntegrityProtectedDataRate	MaxIntegrityProtectedDataRate	C	0..1	This IE shall be present if the upSecurity IE is present and indicates that integrity protection is preferred or required. When present, it shall indicate the maximum integrity protected data rate for uplink. If the maxIntegrityProtectedDataRateDl IE is absent, this IE applies to both uplink and downlink.	
maxIntegrityProtectedDataRateDl	MaxIntegrityProtectedDataRate	O	0..1	This IE may be present if the upSecurity IE is present and indicates that integrity protection is preferred or required. When present, it shall indicate the maximum integrity protected data rate for downlink.	
alwaysOnGranted	boolean	C	0..1	This IE shall be present if available. When present, it shall indicate whether this is an always On PDU session and it shall be set as follows: - true: always-on PDU session granted. - false (default): always-on PDU session not granted.	
upSecurity	UpSecurity	O	0..1	When present, this IE shall indicate the security policy for integrity protection and encryption for the user plane of the PDU session.	
hSmfServiceInstanceId	string	O	0..1	This IE may be present for a HR PDU session. When present, this IE shall contain the serviceInstanceId of the H-SMF service instance serving the PDU session. This IE may be used by the V-SMF to identify PDU sessions affected by a failure or restart of the H-SMF service (see clause 6.2 of 3GPP TS 23.527 [24]).	
smfServiceInstanceId	string	O	0..1	This IE may be present for a PDU session with an I-SMF. When present, this IE shall contain the serviceInstanceId of the SMF service instance serving the PDU session. This IE may be used by the I-SMF to identify PDU sessions affected by a failure or restart of the SMF service (see clause 6.2 of 3GPP TS 23.527 [24]).	
recoveryTime	DateTime	O	0..1	This IE may be present if available. When present, this IE shall indicate the timestamp (in UTC) when the H-SMF or SMF service instance serving the PDU session was (re)started (see clause 6.3 of 3GPP TS 23.527 [24]).	

forwardingInd	boolean	C	0..1	This IE shall be present, when downlink data packets are buffered at I-UPF. The SMF or I-SMF shall use this IE to inform the NF service consumer that a forwarding tunnel is needed for receiving the buffered downlink data packets, as specified in clause 4.23.4 of 3GPP TS 23.502 [3]. When present, this IE shall be set as follows: - true: a forwarding tunnel is needed for sending buffered downlink data packets; - false (default): forwarding tunnel is not needed	
psaTunnelInfo	TunnelInfo	C	0..1	This IE shall be present if available. When present, this IE shall contain the N9 tunnel information of PDU Session Anchor UPF controlled by SMF or H-SMF.	
chargingId	string	C	0..1	This IE shall be present for a HR PDU session, in scenarios with a V-SMF insertion/change/removal. When present, it shall contain the Charging ID of the PDU session (see 3GPP TS 32.255 [25]). The string shall encode the Charging ID (32-bit unsigned integer value, with maximum value "4294967295") in decimal representation. Pattern: '^(0|([1-9]{1}[0-9]{0,9}))$' (NOTE 4)	
smfChargingId	SmfChargingId	C	0..1	This IE shall be present if available for a HR PDU session, in scenarios with a V-SMF insertion/change/removal. When present, it shall contain the String based Charging ID of the PDU session (see 3GPP TS 32.255 [25]).	SCID
chargingInfo	ChargingInformation	C	0..1	This IE shall be present for a HR PDU session, if available and if the NF Service Consumer requesting the SM Context pertains to the same PLMN (i.e. if the Retrieve SM Context Request does not contain the servingNetwork attribute set to a different PLMN ID). When present, it shall contain the addresses of the V-CHF used for the PDU session.	
roamingChargingProfile	RoamingChargingProfile	C	0..1	This IE shall be present for a HR PDU session, if available and if the NF Service Consumer requesting the SM Context pertains to the same PLMN (i.e. if the Retrieve SM Context Request does not contain the servingNetwork attribute set to a different PLMN ID). When present, it shall contain the Roaming Charging Profile selected by the HPLMN (see clauses 5.1.9.1, 5.2.1.7 and 5.2.2.12.2 of 3GPP TS 32.255 [25]).	
nefExtBufSupportInd	boolean	C	0..1	This IE shall be present with value "true", if the anchor NEF has indicated support of Extended Buffering for mobile terminated data during SMF-NEF connection establishment. When present, this IE shall be set as following: - true: Extended Buffering supported by NEF - false (default): Extended Buffering not supported by NEF	
ipv6Index	IpIndex	C	0..1	This IE shall be present during I-SMF change scenarios, if IPv6 Index has previously been received by old I-SMF.	
dnAaaAddress	IpAddress	O	0..1	When present, this IE shall contain the address of DN-AAA server for UE IP Address allocation previously received by old I-SMF.	
redundantPduSessionInfo	RedundantPduSessionInformation	C	0..1	This IE shall be present for a PDU session with an I-SMF, if this information has been received previously from the UE, the anchor SMF or the old I-SMF.	

ranTunnelInfo	QosFlowTunnel	C	0..1	This IE shall be present if the ranUnchangedInd IE is set to "true" in the SM context retrieve request. When present, this IE shall contain the N2 tunnel information of NG-RAN with associated QoS flows (see "DL QoS Flow per TNL Information" in clause 9.3.4.2 of 3GPP 38.413 [9]).	
addRanTunnelInfo	array(QosFlowTunnel)	C	1..N	This IE shall be present if the ranUnchangedInd IE is set to "true" in the SM context retrieve request. When present, this IE shall contain the additional N2 tunnel information of NG-RAN together with associated QoS flows for split PDU session (see "Additional DL QoS Flow per TNL Information" in clause 9.3.4.2 of 3GPP 38.413 [9]).	
redRanTunnelInfo	QosFlowTunnel	C	0..1	This IE shall be present if the ranUnchangedInd IE is set to "true" in the SM context retrieve request. When present, this IE shall contain the additional N2 tunnel information of NG-RAN together with associated QoS flows for Redundant QoS Flow(s) (see "Redundant DL QoS Flow per TNL Information" in clause 9.3.4.2 of 3GPP 38.413 [9]).	
addRedRanTunnelInfo	array(QosFlowTunnel)	C	1..N	This IE shall be present if the ranUnchangedInd IE is set to "true" in the SM context retrieve request. When present, this IE shall contain the additional N2 tunnel information of NG-RAN together with associated QoS flows for Redundant QoS Flow(s) with split PDU session (see "Additional Redundant DL QoS Flow per TNL Information" in clause 9.3.4.2 of 3GPP 38.413 [9]).	
nspuSupportInd	boolean	C	0..1	This IE shall be present and set to "true" if the enablePauseCharging in the SmContext data type is set to "true" and if the (H-)SMF and PSA UPF support Notify Start Pause of Charging via user plane feature as specified in clause 5.30 of 3GPP TS 29.244 [29]. When present, it shall be set as follows: - true: Notify Start Pause of Charging via user plane feature is supported.	
smfBindingInfo	string	C	0..1	This IE shall be present, if available. When present, this IE shall contain the Binding indications of the PDU session resource in the home SMF or the SMF and shall be set to the value of the 3gpp-Sbi-Binding header defined in clause 5.2.3.2.6 of 3GPP TS 29.500 [4], without the header name.	
satelliteBackhaulCategory	SatelliteBackhaulCategory	O	0..1	When present, this IE shall indicate the satellite backhaul category information last signalled towards the anchor SMF, if any.	
sscMode	string	C	0..1	This IE shall be present, if available. When present, this IE shall indicate the SSC mode applicable to the PDU session. When present, it shall be encoded as one character in hexadecimal representation, taking a value of "0" to "7", representing the 3 bits of the SSC mode value of the SSC mode IE specified in clause 9.11.4.16 of 3GPP TS 24.501 [7]. Pattern: "^[0-7]$" Example: SSC mode 3 shall be encoded as "3".	

dlsetSupportInd	boolean	C	0..1	This IE shall be present and set to "true" if the (H-)SMF supports the "DLSET" feature as specified in clause 6.1.8. When present, it shall be set as follows: - true: the (H-)SMF supports the "DLSET" feature. - false: the (H-)SMF does not support the "DLSET" feature	
n9fscSupportInd	boolean	C	0..1	This IE shall be present and set to "true" if the SMF supports the "N9FSC" feature as specified in clause 6.1.8. When present, it shall be set as follows: - true: "N9FSC" feature is supported.	
anchorSmfOauth2Required	boolean	O	0..1	This IE may be present when the NF consumer (i.e. new I-SMF or new V-SMF) and the NF producer (i.e. the old I-SMF, V-SMF or SMF) belong to the same PLMN. When present, this IE shall indicate whether the H-SMF or SMF for a PDU session with an I-SMF requires Oauth2-based authorization for accessing its Nsmf_PDUSession service. - true: OAuth2 based authorization is required. - false: OAuth2 based authorization is not required. The absence of this IE means that no indication is available about the usage of Oauth2 for authorization of the anchor SMF's Nsmf_PDUSession service. (NOTE 3)	
fullDnaiList	array(Dnai)	O	1..N	This IE may be present to contain the full list of DNAIs of interest for PDU session, including DNAIs that may not be supported by the (source) I-SMF and excluding the ones supported by the Anchor SMF.	DTSSA-Ext1
hrsboAuthResult	boolean	C	0..1	This IE shall be present for a HR PDU session, during a V-SMF change within the same PLMN (i.e. if the Retrieve SM Context Request does not contain the servingNetwork attribute set to a different PLMN ID), if HR-SBO was authorized by the H-SMF and the request indicates that the new V-SMF supports HR-SBO. When present, it shall Indicate whether HR-SBO request is authorized - true: authorized. - false: Not authorized.	HR-SBO
hDnsAddr	IpAddress	C	0..1	This IE shall be present for a HR PDU session, during a V-SMF change within the same PLMN (i.e. if the Retrieve SM Context Request does not contain the servingNetwork attribute set to a different PLMN ID), if available, HR-SBO was authorized by the H-SMF and the request indicates that the new V-SMF supports HR-SBO. When present, this IE shall contain the DNS server address of HPLMN.	HR-SBO

hPlmnAddr	IpAddress	C	0..1	This IE shall be present for a HR PDU session, during a V-SMF change within the same PLMN (i.e. if the Retrieve SM Context Request does not contain the servingNetwork attribute set to a different PLMN ID), if available, HR-SBO was authorized by the H-SMF and the request indicates that the new V-SMF supports HR-SBO. When present, this IE shall contain the HPLMN address information (e.g. H-UPF IP address on N6). The new V-SMF may configure the new V-EASDF to build EDNS Client Subnet option based on this HPLMN address information for target FQDN of DNS queries which are not authorized for HR-SBO.	HR-SBO
vplmnOffloadingInfoList	array(VplmnOffloadingInfo)	C	1..N	This IE shall be present for a HR PDU session, during a V-SMF change within the same PLMN (i.e. if the Retrieve SM Context Request does not contain the servingNetwork attribute set to a different PLMN ID), if available, HR-SBO was authorized by the H-SMF and the request indicates that the new V-SMF supports HR-SBO. When present, it shall contain the list of V-PLMN Offloading policies that apply to the PDU session and whose offload identifiers are not yet known by the target V-SMF. (NOTE 5)	HR-SBO
vplmnDlAmbr	VplmnDlAmbr	C	0..1	This IE shall be present for a HR PDU session, during a V-SMF change within the same PLMN (i.e. if the Retrieve SM Context Request does not contain the servingNetwork attribute set to a different PLMN ID), if available, HR-SBO was authorized by the H-SMF and the request indicates that the new V-SMF supports HR-SBO. When present, it shall contain the Authorized DL Session AMBR for Offloading for the V-PLMN.	HR-SBO
offloadIds	array(OffloadIdentifier)	C	1...N	This IE shall be present for a HR PDU session, during a V-SMF change within the same PLMN (i.e. if the Retrieve SM Context Request does not contain the servingNetwork attribute set to a different PLMN ID), if available, HR-SBO was authorized by the H-SMF and the request indicates that the new V-SMF supports HR-SBO, and if the offloadIds are part of the storedOffloadIds included in the the Retrieve SM Context Request. This IE shall be present for a PDU session with an I-SMF, during an I-SMF change, if available, I-SMF based local offloading management was allowed by the SMF and the request indicates that the new I-SMF supports I-SMF based local offloading management. When present, this IE shall contain a list of offload identifiers that apply to the PDU session and that are already known by the target V-SMF/I-SMF. (NOTE 5)	HR-SBO, ISMF-LOM

easInfoToRefresh	EasInfoToRefresh	C	0..1	This IE shall be present for a HR PDU session, during a V-SMF change within the same PLMN (i.e. if the Retrieve SM Context Request does not contain the servingNetwork attribute set to a different PLMN ID), if available, HR-SBO was authorized by the H-SMF and the request indicates that the new V-SMF supports HR-SBO. This IE shall be present for a PDU session with an I-SMF, during an I-SMF change, if available, I-SMF based local offloading management was allowed by the SMF and the request indicates that the new I-SMF supports I-SMF based local offloading management. When present, it shall contain the EAS information to be refreshed for EAS re-discovery.	HR-SBO, ISMF-LOM
targetDnai	Dnai	C	0..1	This IE shall be present, for a HR PDU session, if it is received from H-SMF in AF triggered EAS re-discovery and edge relocation via interacting with HPLMN (see clause 6.7.3.2 of 3GPP TS 23.548 [74]). When present, this IE shall contain the target DNAI.	HR-SBO
trafficInfluInfo	TrafficInfluenceInfo	C	0..1	This IE shall be present for a HR PDU session, during a V-SMF change within the same PLMN (i.e. if the Retrieve SM Context Request does not contain the servingNetwork attribute set to a different PLMN ID), if available, HR-SBO was authorized by the H-SMF and the request indicates that the new V-SMF supports HR-SBO. This IE shall be present for a PDU session with an I-SMF, during an I-SMF change, if available, I-SMF based local offloading management was allowed by the SMF and the request indicates that the new I-SMF supports I-SMF based local offloading management. When present, it shall contain the traffic influence information applicable at the VPLMN for the HR-SBO PDU session, or applicable to the PDU session with I-SMF.	HR-SBO, ISMF-LOM
pendingUpdateInfoList	array(PendingUpdateInfo)	O	1..N	This IE should be included by the old V-SMF/I-SMF if received from the (H-)SMF. When present, this IE shall indicate the list of information that are not required to be updated in real-time to the (H-)SMF, i.e. the change of the listed information (e.g. UE location or Timezone) may be piggybacked in a subsequent essential update (e.g. to exchange the N1 message from the UE) to the (H-)SMF. The NF service consumer (i.e. I-SMF/V-SMF) should not trigger an Update to the (H-)SMF including only the change(s) of the listed information.	
localOffloadingMgtAllowedInd	boolean	C	0..1	This IE shall be present for a PDU session with an I-SMF, during an I-SMF change, if I-SMF based local offloading management was allowed by the SMF and the request indicates that the new I-SMF supports I-SMF based local offloading management. When present, it shall Indicate whether I-SMF based local offloading management was allowed by the SMF - true: allowed - false: not allowed	ISMF-LOM

dnsAddr	IpAddress	C	0..1	This IE shall be present for a PDU session with an I-SMF, during an I-SMF change, if available, the localOffloadingMgtAllowedInd IE is set to true and the request indicates that the new I-SMF supports I-SMF based local offloading management. When present, this IE shall contain the DNS server address to be used for DNS requests related with traffic not to be subject to Local Offloading Management.	ISMF-LOM
psaUpfAddr	IpAddress	C	0..1	This IE shall be present for a PDU session with an I-SMF, during an I-SMF change, if available, the localOffloadingMgtAllowedInd IE is set to true and the request indicates that the new I-SMF supports I-SMF based local offloading management. When present, this IE shall contain the PSA UPF address information (e.g. PSA UPF IP address on N6) to be used by the I-SMF to configure the EASDF to build EDNS Client Subnet option for target FQDN of DNS queries which are not authorized for Local Offloading Management.	ISMF-LOM
localOffloadingInfoList	array(LocalOffloadingManagementInfo)	C	1..N	This IE shall be present for a PDU session with an I-SMF, during an I-SMF change, if available, the localOffloadingMgtAllowedInd IE is set to true and the request indicates that the new I-SMF supports I-SMF based local offloading management. When present, it shall contain the Local Offloading Information list applicable to the PDU session and whose offload identifiers are not yet known by the target I-SMF and are not preconfigured at the source I-SMF. (NOTE 5)	ISMF-LOM
priorityUserInd	boolean	C	0..1	This IE shall be present during intra VPLMN V-SMF change scenario, if previously received from the AMF or from old V-SMF. Presence of this IE with the value false shall be prohibited. (NOTE 6)	
qosMonitoringInfo	QosMonitoringInfo	C	0..1	This IE shall be present if QoS monitoring for packet delay has been activated for at least one QoS flow of the PDU session indicated in the QosFlowSetupItem. See also clause 5.2.2.6.1.	

NOTE 1: If present, this attribute shall be used together with routingIndicator. This attribute is only used by the HPLMN in roaming scenarios.
NOTE 2: See NOTE 7 of Table 6.1.6.2.10-1.
NOTE 3: If the anchorSmfOauth2Required IE was received in SmContextCreateData from the AMF, this IE shall be ignored by the new I-SMF or V-SMF.
NOTE 4: Usage of Charging ID with Uint32 value for roaming scenarios may lead to Charging ID collision between SMFs.
NOTE 5: The same offloadId should not appear in both the offloadIds IE and the vplmnOffloadingInfoList IE (for HR-SBO) or the localOffloadingInfoList IE (for ISMF-LOM). Both the vplmnOffloadingInfoList IE (for HR-SBO) or the localOffloadingInfoList IE (for ISMF-LOM) and the offloadIds IE may be present when multiple offload identifers apply to the PDU session and some of them are already known by the target V-SMF or I-SMF while others are not yet known by the target V-SMF or I-SMF.
NOTE 6: For a HR PDU Session, if the VPLMN QoS Constraints is enabled and the VPLMN QoS Constraints for high priority PDU sessions and normal PDU sessions are different, the V-SMF shall determine the VPLMN QoS Constraints applicable for this PDU session based on the priority user indication.

6.1.6.2.40 Type: ExemptionInd

The ExemptionInd indicates that the included NAS SM message was exempted from one or more NAS SM congestion control, e.g. DNN, and/or S-NSSAI based congestion control, activated in the AMF.

Table 6.1.6.2.40-1: Definition of type ExemptionInd

Attribute name	Data type	P	Cardinality	Description
dnnCongestion	boolean	C	0..1	This IE shall be present and set to Yes if the included NAS Session Management message was exempted from the DNN based congestion activated in the AMF. true: Yes false (default): No
snssaiCongestion	boolean	C	0..1	This IE shall be present and set to Yes if the included NAS Session Management message was exempted from the S-NSSAI only based congestion activated in the AMF. true: Yes false (default): No
snssaiDnnCongestion	boolean	C	0..1	This IE shall be present and set to Yes if the included NAS Session Management message was exempted from the S-NSSAI and DNN based congestion activated in the AMF. true: Yes false (default): No

6.1.6.2.41 Type: PsaInformation

Table 6.1.6.2.41-1: Definition of type PsaInformation

Attribute name	Data type	P	Cardinality	Description
psaInd	PsaIndication	M	1	This IE shall indicate, for a PDU session with an I-SMF, if a PSA and UL CL or BP, or only a PSA is inserted or removed by the I-SMF.
dnaiList	array(Dnai)	M	1..N	This IE shall indicate the DNAI(s) supported by the PSA that is inserted or removed.
ueIpv6Prefix	Ipv6Prefix	C	0..1	This IE shall be present if a PSA and UL CL or BP is inserted or removed, and IPv6 multi-homing applies to the PDU session.
psaUpfId	NfInstanceId	C	0..1	This IE shall be present if a PSA UPF is inserted by the I-SMF. When present, it shall contain the identifier of the PSA UPF.
upfEvents	array(EventType)	O	1..N	UPF event(s) exposed by the local PSA UPF

6.1.6.2.42 Type: DnaiInformation

Table 6.1.6.2.42-1: Definition of type DnaiInformation

Attribute name	Data type	P	Cardinality	Description
dnai	Dnai	M	1	
noDnaiChangeInd	boolean	C	0..1	This IE shall be sent by the SMF to the I-SMF during the insertion of a PSA and BP/UL CL controlled by I-SMF. When present, it shall be set as follows: - true: DNAI shall not be changed; - false: DNAI may be changed.
noLocalPsaChangeInd	boolean	C	0..1	This IE shall be sent by the SMF to the I-SMF during the insertion of a PSA and BP/UL CL controlled by I-SMF. When present, it shall be set as follows: - true: local PSA shall not be changed; - false: local PSA may be changed.

6.1.6.2.43 Type: N4Information

Table 6.1.6.2.43-1: Definition of type N4Information

Attribute name	Data type	P	Cardinality	Description	Applicability
n4MessageType	N4MessageType	M	1	This IE shall indicate the PFCP message signalled in the n4MessagePayload.	
n4MessagePayload	RefToBinaryData	M	1	This IE shall reference the N4 Message Payload binary data (for the n4Info attribute) or the N4 Information extension binary data (for the n4InfoExt1, n4InfoExt2 and n4InfoExt3 attributes), see clause 6.1.6.4.5.	
n4DnaiInfo	DnaiInformation	C	0..1	This IE shall be present if the N4 information relates to a PSA. When present, it shall indicate the DNAI related to the N4 Information. If this IE is not present, this indicates N4 information relates to an UL CL or BP.	
psaUpfId	NfInstanceId	O	0..1	This IE may be sent by SMF to I-SMF if multiple local PSAs are inserted for the PDU session. When present, it shall contain the identifier of the PSA UPF for which the N4 information applies.	
ulClBpId	NfInstanceId	O	0..1	When present, it shall contain the identifier of the UL CL/BP for which the N4 information applies.	
n9UlPdrIdList	array(Uint16)	C	1..N	This IE shall be sent by the anchor SMF to the (new) I-SMF as specified in clauses 4.23.9.4 and 4.23.9.5 of 3GPP TS 23.502 [3] during simultaneous change of Branching Points or UL CLs controlled by I-SMF or controlled by different I-SMFs, if EAS session continuity upon UL CL relocation is required. When present, it shall contain the list of Rule IDs of the UL PDR(s) included in the N4Information to establish the UL N9 data forwarding in the target Branching Point or UL CL towards the old Branching Point or UL CL.	N9FSC

6.1.6.2.44 Type: IndirectDataForwardingTunnelInfo

Table 6.1.6.2.44-1: Definition of type IndirectDataForwardingTunnelInfo

Attribute name	Data type	P	Cardinality	Description
ipv4Addr	Ipv4Addr	C	0..1	When present, this IE shall contain the GTP tunnel IPv4 address. At least one of the ipv4Addr or ipv6Addr shall be present. Both may be present.
ipv6Addr	Ipv6Addr	C	0..1	When present, this IE shall contain the GTP tunnel IPv6 address. At least one of the ipv4Addr or ipv6Addr shall be present. Both may be present.
gtpTeid	Teid	M	1	This IE shall contain the 4-octet GTP tunnel endpoint identifier. If both ipv4Addr and ipv6Addr are present, the TEID shall be shared by both addresses.
drbId	DrbId	C	0..1	This IE shall be present if this is an indirect data forwarding tunnel for a specific Data Radio Bearer (see clause 9.3.1.77 of 3GPP TS 38.413 [9]). This IE shall not present if the additionalTnlNb IE is present. (NOTE)
additionalTnlNb	AdditionalTnlNb	C	0..1	This IE shall be present if this is an additional indirect data forwarding tunnel for multi-connectivity. When present, it shall be set to the value 1 to 3 to indicate whether this is the first, second or third additional indirect data forwarding tunnel for multi-connectivity. This IE shall not present if the drbId IE is present. (NOTE)
NOTE: If neither the drbId IE nor the additionalTnlNb IE is present, the tunnel information shall correspond to the PDU session level indirect data forwarding tunnel (i.e. DL Forwarding UP TNL Information IE or UL Forwarding UP TNL Information IE of the Handover Request Acknowledge Transfer IE of clause 9.3.4.11 of 3GPP TS 38.413 [9]).				

6.1.6.2.45 Type: SmContextReleasedData

Table 6.1.6.2.45-1: Definition of type SmContextReleasedData

Attribute name	Data type	P	Cardinality	Description	Applicability
smallDataRateStatus	SmallDataRateStatus	C	0..1	This IE shall be present, if the NF Service Consumer has indicated support of CIoT and if the status is available. When present, it shall indicate the current small data rate control status for the PDU session.	CIOT
apnRateStatus	ApnRateStatus	C	0..1	This IE shall be present, if the NF Service Consumer has indicated support of CIoT and if the status is available. When present, it shall indicate the current APN rate control status for the PDN connection (APN rates are shared by all PDN connections of the UE to this APN).	CIOT

6.1.6.2.46 Type: ReleasedData

Table 6.1.6.2.46-1: Definition of type ReleasedData

Attribute name	Data type	P	Cardinality	Description	Applicability
smallDataRateStatus	SmallDataRateStatus	C	0..1	This IE shall be present, if the NF Service Consumer has indicated support of CIoT and if available. When present, it shall indicate the current small data rate control status for the PDU session.	CIOT
apnRateStatus	ApnRateStatus	C	0..1	This IE shall be present, if the NF Service Consumer has indicated support of CIoT and if the status is available. When present, it shall indicate the current APN rate control status for the PDN connection (APN rates are shared by all PDN connections of the UE to this APN).	CIOT
n4Info	N4Information	O	0..1	This IE may be present if the SMF needs to send N4 information (e.g. acknowledgement of traffic usage reporting) to the I-SMF for traffic offloaded at a PSA controlled by an I-SMF.	DTSSA
n4InfoExt1	N4Information	O	0..1	This IE may be present if the SMF needs to send additional N4 information (e.g. acknowledgement of traffic usage reporting) to the I-SMF for traffic offloaded at a PSA controlled by an I-SMF.	DTSSA
n4InfoExt2	N4Information	O	0..1	This IE may be present if the SMF needs to send additional N4 information (e.g. acknowledgement of traffic usage reporting) to the I-SMF for traffic offloaded at a PSA controlled by an I-SMF.	DTSSA

6.1.6.2.47 Type: SendMoDataReqData

Table 6.1.6.2.47-1: Definition of type SendMoDataReqData

Attribute name	Data type	P	Cardinality	Description	Applicability
moData	RefToBinaryData	M	1	This IE shall reference the mobile originated data (see clause 6.1.6.4.6).	CIOT
moExpDataCounter	MoExpDataCounter	C	0..1	This IE shall be included if the UE has accessed the network by using "MO exception data" RRC establishment cause and when the AMF decides to send a non-zero value to the SMF. (NOTE) When present, this IE shall contain the MO Exception Data Counter.	CIOT
ueLocation	UserLocation	O	0..1	When present, this IE shall contain the user location.	CIOT
NOTE: The AMF increments the MO Exception Data Counter when the UE establishes/resumes RRC with "MO Exception Data" RRC cause. The AMF may defer sending the moExpDataCounter attribute to the SMF based on local configuration. The AMF resets the MO Exception Data Counter when receiving successful response from the SMF. The SMF however keeps incrementing the counter locally.					

6.1.6.2.48 Type: CnAssistedRanPara

Table 6.1.6.2.48-1: Definition of type CnAssistedRanPara

Attribute name	Data type	P	Cardinality	Description
stationaryIndication	StationaryIndication	O	0..1	Identifies whether the UE is stationary or mobile (see 3GPP 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 3GPP TS 23.502 [3] clause 4.15.6.3).
periodicTime	DurationSec	O	0..1	Identifies interval time of periodic communication (see 3GPP 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 3GPP TS 23.502 [3] clause 4.15.6.3).
scheduledCommunicationType	ScheduledCommunicationType	O	0..1	Indicates that the Scheduled Communication Type (see 3GPP TS 23.502 [3] clause 4.15.6.3). (NOTE 2)
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), and multiple packets transmission (see 3GPP TS 23.502 [3] clause 4.15.6.3).
batteryIndication	BatteryIndication	O	0..1	Indicates the power consumption type(s) of the UE (see 3GPP TS 23.502 [3] clause 4.15.6.3).
NOTE 1: At least one of optional parameters above shall be present. NOTE 2: The value of attribute "scheduledCommunicationType" shall be used together with the value of "scheduledCommunicationTime".				

6.1.6.2.49 Type: UlclBpInformation

Table 6.1.6.2.49-1: Definition of type UlclBpInformation

Attribute name	Data type	P	Cardinality	Description
ulclBpUpfId	NfInstanceId	C	0..1	This IE shall be present if an UL CL or BP UPF separate from the local PSA is inserted by the I-SMF. When present, it shall contain the identifier of the UL CL or BP UPF.
upfEvents	array(EventType)	O	1..N	UPF event(s) exposed by the ULCL or BP.

6.1.6.2.50 Type: TransferMoDataReqData

Table 6.1.6.2.50-1: Definition of type TransferMoDataReqData

Attribute name	Data type	P	Cardinality	Description	Applicability
moData	RefToBinaryData	M	1	This IE shall reference the mobile originated data (see clause 6.1.6.4.6).	CIOT
moExpDataCounter	MoExpDataCounter	C	0..1	This IE shall be present if received from AMF. When present, this IE shall contain the MO Exception Data Counter.	CIOT
ueLocation	UserLocation	O	0..1	When present, this IE shall contain the user location.	CIOT

6.1.6.2.51 Type: TransferMtDataReqData

Table 6.1.6.2.51-1: Definition of type TransferMtDataReqData

Attribute name	Data type	P	Cardinality	Description	Applicability
mtData	RefToBinaryData	M	1	This IE shall reference the mobile terminated data (see clause 6.1.6.4.7).	CIOT

6.1.6.2.52 Type: TransferMtDataError

Table 6.1.6.2.52-1: Definition of type TransferMtDataError as a list of to be combined data types

Data type	Cardinality	Description	Applicability
ExtProblemDetails	1	Detail information of the problem	
TransferMtDataAddInfo	1	Additional information to be returned in error response.	

6.1.6.2.53 Type: TransferMtDataAddInfo

Table 6.1.6.2.53-1: Definition of type TransferMtDataAddInfo

Attribute name	Data type	P	Cardinality	Description	Applicability
maxWaitingTime	DurationSec	C	0..1	This IE shall be present if available. When present, this IE shall contain the estimated maximum wait time (see clause 4.25.5 of 3GPP 23.502 [3]).	CIOT

6.1.6.2.54 Type: VplmnQos

Table 6.1.6.2.54-1: Definition of type VplmnQos

Attribute name	Data type	P	Cardinality	Description
5qi	5Qi	O	0..1	When present, this IE shall contain the 5G QoS Identifier (5QI) accepted or requested for the QoS Flow associated with the default QoS rule.
add5QiList	array(5Qi)	O	1..N	This IE may be present when 5qi IE is present. When present, this IE shall indicate the additional 5G QoS Identifier(s) accepted or requested for the QoS Flow associated with the default QoS rule.
arp	Arp	O	0..1	When present, this IE shall contain the Allocation and Retention Priority (ARP) accepted by the VPLMN for the QoS Flow associated with the default QoS rule.
sessionAmbr	Ambr	O	0..1	When present, this IE shall contain the highest Session-AMBR accepted by the VPLMN for the PDU session.
maxFbrDl	BitRate	O	0..1	When present, this IE shall contain the Maximum Bit Rate in Downlink accepted by the VPLMN for the QoS Flow associated with the default QoS rule (if this is a GBR QoS Flow). See 3GPP TS 23.501 [2].
maxFbrUl	BitRate	O	0..1	When present, this IE shall contain the Maximum Bit Rate in Uplink accepted by the VPLMN for the QoS Flow associated with the default QoS rule (if this is a GBR QoS Flow). See 3GPP TS 23.501 [2].
guaFbrDl	BitRate	O	0..1	When present, this IE shall contain the Guaranteed Bit Rate in Downlink accepted by the VPLMN for the QoS Flow associated with the default QoS rule (if this is a GBR QoS Flow). See 3GPP TS 23.501 [2].
guaFbrUl	BitRate	O	0..1	This IE shall contain the Guaranteed Bit Rate in Uplink accepted by the VPLMN for the QoS Flow associated with the default QoS rule (if this is a GBR QoS Flow). See 3GPP TS 23.501 [2].
5qiPL	5QiPriorityLevel	O	0..1	This IE shall contain the 5QI Priority Level when a 5QI Priority Level value different from the standardized Default Priority Level value in the QoS characteristics Table 5.7.4-1 in 3GPP TS 23.501 [2] is required.

6.1.6.2.55 Type: DdnFailureSubs

Table 6.1.6.2.55-1: Definition of type DdnFailureSubs

Attribute name	Data type	P	Cardinality	Description
ddnFailureSubsInd	boolean	M	1	When present, it shall be set as follows: - true: Notification of DDN failure is subscribed. - false (default): Notification of DDN failure is not subscribed.
ddnFailureSubsInfoList	array(DdnFailureSubInfo)	C	1..N	This IE shall be present, if notification of DDN failure is subscribed, to provide DDN failure subscription details.

6.1.6.2.56 Type: RetrieveData

Table 6.1.6.2.56-1: Definition of type RetrieveData

Attribute name	Data type	P	Cardinality	Description	Applicability
smallDataRateStatusReq	boolean	C	0..1	This IE shall be present and set to "true" if this is a request to retrieve the Small Data Rate Status of the PDU session. When present, it shall be set as follows: - true: small data rate control status is requested. - false (default): small data rate control status is not requested.	CIOT
pduSessionContextType	PduSessionContextType	C	0..1	This IE shall be present if this is a request to retrieve the AF Coordination Information during the change of SSC mode 3 PDU Session Anchor with multiple PDU Sessions, if the runtime coordination between old SMF and AF is enabled (see clause 4.3.5.2 of 3GPP TS 23.502 [3]).	EnEDGE

6.1.6.2.57 Type: RetrievedData

Table 6.1.6.2.57-1: Definition of type RetrievedData

Attribute name	Data type	P	Cardinality	Description	Applicability
smallDataRateStatus	SmallDataRateStatus	C	0..1	This IE shall be present if the information has been requested in the request and is available. When present, it shall indicate the current small data rate control status for the PDU session.	CIOT
afCoordinationInfo	AfCoordinationInfo	C	0..1	This IE shall be present if the PDU Session Context type was present in the request and indicated a request to retrieve the AF Coordination Information.	EnEDGE

6.1.6.2.58 Type: SecurityResult

Table 6.1.6.2.58-1: Definition of type SecurityResult

Attribute name	Data type	P	Cardinality	Description
integrityProtectionResult	ProtectionResult	C	0..1	This IE shall be included if available. If present, this IE indicates whether UP integrity protection is performed or not for the concerned PDU session.
confidentialityProtectionResult	ProtectionResult	C	0..1	This IE shall be included if available. If present, this IE indicates whether UP ciphering is performed or not for the concerned PDU session.

6.1.6.2.59 Type: UpSecurityInfo

Table 6.1.6.2.59-1: Definition of type UpSecurityInfo

Attribute name	Data type	P	Cardinality	Description
upSecurity	UpSecurity	M	1	This IE shall indicate the security policy for integrity protection and encryption for the user plane of the PDU session. See clause 9.3.1.60 of 3GPP TS 38.413 [9].
maxIntegrityProtectedDataRateUl	MaxIntegrityProtectedDataRate	C	0..1	This IE shall be present if the upSecurity IE is present and indicates that integrity protection is preferred or required. See clause 9.3.1.60 of 3GPP TS 38.413 [9]. When present, it shall indicate the maximum integrity protected data rate supported by the UE for uplink.
maxIntegrityProtectedDataRateDl	MaxIntegrityProtectedDataRate	C	0..1	This IE shall be present if the upSecurity IE is present and indicates that integrity protection is preferred or required. When present, it shall indicate the maximum integrity protected data rate supported by the UE for downlink.
securityResult	SecurityResult	C	0..1	This IE shall be included if available. If present, this IE shall contain the Security Result associated to the PDU session. See clause 9.3.1.60 of 3GPP TS 38.413 [9].

6.1.6.2.60 Type: DdnFailureSubInfo

Table 6.1.6.2.60-1: Definition of type DdnFailureSubInfo

Attribute name	Data type	P	Cardinality	Description
notifyCorrelationId	string	M	1	This IE shall indicate the notification correlation Id provided by the NF service consumer (e.g. AMF) when subscribing to the notification of the DDN Failure, which shall be returned by the SMF when a DDN Failure is notified for this subscription. This parameter can be useful if the NF service consumer has multiple subscriptions for the same PDU session.
dddTrafficDescriptorList	array(DddTrafficDescriptor)	C	1..N	This IE shall be present if it is received from the UDM. When present, it shall contain a list of Traffic Descriptors related to the event of DDN Failure for which the subscription applies.

6.1.6.2.61 Type: AlternativeQosProfile

Table 6.1.6.2.61-1: Definition of type AlternativeQosProfile

Attribute name	Data type	P	Cardinality	Description
index	Integer	M	1	When present, this IE shall contain the index identifying the alternative QoS profile. Minimum = 1. Maximum = 8.
guaFbrDl	BitRate	O	0..1	When present, this IE shall contain the Guaranteed Bit Rate in Downlink. See 3GPP TS 23.501 [2].
guaFbrUl	BitRate	O	0..1	When present, this IE shall contain the Guaranteed Bit Rate in Uplink. See 3GPP TS 23.501 [2].
packetDelayBudget	PacketDelBudget	O	0..1	When present, this IE shall indicate the packet delay budget.
packetErrRate	PacketErrRate	O	0..1	When present, this IE shall indicate the packet error rate.
maxDataBurstVol	integer	O	0..1	Unsigned integer indicating Maximum Data Burst Volume (see clauses 5.7.3.7 and 5.7.4 of 3GPP TS 23.501 [8]), expressed in Bytes. Minimum = 1. Maximum = 2000000. This IE may only be present for a Delay Critical GBR QoS flow. If absent, the maximum data burst volume included in dynamic5Qi or nonDynamic5Qi attribute shall be applied for the alternative QoS Profile of a Delay Critical GBR QoS flow. It the IE is also absent in nonDynamic5Qi, the default value of the Maximum Data Burst Volume shall be applied.
pduSetQosDl	PduSetQosPara	C	0..1	This IE shall be present if the qosFlowProfile IE in QosFlowSetupItem and QosFlowAddModifyRequestItem contains the pduSetQosDl with PSDB and PSER. See clause 5.7.1.2a of 3GPP TS 23.501 [2]. When present, this IE shall contain the PSDB and PSER for the DL direction.
pduSetQosUl	PduSetQosPara	C	0..1	This IE shall be present if the qosFlowProfile IE in QosFlowSetupItem and QosFlowAddModifyRequestItem contains the pduSetQosUl with PSDB and PSER. See clause 5.7.1.2a of 3GPP TS 23.501 [2]. When present, this IE shall contain the PSDB and PSER for the UL direction.

6.1.6.2.62 Type: ProblemDetailsAddInfo

Table 6.1.6.2.62-1: Definition of type ProblemDetailsAddInfo

Attribute name	Data type	P	Cardinality	Description
remoteError	boolean	O	0..1	When present, this IE shall indicate whether the error is originated by the remote entity or by the entity sending the response, as follows: - true: the error is originated by the remote entity (i.e. H-SMF/SMF or AMF). - false: the error is originated by the entity sending the response (i.e. V-SMF/I-SMF). This IE shall be present and set to "true" for a HR PDU session or for a PDU session with an I-SMF, when the V-SMF/I-SMF retuns an error response to the AMF that was originated by the H-SMF/SMF, or when the V-SMF/I-SMF returns an error response to the H-SMF/SMF that was originated by the AMF. This IE may be present if the error is originated by the V-SMF/I-SMF.

6.1.6.2.63 Type: ExtProblemDetails

Table 6.1.6.2.63-1: Definition of type ExtProblemDetails as a list of to be combined data types

Data type	Cardinality	Description	Applicability
ProblemDetails	1	Detail information of the problem	
ProblemDetailsAddInfo	1	Additional information to be returned in error response.	

6.1.6.2.64 Type: QosMonitoringInfo

Table 6.1.6.2.64-1: Definition of type QosMonitoringInfo

Attribute name	Data type	P	Cardinality	Description
qosMonitoringInd	boolean	C	0..1	This IE shall be present and set to "true" if QoS monitoring activated for QoS flows of the PDU session is performed using end to end accumulated packet delay reporting in UL GTP-U packets (see clause 5.33.3.3 of 3GPP TS 23.501 [2]). - True: QoS monitoring is performed using end to end accumulated packet delay reporting in UL GTP-U packets (see clause 5.33.3.3 of 3GPP TS 23.501 [2]). - False (default): QoS monitoring is performed using UPF and RAN time information in GTP-U packets (see clause 5.33.3.2 of 3GPP TS 23.501 [2]). When this attribute is present and set to "true", the I-SMF shall provision the I-UPF to report an end to end accumulated packet delay in UL GTP-U packets as specified in 3GPP TS 29.244 [29].

6.1.6.2.65 Type: IpAddress

Table 6.1.6.2.65-1: Definition of type IpAddress

Attribute name	Data type	P	Cardinality	Description
ipv4Addr	Ipv4Addr	C	0..1	Indicate an IPv4 Address
ipv6Addr	Ipv6Addr	C	0..1	Indicate an IPv6 Address
ipv6Prefix	Ipv6Prefix	C	0..1	Indicate an IPv6 Prefix
NOTE: One and only one of ipv4Addr, ipv6Addr and ipv6Prefix shall be present.				

6.1.6.2.66 Type: RedundantPduSessionInformation

Table 6.1.6.2.66-1: Definition of type RedundantPduSessionInformation

Attribute name	Data type	P	Cardinality	Description
rsn	Rsn	M	1	RSN
pduSessionPairId	integer	O	0..1	PDU Session Pair ID

6.1.6.2.67 Type: QosFlowTunnel

Table 6.1.6.2.67-1: Definition of type QosFlowTunnel

Attribute name	Data type	P	Cardinality	Description
qfiList	array(Qfi)	M	1..N	This IE shall contain the list of QoS Flow Identifiers.
tunnelInfo	TunnelInfo	M	1	This IE shall contain the RAN Tunnel Information.

6.1.6.2.68 Type: TargetDnaiInfo

Table 6.1.6.2.68-1: Definition of type TargetDnaiInfo

Attribute name	Data type	P	Cardinality	Description
targetDnai	Dnai	C	0..1	This IE shall be present if the I-SMF selection/ removal or SMF selection per target DNAI is needed. When present, this IE shall contain the target DNAI. This IE shall be absent for an SMF triggered I-SMF removal due to the DNAI being no longer used by the PDU Session.
smfSelectionType	SmfSelectionType	M	1	This IE shall indicate the I-SMF selection or removal for the current PDU session or SMF selection during PDU Session re-establishment for SSC mode 2/3.

6.1.6.2.69 Type: AfCoordinationInfo

Table 6.1.6.2.69-1: Definition of type AfCoordinationInfo

Attribute name	Data type	P	Cardinality	Description
sourceDnai	Dnai	C	0..1	This IE shall be present if available. If present, this IE shall contain the source DNAI.
sourceUeIpv4Addr	Ipv4Addr	C	0..1	This IE shall be present if available. If present, this IE shall contain the IPv4 Address of the served UE for the source DNAI.
sourceUeIpv6Prefix	Ipv6Prefix	C	0..1	This IE shall be present if available. If present, this IE shall contain the Ipv6 Address Prefix of the served UE for the source DNAI.
notificationInfoList	array(NotificationInfo)	C	1..N	This IE shall be present if available. If present, this IE shall contain the list of the Notification Correlation ID and Notification URI provided by the NF service consumers.

6.1.6.2.70 Type: NotificationInfo

Table 6.1.6.2.70-1: Definition of type NotificationInfo

Attribute name	Data type	P	Cardinality	Description
notifId	string	M	1	Notification Correlation ID provided by the NF service consumer.
notifUri	Uri	M	1	Identifies the recipient of Notifications sent by the SMF.
upBufferInd	boolean	C	0..1	This IE shall be present, if available. When present, it shall be set as follows: - true: uplink buffering is required; - false (default): uplink buffering is not required.

6.1.6.2.71 Type: AnchorSmfFeatures

The AnchorSmfFeatures indicates a list of features supported by the (H-)SMF to the AMF.

Table 6.1.6.2.71-1: Definition of type AnchorSmfFeatures

Attribute name	Data type	P	Cardinality	Description
psetrSupportInd	boolean	C	0..1	This IE shall be present and set to "true" if the (H-)SMF supports the "PSETR" feature as specified in clause 6.8.1 of 3GPP TS 23.527 [24]. It may be present otherwise. When present, it shall be set as follows: - true: the (H-)SMF supports the "PSETR" feature - false: the (H-)SMF does not support the "PSETR" feature.

6.1.6.2.72 Type: HrsboInfoFromVplmn

Table 6.1.6.2.72-1: Definition of type HrsboInfoFromVplmn

Attribute name	Data type	P	Cardinality	Description
hrsboAuthReqInd	boolean	C	0..1	This IE shall be present, for a HR PDU session, if the V-SMF requests HR SBO authorization: - in a Create Request; and - in an Update Request sent during a V-SMF insertion (i.e. H-PLMN to V-PLMN mobility) and during an Inter-PLMN V-SMF change (i.e. mobility between different V-PLMNs). When present, this IE shall be set to true to indicate that authorization of Session Breakout for HR Session in VPLMN is requested.
vEasdfAddr	IpAddress	C	0..1	This IE shall be present during a request for HR-SBO authorization, when using the EAS Discovery procedure with V-EASF for HR-SBO (see clause 6.7.2.3 of 3GPP TS 23.548 [39]) and if available, or if the V-EASDF IP address previously signaled to the H-SMF needs to be changed e.g. as a result of a V-SMF change. When present, this IE shall contain the IP Address of the (new) V-EASDF.
localDnsAddr	IpAddress	O	0..1	This IE may be present during the EAS Discovery Procedure with Local DNS for HR-SBO (see clause 6.7.2.4 of 3GPP TS 23.548 [39]) after UL-CL/BP insertion. When present, it shall be set to the address of the Local DNS Server/Resolver.
easRediscoveryInd	boolean	C	0..1	This IE shall be present, for a HR PDU session, if the UE indicates the support of EAS rediscovery and the V-SMF requests EAS rediscovery in an Update Request sent during a V-SMF insertion (i.e. H-PLMN to V-PLMN mobility) and during an Inter-PLMN V-SMF change (i.e. mobility between different V-PLMNs). When present, this IE shall be set to true to indicate that EAS rediscovery is requested.
easInfoToRefresh	EasInfoToRefresh	C	0..1	This IE shall be present if the easRediscoveryInd is set to true and the V-SMF receives the information in SM context from source V-SMF or H-SMF. When present, it shall contain the EAS information to be refreshed for EAS re-discovery.
storedOffloadIds	array(OffloadIdentifier)	C	1...N	The IE shall be present when the V-SMF service instance has stored a list of offload identifiers which were received from any H-SMF from the Home PLMN during previous signalling procedures for this HR-SBO PDU session and also for other HR-SBO PDU sessions. When present, this IE shall contain the list of offload identifiers of the HPLMN that are known by the V-SMF service instance. (NOTE 1)
easIpReplSupportInd	boolean	O	0..1	When present, this IE shall indicate the V-SMF capability to support EAS IP Replacement at the VPLMN for HR-SBO traffic. true: supported false (default): not supported

vEasdfSecurityInfo	array(DnsServerSecurityInformation)	O	1..N	When present, this IE shall contain one or more DNS server security information with length of two octets container(s), set with the V-EASDF security information. (NOTE 2)
localDnsSecurityInfo	array(DnsServerSecurityInformation)	O	1..N	When present, this IE shall contain one or more DNS server security information with length of two octets container(s), set with the Local DNS Server/Resolver security information. (NOTE 2)
NOTE 1: The H-SMF assumes that the V-SMF does not know any Offload Identifiers of the HPLMN if this IE is absent. NOTE 2: The V-SMF shall ensure that the V-EASDF security information or Local DNS Server/Resolver security information that it provides to the H-SMF is consistent with the DNS security protocol(s) supported by the UE that is received in the PCO IE from the UE.				

6.1.6.2.73 Type: HrsboInfoFromHplmn

Table 6.1.6.2.73-1: Definition of type HrsboInfoFromHplmn

Attribute name	Data type	P	Cardinality	Description
hrsboAuthResult	boolean	C	0..1	This IE shall be present, for a HR PDU session, if the H-SMF received a request for HR SBO authorization: - in a Create Response; and - in an Update Response sent during a V-SMF insertion (i.e. H-PLMN to V-PLMN mobility) and during an Inter-PLMN V-SMF change (i.e. mobility between different V-PLMNs). When present, this IE shall indicate whether HR-SBO request is authorized as follows: - true: authorized. - false: Not authorized.
hDnsAddr	IpAddress	C	0..1	This IE shall be present, when using the EAS Discovery procedure with V-EASF for HR-SBO (see clause 6.7.2.3 of 3GPP TS 23.548 [39]) or the EAS discovery procedure with V-EASDF using IP replacement mechanism for supporting HR-SBO (see clause 6.7.2.5 of 3GPP TS 23.548 [39]), if available. When present, this IE shall contain the DNS server address of HPLMN to be used: - for DNS requests related with traffic not to be subject to HR-SBO, to configure the V-EASDF when using the EAS Discovery procedure with V-EASF for HR-SBO (see clause 6.7.2.3 of 3GPP TS 23.548 [39]), or - for DNS requests related to traffic subject to HR-SBO, to configure the UPF in VPLMN to perform IP replacement when using the EAS discovery procedure with V-EASDF using IP replacement mechanism for supporting HR-SBO (see clause 6.7.2.5 of 3GPP TS 23.548 [39]). (NOTE 3).
hPlmnAddr	IpAddress	O	0..1	This IE may be present when using the EAS Discovery procedure with V-EASF for HR-SBO (see clause 6.7.2.3 of 3GPP TS 23.548 [39]). When present, this IE shall contain the HPLMN address information (e.g. H-UPF IP address on N6) to be used by the V-SMF to configure the V-EASDF to build EDNS Client Subnet option for target FQDN of DNS queries which are not authorized for HR-SBO.
vplmnOffloadingInfoList	array(VplmnOffloadingInfo)	O	0..N	When present, this IE shall include VPLMN specific Offloading Information list applicable to the PDU session and whose offload identifiers are not yet known by the V-SMF service instance or whose offload identifier's version has changed. (NOTE 5)(NOTE 6)
vplmnDlAmbr	VplmnDlAmbr	O	0..1	When present, it shall contain the Authorized DL Session AMBR for Offloading for the V-PLMN.
offloadIds	array(OffloadIdentifier)	C	0..N	When present, this IE shall include a list of specific Offload Ids applicable for the PDU session and that are part of the StoredOffloadIds included in the corresponding request message. (NOTE 5)(NOTE 6)
internalGroupIds	array(GroupId)	O	1..N	When present, this IE shall include the list of internal group identifier if the UE belongs to any subscribed internal group(s).

targetDnai	Dnai	C	0..1	This IE shall be present, for a HR PDU session, if the H-SMF receives the target DNAI from AF during AF triggered EAS re-discovery and edge relocation via interacting with HPLMN (see clause 6.7.3.2 of 3GPP TS 23.548 [74]). When present, this IE shall contain the target DNAI.
trafficInfluInfo	TrafficInfluenceInfo	O	0..1	This IE may be present for a HR-SBO PDU session, when the AF interacts with the HPLMN to influence the HR-SBO PDU session at VPLMN, e.g. if the H-SMF receives the EAS IP replacement information from AF during AF triggered EAS re-discovery and edge relocation via interacting with HPLMN (see clause 6.7.3.2 of 3GPP TS 23.548 [74]). When present, it shall include AF traffic influence information that applies at the VPLMN to the HR-SBO PDU session.

NOTE 1: The H-SMF sends the V-EASDF address received from the V-SMF to the UE in n1SmInfoToUe attribute when using the EAS Discovery procedure with V-EASDF for HR-SBO (see clause 6.7.2.3 of 3GPP TS 23.548 [39]).

NOTE 2: The H-SMF sends the Local DNS Server/Resolver address received from the V-SMF to the UE in n1SmInfoToUe attribute when using the EAS Discovery Procedure with Local DNS for HR-SBO (see clause 6.7.2.4 of 3GPP TS 23.548 [39]).

NOTE 3: The H-SMF also sends the DNS server IP address of the HPLMN to the UE in n1SmInfoToUe attribute (via PCO) when using the EAS discovery procedure with V-EASDF using IP replacement mechanism for supporting HR-SBO (see clause 6.7.2.5 of 3GPP TS 23.548 [39]).

NOTE 4: The H-SMF sends the EAS rediscovery indication and EAS information to be refreshed for EAS re-discovery received from the V-SMF to the UE in n1SmInfoToUe attribute.

NOTE 5: When the H-SMF determines that the V-SMF service instance has already received the corresponding Vplmn Offloading Info based on the storedOffloadIds provided by the V-SMF service instance in the corresponding request message and the associated vplmnOffloadInfo has not changed, then in the corresponding response message, the H-SMF shall include the corresponding offload identifier in the offloadIds attribute; otherwise, the H-SMF shall include it in the vplmnOffloadingInfoList attribute. The H-SMF shall always provision a complete list of vplmnOffloadingInfo and/or offloadIds.

NOTE 6: The V-SMF service instance shall always overwrite any vplmnOffloadingInfoList and the offloadIds stored for the PDU session with the latest vplmnOffloadingInfo and/or offloadIds received. The H-SMF may request the V-SMF to remove all vplmnOffloadingInfo provisioned earlier for a HR-SBO PDU session by provisioning an empty vplmnOffloadingInfo array. When the V-SMF receives a VplmnOffloadingInfo containing an offloadId which is known by the V-SMF, it shall consider that the vplmnOffloadingInfo for the offloadId has changed if the offloadId does not contain a version field or if the offload id has an incremented version number, and if so, the V-SMF service instance shall enforce the changed vplmnOffloadingInfo for the HR-SBO PDU session and also for any other HR-SBO PDU sessions with the same offloadId.

NOTE 7: The H-SMF sends the V-EASDF (i.e. DNS server) security information received from the V-SMF to the UE in n1SmInfoToUe attribute (via PCO) (see Annex T.4 of 3GPP TS 33.501 [17]).

6.1.6.2.74 Type: EasInfoToRefresh

Table 6.1.6.2.74-1: Definition of type EasInfoToRefresh

Attribute name	Data type	P	Cardinality	Description
ipv4AddressRanges	array(Ipv4AddressRange)	C	1..N	This IE shall be present if available. When present, this IE includes the list of impacted ranges of IPv4 addresses which needs to be refreshed.
ipv6AddressRanges	array(Ipv6AddressRange)	C	1..N	This IE shall be present if available. When present, this IE includes the list of impacted ranges of IPv6 addresses which needs to be refreshed.
fqdnList	array(Fqdn)	C	1..N	This IE shall be present if available. When present, this IE includes the list of impacted FQDNs which needs to be refreshed.
NOTE: At least one of the addressing parameters (ipv4AddressRanges, ipv6AddressRanges or fqdnList) shall be included in the EasInfoToRefresh.				

6.1.6.2.75 Type: EcnMarkingCongestionInfoReq

Table 6.1.6.2.75-1: Definition of type EcnMarkingCongestionInfoReq

Attribute name	Data type	P	Cardinality	Description	Applicability
ecnMarkingRanReq	EcnMarkingReq	C	0..1	This IE shall be present when ECN marking for L4S is requested in the 5G-AN. When present, it shall indicate whether ECN marking for L4S is requested for the UL, the DL or both the UL and the DL, or indicate to stop ECN marking for L4S. (NOTE)	EMECI
ecnMarkingUpfReq	EcnMarkingReq	C	0..1	This IE shall be present when QoS monitoring for congestion monitoring is requested in the NG-RAN to enable ECN marking for L4S in the PSA UPF. When present, it shall indicate whether ECN marking for L4S is requested for the UL, the DL or both the UL and the DL, or indicate to stop ECN marking for L4S. (NOTE)	EMECI
congestionInfoReq	CongestionInfoReq	C	0..1	This IE shall be present when QoS monitoring for congestion monitoring is requested in the NG-RAN to enable Network Exposure of 5GS information. When present, this IE shall contain QoS monitoring for congestion information as described in clause 5.45.3 of TS 23.501 [2]. (NOTE)	EMECI
NOTE: One and only one of the ecnMarkingRanReq IE, the ecnMarkingUpfReq IE and the congestionInfoReq IE shall be present.					

6.1.6.2.76 Type: EcnMarkingCongestionInfoStatus

Table 6.1.6.2.76-1: Definition of type EcnMarkingCongestionInfoStatus

Attribute name	Data type	P	Cardinality	Description	Applicability
qfi	Qfi	M	1	This IE shall contain the QoS Flow Identifier.	EMECI
activationStatus	ActivationStatus	M	1	This IE shall indicate the established QoS Flows status (active/not active) for QoS monitoring for congestion information or established QoS Flows status (active/not active) for ECN marking for L4S.	EMECI

6.1.6.2.77 Type: TscAssistanceInformation

Table 6.1.6.2.77-1: Definition of type TscAssistanceInformation

Attribute name	Data type	P	Cardinality	Description	Applicability
periodicity	Uint32	O	0..1	When present, this IE shall indicate the time period between start of two data bursts in milliseconds.	UEPSM
n6JitterInformation	N6JitterInformation	O	0..1	When present, this IE shall indicate the downlink N6 jitter range associated with downlink Periodicity.	UEPSM

6.1.6.2.78 Type: N6JitterInformation

Table 6.1.6.2.78-1: Definition of type N6JitterInformation

Attribute name	Data type	P	Cardinality	Description	Applicability
lowerJitterInfo	Int32	O	0..1	When present, this IE shall indicate the Lower DL Jitter Measurement. This IE shall be encoded as a signed32 binary integer value containing the downlink packet Jitter (i.e. positive or negative deviation of the arrival time of first packet of a Data Burst compared to the ideal Data Burst start time which is determined based on the DL periodicity) measured in milliseconds. (See also clause 5.27.2 of 3GPP TS 23.501 [2])	UEPSM
higherJitterInfo	Int32	O	0..1	When present, this IE shall indicate the Higher DL Jitter Measurement. This IE shall be encoded as a signed32 binary integer value containing the downlink packet Jitter (i.e. positive or negative deviation of the arrival time of first packet of a Data Burst compared to the ideal Data Burst start time which is determined based on the DL periodicity) measured in milliseconds. (See also clause 5.27.2 of 3GPP TS 23.501 [2])	UEPSM

6.1.6.2.79 Type: TrafficInfluenceInfo

Table 6.1.6.2.79-1: Definition of type TrafficInfluenceInfo

Attribute name	Data type	P	Cardinality	Description
traffInfluData	array(TrafficInfluenceData)	C	1..N	An array of traffic influence data, where each traffic influence data entry comprises the Service Data Flow description and the Application Function influence on traffic routing Enforcement Control parameters of a PCC rule.
traffContDecs	map(TrafficControlData)	C	1..N	Map of Traffic Control data policy decisions. The key used in this map for each entry shall be the tcId attribute of the corresponding TrafficControlData. This IE shall be present if the traffInfluData IE contains at least one TrafficInfluenceData entry with the refTcData IE present. When present, the TrafficControlData shall include the tcId attribute and may include the following attributes: - for an HR-SBO PDU session: - trafficSteeringPolIdDl - trafficSteeringPolIdUl - routeToLocs - maxAllowedUpLat - easIpReplaceInfos - simConnInd - simConnTerm - upPathChgEvent - candDnaiInd - for a PDU session with an I-SMF using I-SMF based Local Offloading Management: - maxAllowedUpLat - n6DelayInd (NOTE) See clause 4.2.6.2.6.2 of 3GPP TS 29.512 [30].
NOTE: The attributes listed for HR-SBO PDU session but not listed for PDU session with an I-SMF shall not be signaled over N16a since they are either not applicable to local offloading management or they correspond to information signaled via N4 information over N16a.				

6.1.6.2.80 Type: TrafficInfluenceData

Table 6.1.6.2.80-1: Definition of type TrafficInfluenceData

Attribute name	Data type	P	Cardinality	Description
flowInfos	array(FlowInformation)	C	1..N	An array of Ethernet or IP flow packet filter information.
appId	string	C	0..1	A reference to the application detection filter configured at the UPF.
precedence	Uinteger	O	0..1	Determines the order in which this Traffic Influence Data entry is applied relative to other Traffic Influence Data entries within the same PDU session. It shall be included if the "flowInfos" attribute is included or may be included if the "appId" attribute is included.
refTcData	array(string)	O	1..N	A reference to the TrafficControlData policy decision type. It is the tcId described in clause 5.6.2.10 of 3GPP TS 29.512 [30]. (NOTE)
NOTE: Arrays are only introduced for future compatibility. In this release of the specification the maximum number of elements in the array is 1.				

6.1.6.2.81 Type: LocalOffloadingMgtInfoFromIsmf

Table 6.1.6.2.81-1: Definition of type LocalOffloadingMgtInfoFromIsmf

Attribute name	Data type	P	Cardinality	Description
localOffloadingMgtAllowedInd	boolean	C	0..1	This IE shall be present with the value true in the Create Request (during an I-SMF insertion) and in the Update Request (during an I-SMF change), if the inserted/changed I-SMF is allowed (by the AMF) to apply Local Offloading Management. It shall also be present in an Update Request if the local offloading management allowed indication information needs to be changed, e.g. due to the AMF indicating to the I-SMF that local offloading management is newly allowed or no longer allowed. When present, it shall be set as follows: true: Local Offloading Management is allowed false: Local Offloading Management is not allowed When this IE is received with the value true, the SMF shall not discover, select and configure EASDF as well as DNS message handling for the locally offloaded traffic towards the local part of DN. When this IE is received with the value false in an Update Request (with or without an I-SMF change), or when this IE is not received in an Update Request during an I-SMF change, the SMF shall consider that I-SMF based local offloading management does not apply anymore to the PDU session (if this was applying beforehand) and the SMF shall proceed as specified in clause 6.10.2.4 of 3GPP TS 23.548 [39]).
easdfAddr	IpAddress	O	0..1	When present, this IE shall contain the IP address of the EASDF or of the new EASDF if the EASDF needs to be changed e.g. as a result of an I-SMF change.
easdfSecurityInfo	array(DnsServerSecurityInformation)	O	1..N	When present, this IE shall contain one or more DNS server security information with length of two octets container(s), set with the EASDF security information. (NOTE 2)
easRediscoveryInd	boolean	C	0..1	This IE shall be present in the Update Request if the UE indicates the support of EAS rediscovery and the I-SMF needs to trigger an EAS rediscovery. When present, this IE shall be set to true to indicate that EAS rediscovery is requested.
easInfoToRefresh	EasInfoToRefresh	O	0..1	This IE may be present in the Update Request if the easRediscoveryInd is set to true. When present, it shall contain the EAS information to be refreshed for EAS re-discovery.

storedOffloadIds	array(OffloadIdentifier)	C	1...N	The IE shall be present when the I-SMF service instance has stored a list of offload identifiers which are preconfigured at the I-SMF or which were received from any SMF (of the same PLMN) during previous signalling procedures for this PDU session with an I-SMF and also for other PDU sessions with an I-SMF. When present, this IE shall contain the list of offload identifiers that are known by the I-SMF service instance. (NOTE 1)
NOTE 1: The SMF assumes that the I-SMF does not know any Offload Identifiers if this IE is absent. NOTE 2: The I-SMF shall ensure that the EASDF security information that it provides to the SMF is consistent with the DNS security protocol(s) supported by the UE that is received in the PCO IE from the UE.				

6.1.6.2.82 Type: LocalOffloadingMgtInfoToIsmf

Table 6.1.6.2.82-1: Definition of type LocalOffloadingMgtInfoToIsmf

Attribute name	Data type	P	Cardinality	Description
localOffloadingMgtAllowedInd	boolean	C	0..1	This IE shall be present in the Create or Update Response, if the localOffloadingMgtAllowedInd IE was present and set to true in the request. When present, this IE shall indicate whether the SMF allows the I-SMF to perform Local Offloading Management: - true: allowed - false: not allowed
dnsAddr	IpAddress	O	0..1	When present, this IE shall contain the DNS server address to be used for DNS requests related with traffic not to be subject to Local Offloading Management.
psaUpfAddr	IpAddress	O	0..1	When present, this IE shall contain the PSA UPF address information (e.g. PSA UPF IP address on N6) to be used by the I-SMF to configure the EASDF to build EDNS Client Subnet option for target FQDN of DNS queries which are not authorized for Local Offloading Management.
localOffloadingInfoList	array(LocalOffloadingManagementInfo)	O	0..N	When present, this IE shall include Local Offloading Information list applicable to the PDU session and whose offload identifiers are not yet known by the I-SMF service instance or whose offload identifier's version has changed. (NOTE 2) (NOTE 3) (NOTE 4)
offloadIds	array(OffloadIdentifier)	C	0..N	When present, this IE shall include a list of specific Offload Ids applicable for the PDU session and that are part of the StoredOffloadIds included in the corresponding request message. (NOTE 2) (NOTE 3) (NOTE 4)
trafficInfluInfo	TrafficInfluenceInfo	O	0..1	When present, it shall include AF traffic influence information that applies at the I-SMF to the PDU session.

NOTE 1: The SMF sends the EAS rediscovery indication and EAS information to be refreshed for EAS re-discovery received from the I-SMF to the UE in n1SmInfoToUe attribute.

NOTE 2: When the SMF determines that the I-SMF service instance already knows the corresponding Local Offloading Info based on the storedOffloadIds provided by the I-SMF service instance in the corresponding request message and the associated localOffloadInfo has not changed, then in the corresponding response message, the SMF shall include the corresponding offload identifier in the offloadIds attribute; otherwise, the SMF shall include it in the localOffloadingInfoList attribute. The SMF shall always provision a complete list of localOffloadingInfo and/or offloadIds.

NOTE 3: The I-SMF service instance shall always overwrite any localOffloadingInfoList and the offloadIds stored for the PDU session with the latest localOffloadingInfoList and/or offloadIds received. The SMF may request the I-SMF to remove all localOffloadingInfoList provisioned earlier for a PDU session with an I-SMF by provisioning an empty localOffloadingInfoList array. When the I-SMF receives a LocalOffloadingInfo containing an offloadId which is known by the I-SMF and which does not correspond to an offload identifier preconfigured at the I-SMF, it shall consider that the localOffloadingInfo for the offloadId has changed if the offloadId does not contain a version field or if the offloadId has an incremented version number, and if so, the I-SMF service instance shall enforce the changed localOffloadingInfo for the PDU session with an I-SMF and also for any other PDU sessions with an I-SMF with the same offloadId.

NOTE 4: If, based on configuration, the PCF is aware that the I-SMF is preconfigured with the Local Offloading Management Policy information, the PCF does only provide the SMF with the offload Identifier, without the Local Offloading Management Policy information, as defined in clause 4.2.2.26 of 3GPP TS 29.512 [30]. Accordingly, the SMF only provides an offload identifier preconfigured at the I-SMF within the offloadIds IE and not within the localOffloadingInfoList IE.

6.1.6.2.83 Type: AvailableBitrateMonitoringRequest

Table 6.1.6.2.83-1: Definition of type AvailableBitrateMonitoringRequest

Attribute name	Data type	P	Cardinality	Description
availBitrateReq	AvailableBitrateRequest	M	1	This IE shall indicate whether available bitrate monitoring is requested for the UL direction, the DL direction or both the UL and DL directions, or indicate to stop available bitrate monitoring.
availBitrateUlThrs	array(BitRate)	C	1..8	This IE shall be present if the availBitrateReq IE is set to "UL" or "BOTH". When present, it shall indicate a list of thresholds for uplink available bitrate reporting. (NOTE)
availBitrateDlThrs	array(BitRate)	C	1..8	This IE shall be present if the availBitrateReq IE is set to "DL" or "BOTH". When present, it shall indicate a list of thresholds for downlink available bitrate reporting. (NOTE)
NOTE: The reporting thresholds are encoded with a unit of 1 Kbps in 3GPP TS 38.413 [9]. Accordingly, this is the smallest granularity of threshold values that can be signaled to the NG-RAN.				

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
ProcedureTransactionId	integer	Unsigned integer representing a Procedure Transaction Identity, within the range 0 to 255, as specified in 3GPP TS 24.007 [8].
EpsBearerId	integer	Integer identifying an EPS bearer, within the range 0 to 15, as specified in clause 11.2.3.1.5, bits 5 to 8, of 3GPP TS 24.007 [8].
EpsPdnCnxContainer	string	String with format "byte" as defined in OpenAPI Specification [15], i.e. base64-encoded characters, encoding the UeEpsPdnConnection IE specified in Table 7.3.1-2 or Table 7.3.6-2 of 3GPP TS 29.274 [16] for the N26 interface.
EpsBearerContainer	string	String with format "byte" as defined in OpenAPI Specification [15], i.e. base64-encoded characters, encoding the Bearer Context IE specified in Table 7.3.2-2 of 3GPP TS 29.274 [16].
Teid	string	4-octet GTP tunnel endpoint identifier, as defined in 3GPP TS 29.274 [16], in hexadecimal representation. Each character in the string shall take a value of "0" to "9" or "a" to "f" or "A" to "F" and shall represent 4 bits. The most significant character representing the 4 most significant bits of the TEID shall appear first in the string, and the character representing the 4 least significant bit of the TEID shall appear last in the string. Pattern: "^[A-Fa-f0-9]{8}" Example: A GTP TEID 0x5BD60076 shall be encoded as "5BD60076".
EpsBearerContextStatus	string	EPS bearer context status, as defined in octets 3 and 4 of the EPS bearer context status IE in clause 9.9.2.1 of 3GPP TS 24.301 [27], in hexadecimal representation. Each character in the string shall take a value of "0" to "9" or "a" to "f" or "A" to "F" and shall represent 4 bits. The most significant character representing the 4 most significant bits of the EPS bearer context status shall appear first in the string, and the character representing the 4 least significant bit of the EPS bearer context status shall appear last in the string. Pattern: '^[A-Fa-f0-9]{4}$' Example: An EPS bearer context status IE where only the EBIs 2, 5, 6 and 9 are active shall be encoded as "6402".
DrbId	integer	Unsigned integer representing a Data Radio Bearer Identity, within the range 1 to 32, as specified in clause 9.3.1.53 of 3GPP TS 38.413 [9].
AdditionalTnlNb	integer	Unsigned integer, within the range 1 to 3, indicating whether this is the first, second or third additional indirect data forwarding tunnel for multi-connectivity.
ForwardingBearerContainer	string	String with format "byte" as defined in OpenAPI Specification [15], i.e. base64-encoded characters, encoding the Bearer Context IE within Context Acknowledge specified in Table 7.3.7-2 of 3GPP TS 29.274 [16].
SecondaryRatUsageDataReportContainer	string	String with format "byte" as defined in OpenAPI Specification [15], i.e. base64-encoded characters, encoding the Secondary RAT Usage Data Report IE within Forward Relocation Complete Acknowledge specified in Table 7.3.4-1 of 3GPP TS 29.274 [16] (starting from octet 1).
DnsServerSecurityInformation	string	String with format "byte" as defined in OpenAPI Specification [15], i.e. base64-encoded characters, encoding the DNS server security information with length of two octets container specified in clause 10.5.6.3.1 of 3GPP TS 24.008 [47].
PduSessionPriority	integer	Unsigned integer representing the priority of the PDU session, within the range 0 to 31 (where 0 indicates the highest priority and 31 indicates the lowest priority), that is used to determine the SBI Message Priority (SMP) to set in subsequent signaling related to this PDU session as specified in clauses 5.22.2 and 5.22.3 of 3GPP TS 23.501 [2].

ServiceLevelAaContainer	string	String with format "byte" as defined in OpenAPI Specification [15], i.e. base64-encoded characters, encoding the Service-level-AA Container IE specified in clause 9.11.2.10 of 3GPP TS 24.501 [7], starting from octet 2, i.e. including length of two octets and Service-level-AA container contents, but not the IEI field.

6.1.6.3.3 Enumeration: UpCnxState

The enumeration UpCnxState represents the state of the user plane connection of a PDU session. It shall comply with the provisions defined in table 6.1.6.3.3-1.

Table 6.1.6.3.3-1: Enumeration UpCnxState

Enumeration value	Description
"ACTIVATED"	A N3 tunnel is established between the 5G-AN and UPF.
"DEACTIVATED"	No N3 tunnel is established between the 5G-AN and UPF.
"ACTIVATING"	A N3 tunnel is being established (the 5G-AN's F-TEID for downlink traffic is not assigned yet).
"SUSPENDED"	A N3 tunnel is suspended between the 5G-AN and UPF.

6.1.6.3.4 Enumeration: HoState

The enumeration HoState represents the handover state of a PDU session. It shall comply with the provisions defined in table 6.1.6.3.4-1.

Table 6.1.6.3.4-1: Enumeration HoState

Enumeration value	Description
"NONE"	No handover is in progress for the PDU session.
"PREPARING"	A handover is in preparation for the PDU session; see clause 5.2.2.3.4.1.
"PREPARED"	A handover is prepared for the PDU session; see clause 5.2.2.3.4.1.
"COMPLETED"	The handover is completed.
"CANCELLED"	The handover is cancelled.

6.1.6.3.5 Enumeration: RequestType

The enumeration RequestType indicates the type of a PDU session creation request. It shall comply with the provisions defined in table 6.1.6.3.5-1.

Table 6.1.6.3.5-1: Enumeration RequestType

Enumeration value	Description
"INITIAL_REQUEST"	Request to establish a new PDU session.
"EXISTING_PDU_SESSION"	Request referring to an existing PDU session.
"INITIAL_EMERGENCY_REQUEST"	Request to establish a new PDU session for Emergency Services.
"EXISTING_EMERGENCY_PDU_SESSION"	Request referring to an existing PDU session for Emergency Services.
NOTE: Clause 9.11.3.47 of 3GPP TS 24.501 [7] defines a specific Request type value in NAS PDUs for a MA PDU request. This shall be mapped to the maRequestInd attribute in the Create SM Context Request, Update SM Context Request, Create Request and Update Request. Accordingly, no corresponding value is defined in the RequestType enumeration.	

6.1.6.3.6 Enumeration: RequestIndication

The enumeration RequestIndication indicates the request type. It shall comply with the provisions defined in table 6.1.6.3.6-1.

Table 6.1.6.3.6-1: Enumeration RequestIndication

Enumeration value	Description
"UE_REQ_PDU_SES_MOD"	UE Requested PDU Session Modification
"UE_REQ_PDU_SES_REL"	UE Requested PDU Session Release
"PDU_SES_MOB"	PDU Session Mobility (e.g. between 3GPP and non-3GPP access, or from EPS to 5GS with N26 interface)
"NW_REQ_PDU_SES_AUTH"	Network Requested PDU Session Authentication. This value is used for the procedures with a secondary authorization/ authentication in an Update request initiated by an H-SMF/SMF during e.g. the PDU Session establishment procedure to inform the V-SMF/I-SMF that the H-SMF/SMF decided to initiate the optional PDU Session establishment authentication/authorization procedure (see clause 4.3.2.3 in 3GPP TS 23.502 [3]).
"NW_REQ_PDU_SES_MOD"	Network Requested PDU Session Modification
"NW_REQ_PDU_SES_REL"	Network Requested PDU Session Release
"EBI_ASSIGNMENT_REQ"	EPS Bearer ID Assignment Request or EPS Bearer ID Revocation Request
"REL_DUE_TO_5G_AN_REQUEST"	5G-AN Requested PDU Session Resource Release

6.1.6.3.7 Enumeration: NotificationCause

The enumeration NotificationCause indicates the cause of a notification. It shall comply with the provisions defined in table 6.1.6.3.7-1.

Table 6.1.6.3.7-1: Enumeration NotificationCause

Enumeration value	Description
"QOS_FULFILLED"	The QoS targets are fulfilled again for the GBR QoS flow (in both DL and UL directions).
"QOS_NOT_FULFILLED"	The QoS targets are no longer fulfilled for the GBR QoS flow (in both DL and UL directions).
"QOS_NOT_FULFILLED_DL"	The QoS targets are no longer fulfilled in the DL direction for the GBR QoS flow.
"QOS_NOT_FULFILLED_UL"	The QoS targets are no longer fulfilled in the UL direction for the GBR QoS flow.
"UP_SEC_FULFILLED"	The user plane security enforcement "Preferred" is fulfilled again for the PDU session.
"UP_SEC_NOT_FULFILLED"	The user plane security enforcement "Preferred" (or "Required" during a handover failure scenario) is not fulfilled for the PDU session.

6.1.6.3.8 Enumeration: Cause

The enumeration Cause indicates a cause information. It shall comply with the provisions defined in table 6.1.6.3.8-1.

Table 6.1.6.3.8-1: Enumeration Cause

Enumeration value	Description
"REL_DUE_TO_HO"	Release due to Handover
"EPS_FALLBACK"	Mobility due to EPS fallback for IMS voice is on-going.
"REL_DUE_TO_UP_SEC"	Release due to user plane Security requirements that cannot be fulfilled.
"DNN_CONGESTION"	Release due to the DNN based congestion control.
"S_NSSAI_CONGESTION"	Release due to the S-NSSAI based congestion control.
"REL_DUE_TO_REACTIVATION"	Release due to PDU session reactivation.
"5G_AN_NOT_RESPONDING"	The 5G AN did not respond to the request initiated by the network.
"REL_DUE_TO_SLICE_NOT_AVAILABLE"	Release due to the associated S-NSSAI becomes no longer available (e.g. the validity time of the S-NSSAI expires, or the S-NSSAI is decommissioned, etc.).
"REL_DUE_TO_DUPLICATE_SESSION_ID"	Release due to a UE request to establish a new PDU session with an identical PDU session Id.
"PDU_SESSION_STATUS_MISMATCH"	Release due to mismatch of PDU Session status between UE and AMF.
"HO_FAILURE"	Handover preparation failure
"INSUFFICIENT_UP_RESOURCES"	Failure to activate the User Plane connection of a PDU session due to insufficient user plane resources.
"PDU_SESSION_HANDED_OVER"	The PDU session is handed over to another system or access.
"PDU_SESSION_RESUMED"	Resume the user plane connection of the PDU session.
"CN_ASSISTED_RAN_PARAMETER_TUNING"	SMF derived CN assisted RAN parameters tuning.
"ISMF_CONTEXT_TRANSFER"	The PDU session shall be transferred from old I-SMF to new I-SMF.
"SMF_CONTEXT_TRANSFER"	The PDU session shall be transferred from old SMF to new SMF.
"REL_DUE_TO_PS_TO_CS_HO"	Release due to 5G SRVCC from NG-RAN to 3GPP UTRAN, as specified in clause 6.5.4 of 3GPP TS 23.216 [35].
"REL_DUE_TO_SUBSCRIPTION_CHANGE"	PDU session release due to UE subscription changes, triggered by the SMF e.g. due to the removal of subscribed DNNs, or by the AMF e.g. due to ODB changes.
"HO_CANCEL"	Handover cancellation
"REL_DUE_TO_SLICE_NOT_AUTHORIZED"	Release due to Network Slice-Specific Authentication and Authorization failure or revocation.
"PDU_SESSION_HAND_OVER_FAILURE"	Failure to handover PDU session to another access
"DDN_FAILURE_STATUS"	DDN failure status reporting
"REL_DUE_TO_CP_ONLY_NOT_APPLICABLE"	Release due to Control Plane Only indication associated with PDU Session is not applicable any longer
"NOT_SUPPORTED_WITH_ISMF"	PDU session release due to a requested functionality that is not supported for a PDU session with an I-SMF/V-SMF.
"CHANGED_ANCHOR_SMF"	The anchor SMF of the PDU session is changed.
"CHANGED_INTERMEDIATE_SMF"	The intermediate SMF (e.g. I-SMF or V-SMF) is changed.
"TARGET_DNAI_NOTIFICATION"	Notify the target DNAI for I-SMF selection for the current PDU Session, or SMF selection during PDU Session re-establishment for SSC mode 2/3.

"REL_DUE_TO_VPLMN_QOS_FAILURE"	Release due to QoS not complying with VPLMN QoS constraints, i.e. VPLMN QoS constraints are required for the PDU session and the H-SMF provides QoS parameters not complying with VPLMN QoS required by the V-SMF.
"REL_DUE_TO_SMF_NOT_SUPPORT_PSETR"	Release the PDU session due to the (H-)SMF does not support the PSETR feature when the V/I-SMF has failed.
"REL_DUE_TO_SNPN_SNPN_MOBILITY"	Release due to the PDU session is rejected by the new AMF during registration procedure as the continuity of the PDU Session cannot be supported between networks with SNPN-SNPN mobility.
"REL_DUE_TO_NO_HR_AGREEMENT"	Release due to the PDU session is rejected by the new AMF during registration procedure as the continuity of the PDU Session cannot be supported between networks with inter-PLMN mobility where no HR agreement exists.
"REL_DUE_TO_SNSSAI_DENIED"	Release due to the subscriber does not have the necessary subscription to access the SNSSAI.
"REL_DUE_TO_DNN_DENIED"	Release due to the subscriber does not have the necessary subscription to access the DNN.
"REL_DUE_TO_PDUTYPE_DENIED"	Release due to the subscriber does not have the necessary subscription for the requested PDU session type.
"REL_DUE_TO_SSC_DENIED"	Release due to the subscriber does not have the necessary subscription for the requested SSC mode.
"REL_DUE_TO_SUBSCRIPTION_DENIED"	Release due to an error, other than those listed in this table, due to lack of necessary subscription to serve the UE request.
"REL_DUE_TO_DNN_NOT_SUPPORTED"	Release due to the DNN is not supported by the SMF.
"REL_DUE_TO_PDUTYPE_NOT_SUPPORTED"	Release due to the requested PDU session type is not supported by the SMF for the PDN corresponding to the DNN.
"REL_DUE_TO_SSC_NOT_SUPPORTED"	Release due to the requested SSC mode is not supported by the SMF for the PDN corresponding to the DNN.
"REL_DUE_TO_INSUFFICIENT_RESOURCES_SLICE"	Release due to insufficient resources for the specific slice.
"REL_DUE_TO_INSUFFICIENT_RESOURCES_SLICE_DNN"	Release due to insufficient resources for the specific slice and DNN.
"REL_DUE_TO_DNN_CONGESTION"	The SMF has detected congestion for the requested DNN and performs overload control for that DNN which does not allow the PDU session to be established.
"REL_DUE_TO_S_NSSAI_CONGESTION"	The SMF has detected congestion for the requested S-NSSAI and performs overload control for that S-NSSAI which does not allow the PDU session to be established.
"REL_DUE_TO_PEER_NOT_RESPONDING"	No response is received from a remote peer, or the remote peer is known to be not reachable, e.g. to indicate that no response has been received from the H-SMF for a HR PDU session or the SMF for a PDU session with I-SMF.
"REL_DUE_TO_NETWORK_FAILURE"	The request is rejected due to a network problem.
"REL_DUE_TO_UPF_NOT_RESPONDING"	The request is rejected due to no response received from the UPF.

"REL_DUE_TO_NO_EPS_5GS_CONTINUITY"	It is used during an EPS to 5GS Idle mode mobility or handover, if the PDU session does not support seamless session continuity to 5GS.
"REL_DUE_TO_NOT_SUPPORTED_WITH_ISMF"	The request is rejected due to a requested functionality that is not supported for a PDU session with an I-SMF/V-SMF.
"REL_DUE_TO_EXCEEDED_UE_SLICE_DATA_RATE"	The request is rejected due to the maximum bit rate per S-NSSAI per UE is exceeded, when the SMF receives the same application error from the PCF.
"REL_DUE_TO_EXCEEDED_SLICE_DATA_RATE"	The request is rejected due to the maximum bit rate per S-NSSAI is exceeded, when the SMF receives the same application error from the PCF.
"REL_DUE_TO_CONTEXT_NOT_FOUND"	It is used when no context corresponding to the request exists in the SMF.
"REL_DUE_TO_UNSPECIFIED_REASON"	Release due to unspecified reasons.
"REL_DUE_TO_MOB_ACCESS_RESTRICTIONS"	Release due to Mobility Restrictions or Access Restrictions (e.g. CAG restrictions).
"REL_DUE_TO_SLICE_INACTIVITY"	Release due to slice inactivity (i.e. slice-specific inactivity period for the PDU session expires), as specified in clause 5.15.15.3 of 3GPP TS 23.501 [2] and clause 5.11.2 of 3GPP TS 29.244 [29].
"REL_DUE_TO_NSI_NOT_AVAILABLE"	Release due to the associated Network Slice Instance is congested or not available, as specified in clause 5.2.16.3.3 of 3GPP TS 23.502 [3].
"REL_DUE_TO_MBSR_NOT_AUTHORIZED"	Release due to the MBSR authorization status is changed from "authorized" to "not authorized".
"DEACT_DUE_TO_UE_OUT_OF_SLICE_SUPPORT_AREA"	User Plane deactivation due to the UE moving out of the network slice area of support or availability, as specified in clause 4.3.7 of 3GPP TS 23.502 [3].
"REJECT_DUE_TO_N1_SM_ERROR"	The PDU Session is rejected due to N1 SM Error, e.g. PDU session establishment rejected due to Operator Determined Barring.
"REL_DUE_TO_DUPLICATE_SESSION_EPDG"	Release due to a new PDU session with an identical PDU session Id was established from another anchor SMF via an ePDG.
"REL_DUE_TO_AF_REQUESTED_SLICE_REPLACEMENT"	Release due to AF requested modification of set of network slice, as specified in clause 5.15.5.2.2a of 3GPP TS 23.501 [2].

6.1.6.3.9 Enumeration: ResourceStatus

The enumeration ResourceStatus indicates the status of an SM context or PDU session resource. It shall comply with the provisions defined in table 6.1.6.3.9-1.

Table 6.1.6.3.9-1: Enumeration ResourceStatus

Enumeration value	Description	Applicability
"RELEASED"	The SM context or PDU session resource is released.	
"UNCHANGED"	The status of SM context or PDU session resource is not changed.	
"TRANSFERRED"	The SM context shall be transferred.	
"UPDATED"	The SM context or PDU session resource context has changed: - The access type of PDU session is changed. - The anchor SMF (H-SMF or SMF) or intermediate SMF (I-SMF or V-SMF) has changed within the SMF set. - The SM context with the I-SMF in the source access needs to be released but without releasing the PDU session in the AMF (see clauses 5.2.2.5.1 and 5.2.2.10.1).	HOFAIL ES3XX DTSSA
"ALT_ANCHOR_SMF"	The V-SMF has established the PDU session towards an alternative H-SMF during PDU session establishment for HR PDU session, as specified in clause 4.3.2.2.2 of 3GPP TS 23.502 [3], or the I-SMF has established the PDU session towards an alternative SMF during PDU session establishment for a PDU session with I-SMF (see clause 4.23.5.1 of 3GPP TS 23.502 [3]).	AASN

6.1.6.3.10 Enumeration: DnnSelectionMode

The enumeration DnnSelectionMode indicates whether the DNN of a PDU session being established corresponds to an explicitly subscribed DNN or to the usage of a wildcard subscription. It shall comply with the provisions defined in table 6.1.6.3.10-1.

Table 6.1.6.3.10-1: Enumeration DnnSelectionMode

Enumeration value	Description
"VERIFIED"	UE or network provided DNN is authorized based on the explicitly subscribed DNN, subscription verified
"UE_DNN_NOT_VERIFIED"	UE provided DNN is authorized based on the wildcard DNN, subscription not verified
"NW_DNN_NOT_VERIFIED"	Network provided DNN is authorized based on the wildcard DNN, subscription not verified

6.1.6.3.11 Enumeration: EpsInterworkingIndication

The enumeration EpsInterworkingIndication indicates whether and how the PDU session will possibly be moved to EPS or EPC/ePDG.

Table 6.1.6.3.11-1: Enumeration EpsInterworkingIndication

Enumeration value	Description
"NONE"	The PDU session cannot be moved to EPS and EPC/ePDG. (NOTE)
"WITH_N26"	The PDU session may possibly be moved to EPS or EPC/ePDG, with N26 interface supported during EPS interworking procedures. This may correspond to: - a PDU session or an MA-PDU session with a 3GPP access; or - a MA PDU Session with a non-3GPP access for a UE registered to the same PLMN over both 3GPP and non-3GPP accesses, i.e. served by the same AMF for both accesses.
"WITHOUT_N26"	The PDU session may possibly be moved to EPS or EPC/ePDG, without N26 interface supported during EPS interworking procedures. This may correspond to: - a PDU session or an MA-PDU session with a 3GPP access; or - a MA PDU Session with a non-3GPP access for a UE registered to the same PLMN over both 3GPP and non-3GPP accesses, i.e. served by the same AMF for both accesses.
"IWK_NON_3GPP"	The PDU session via non-3GPP access may possibly be moved to EPS.
NOTE: See clause 4.11.5 of 3GPP TS 23.502 [3] for the setting of the EpsInterworkingIndication by the AMF and its handling by the SMF.	

6.1.6.3.12 Enumeration: N2SmInfoType

Table 6.1.6.3.12-1: Enumeration N2SmInfoType

Enumeration value	Description
"PDU_RES_SETUP_REQ"	PDU Session Resource Setup Request Transfer
"PDU_RES_SETUP_RSP"	PDU Session Resource Setup Response Transfer
"PDU_RES_SETUP_FAIL"	PDU Session Resource Setup Unsuccessful Transfer
"PDU_RES_REL_CMD"	PDU Session Resource Release Command Transfer
"PDU_RES_REL_RSP"	PDU Session Resource Release Response Transfer
"PDU_RES_MOD_REQ"	PDU Session Resource Modify Request Transfer
"PDU_RES_MOD_RSP"	PDU Session Resource Modify Response Transfer
"PDU_RES_MOD_FAIL"	PDU Session Resource Modify Unsuccessful Transfer
"PDU_RES_NTY"	PDU Session Resource Notify Transfer
"PDU_RES_NTY_REL"	PDU Session Resource Notify Released Transfer
"PDU_RES_MOD_IND"	PDU Session Resource Modify Indication Transfer
"PDU_RES_MOD_CFM"	PDU Session Resource Modify Confirm Transfer
"PATH_SWITCH_REQ"	Path Switch Request Transfer
"PATH_SWITCH_SETUP_FAIL"	Path Switch Request Setup Failed Transfer
"PATH_SWITCH_REQ_ACK"	Path Switch Request Acknowledge Transfer
"PATH_SWITCH_REQ_FAIL"	Path Switch Request Unsuccessful Transfer
"HANDOVER_REQUIRED"	Handover Required Transfer
"HANDOVER_CMD"	Handover Command Transfer
"HANDOVER_PREP_FAIL"	Handover Preparation Unsuccessful Transfer
"HANDOVER_REQ_ACK"	Handover Request Acknowledge Transfer
"HANDOVER_RES_ALLOC_FAIL"	Handover Resource Allocation Unsuccessful Transfer
"SECONDARY_RAT_USAGE"	Secondary RAT Data Usage Report Transfer
"PDU_RES_MOD_IND_FAIL"	PDU Session Resource Modify Indication Unsuccessful Transfer
"UE_CONTEXT_RESUME_REQ"	UE Context Resume Request Transfer
"UE_CONTEXT_RESUME_RSP"	UE Context Resume Response Transfer
"UE_CONTEXT_SUSPEND_REQ"	UE Context Suspend Request Transfer

6.1.6.3.13 Enumeration: MaxIntegrityProtectedDataRate

Table 6.1.6.3.13-1: Enumeration MaxIntegrityProtectedDataRate

Enumeration value	Description
"64_KBPS"	64 kbps
"MAX_UE_RATE"	Full data rate

6.1.6.3.14 Enumeration: MaReleaseIndication

The enumeration MaReleaseIndication indicates the access type over which the MA PDU session is requested to be released.

Table 6.1.6.3.14-1: Enumeration MaReleaseIndication

Enumeration value	Description
"REL_MAPDU_OVER_3GPP"	The MA PDU session over 3GPP access is to be released or has been released.
"REL_MAPDU_OVER_N3GPP"	The MA PDU session over Non-3GPP access is to be released or has been released.

6.1.6.3.15 Enumeration: SmContextType

The enumeration SmContextType represents the type of SM context information requested during a Retrieve SM Context service operation. It shall comply with the provisions defined in table 6.1.6.3.15-1.

Table 6.1.6.3.15-1: Enumeration SmContextType

Enumeration value	Description
"EPS_PDN_CONNECTION"	UE EPS PDN Connection.
"SM_CONTEXT"	Complete SM Context (i.e. 5G SM context including EPS context information as defined in clause 6.1.6.2.39)
"AF_COORDINATION_INFO"	AF Coordination Information

6.1.6.3.16 Enumeration: PsaIndication

The enumeration PsaIndication indicates whether a PSA and an UL CL or BP, or only a PSA has been inserted or removed to/from the data path of a PDU session by an I-SMF. It shall comply with the provisions defined in table 6.1.6.3.16-1.

Table 6.1.6.3.16-1: Enumeration PsaIndication

Enumeration value	Description
"PSA_INSERTED"	A PSA and UL CL or BP has been inserted into the data path of the PDU session.
"PSA_REMOVED"	A PSA and UL CL or BP has been removed from the data path of the PDU session.
"PSA_INSERTED_ONLY"	A PSA has been inserted into the data path of the PDU session and the UL CL or BP is not changed.
"PSA_REMOVED_ONLY"	A PSA has been removed from the data path of the PDU session and the UL CL or BP is not changed.

6.1.6.3.17 Enumeration: N4MessageType

The enumeration N4MessageType indicates the PFCP message type sent within a N4 Message Payload. It shall comply with the provisions defined in table 6.1.6.3.17-1.

Table 6.1.6.3.17-1: Enumeration N4MessageType

Enumeration value	Description
"PFCP_SES_EST_REQ"	PFCP Session Establishment Request
"PFCP_SES_EST_RSP"	PFCP Session Establishment Response
"PFCP_SES_MOD_REQ"	PFCP Session Modification Request
"PFCP_SES_MOD_RSP"	PFCP Session Modification Response
"PFCP_SES_DEL_REQ"	PFCP Session Deletion Request
"PFCP_SES_DEL_RSP"	PFCP Session Deletion Response
"PFCP_SES_REP_REQ"	PFCP Session Report Request
"PFCP_SES_REP_RSP"	PFCP Session Report Response

6.1.6.3.18 Enumeration: QosFlowAccessType

The enumeration QoSFlowAccessType indicates the access type which the QoS Flow is associated with.

Table 6.1.6.3.18-1: Enumeration QosFlowAccessType

Enumeration value	Description
"3GPP"	The QoS Flow is only associated with 3GPP access.
"NON_3GPP"	The QoS Flow is only associated with Non-3GPP access.
"3GPP_AND_NON_3GPP"	The QoS Flow is associated with both 3GPP access and Non-3GPP access.

6.1.6.3.19 Enumeration: UnavailableAccessIndication

The enumeration UnavailableAccessIndication indicates the access type of the MA PDU session that is unavailable.

Table 6.1.6.3.19-1: Enumeration UnavailableAccessIndication

Enumeration value	Description
"3GA_UNAVAILABLE"	The 3GPP access of the MA PDU session is unavailable.
"N3GA_UNAVAILABLE"	The Non-3GPP access of the MA PDU session is unavailable.

6.1.6.3.20 Enumeration: ProtectionResult

The enumeration ProtectionResult indicates whether the security policy indicated as "preferred" is performed or not.

Table 6.1.6.3.20-1: Enumeration ProtectionResult

Enumeration value	Description
"PERFORMED"	The security policy indicated as "preferred" is performed
"NOT_PERFORMED"	The security policy indicated as "preferred" is not performed

6.1.6.3.21 Enumeration: QosMonitoringReq

The enumeration QosMonitoringReq indicates the measurement of UL, or DL, or both UL/DL delays, or no measurements are required.

Table 6.1.6.3.21-1: Enumeration QosMonitoringReq

Enumeration value	Description
"UL"	Measurement of UL delay.
"DL"	Measurement of DL delay.
"BOTH"	Measurement of both UL/DL delays.
"NONE"	No measurements are required. This value shall be used to stop on-going UL and/or DL measurements.

6.1.6.3.22 Enumeration: Rsn

The enumeration Rsn indicates the RSN value which differentiates the PDU sessions that are handled redundantly (see clause 5.33.2.1 of 3GPP TS 23.501 [2]).

Table 6.1.6.3.22-1: Enumeration Rsn

Enumeration value	Description
"V1"	V1
"V2"	V2
"NONE"	This value indicates that no RSN value is available (NOTE)
NOTE: This value shall be used in a Create Request if a PDU Session Pair ID was received from the UE without an RSN value.	

6.1.6.3.23 Enumeration: SmfSelectionType

The enumeration SmfSelectionType represents the I-SMF selection or removal for the current PDU Session, or the SMF selection during PDU Session re-establishment for SSC mode 2/3. It shall comply with the provisions defined in table 6.1.6.3.23-1.

Table 6.1.6.3.23-1: Enumeration SmfSelectionType

Enumeration value	Description
"CURRENT_PDU_SESSION"	I-SMF selection or removal for the current PDU Session.
"NEXT_PDU_SESSION"	SMF selection for the next PDU Session, i.e. the re-established PDU session for SSC mode 2/3.

6.1.6.3.24 Enumeration: PduSessionContextType

The enumeration PduSessionContextType represents the type of PDU Session information requested during a Retrieve service operation. It shall comply with the provisions defined in table 6.1.6.3.24-1.

Table 6.1.6.3.24-1: Enumeration PduSessionContextType

Enumeration value	Description
"AF_COORDINATION_INFO"	AF Coordination Information

6.1.6.3.25 Enumeration: PendingUpdateInfo

The enumeration PendingUpdateInfo indicates the information that are not required to be updated in real-time.

Table 6.1.6.3.25-1: Enumeration PendingUpdateInfo

Enumeration value	Description
"UE_LOCATION"	UE Location
"TIMEZONE"	Timezone
"ACCESS_TYPE"	Access Type
"RAT_TYPE"	Radio Access Type
"AMF_ID"	Serving AMF Identifier

6.1.6.3.26 Enumeration: EstablishmentRejectionCause

The enumeration EstablishmentRejectionCause indicates the reason to reject the PDU session establishment request.

Table 6.1.6.3.26-1: Enumeration EstablishmentRejectionCause

Enumeration value	Description
"OPERATOR_DETERMINED_BARRING"	PDU Session Establishment to be rejected due to Operator Determined Barring.

6.1.6.3.27 Enumeration: EcnMarkingReq

Table 6.1.6.3.27-1: Enumeration EcnMarkingReq

Enumeration value	Description	Applicability
"UL"	ECN marking for L4S for the UL.	
"DL"	ECN marking for L4S for the DL.	
"BOTH"	ECN marking for L4S for the UL and the DL.	
"STOP"	Stop ECN marking for L4S.	

6.1.6.3.28 Enumeration: CongestionInfoReq

Table 6.1.6.3.28-1: Enumeration CongestionInfoReq

Enumeration value	Description	Applicability
"UL"	Indicates to NG-RAN to report the congestion information of the QoS Flow on UL direction.	
"DL"	Indicates to NG-RAN to report the congestion information of the QoS Flow on DL direction.	
"BOTH"	Indicates to NG-RAN to report the congestion information of the QoS Flow on UL and DL directions.	
"STOP"	Indicates to NG-RAN to stop reporting the congestion information of the QoS Flow.	

6.1.6.3.29 Enumeration: ActivationStatus

Table 6.1.6.3.29-1: Enumeration ActivationStatus

Enumeration value	Description	Applicability
"ACTIVE"	Indicates that the established QoS Flows status for QoS monitoring for congestion information or for ECN marking for L4S is active.	
"NOT_ACTIVE"	Indicates that the established QoS Flows status for QoS monitoring for congestion information or for ECN marking for L4S is not active.	

6.1.6.3.30 Enumeration: QosMonitoringPdSupported

Table 6.1.6.3.30-1: Enumeration QosMonitoringPdSupported

Enumeration value	Description	Applicability
"SUPPORTED"	QoS monitoring for packet delay is supported.	
"NOT_SUPPORTED"	QoS monitoring for packet delay is not supported	
"UNKNOWN"	Support of QoS monitoring for packet delay is unknown, only applicable on N16/N16a interface.	

6.1.6.3.31 Enumeration: QosMonitoringCongestionSupported

Table 6.1.6.3.31-1: Enumeration QosMonitoringCongestionSupported

Enumeration value	Description	Applicability
"SUPPORTED"	QoS monitoring for congestion is supported.	
"NOT_SUPPORTED"	QoS monitoring for congestion is not supported	
"UNKNOWN"	Support of QoS monitoring for congestion is unknown, only applicable on N16/N16a interface.	

6.1.6.3.32 Enumeration: AvailableBitrateRequest

Table 6.1.6.3.32-1: Enumeration AvailableBitrateRequest

Enumeration value	Description	Applicability
"UL"	Available Bitrate monitoring for the UL direction.	
"DL"	Available Bitrate monitoring for the DL direction.	
"BOTH"	Available Bitrate monitoring for both the UL and DL directions.	
"STOP"	Stop Available Bitrate monitoring	

6.1.6.3.33 Enumeration: AvailBitRateMonSupported

Table 6.1.6.3.33-1: Enumeration AvailBitRateMonSupported

Enumeration value	Description	Applicability
"SUPPORTED"	Available bitrate monitoring is supported.	
"NOT_SUPPORTED"	Available bitrate monitoring is not supported	
"UNKNOWN"	Support of available bitrate monitoring is unknown, only applicable on N16/N16a interface.	

6.1.6.3.34 Enumeration: UliChangeGranularity

Table 6.1.6.3.34-1: Enumeration UliChangeGranularity

Enumeration value	Description	Applicability
"GNB"	ULI reporting upon change of gNB	
"TAI"	ULI reporting upon change of TAI	

6.1.6.3.35 Enumeration: QosMonitoringPdMethod

Table 6.1.6.3.35-1: Enumeration QosMonitoringPdMethod

Enumeration value	Description	Applicability
"USING_TIMESTAMP"	QoS monitoring for packet delay is supported using the UPF and RAN time information in GTP-U packets as specified in clause 5.33.3.2 of 3GPP TS 23.501 [2]).	
"USING_GTP_U_PATH"	QoS monitoring for packet delay is supported using GTP-U path based solution, i.e. the end to end accumulated packet delay reporting in UL GTP-U packets as specified in clause 5.33.3.3 of 3GPP TS 23.501 [2].	

6.1.6.4 Binary data

6.1.6.4.1 Introduction

This clause defines the binary data that shall be supported in a binary body part in an HTTP multipart message (see clauses 6.1.2.2.2 and 6.1.2.4).

Table 6.1.6.4.1-1: Binary Data Types

Name	Clause defined	Content type
N1 SM Message	6.1.6.4.2	vnd.3gpp.5gnas
N2 SM Information	6.1.6.4.3	vnd.3gpp.ngap
n1SmInfoFromUe	6.1.6.4.4	vnd.3gpp.5gnas
n1SmInfoToUe	6.1.6.4.4	vnd.3gpp.5gnas
unknownN1SmInfo	6.1.6.4.4	vnd.3gpp.5gnas
N4 Message Payload	6.1.6.4.5	vnd.3gpp.pfcp

6.1.6.4.2 N1 SM Message

N1 SM Message shall encode a 5GS NAS SM message as specified in 3GPP TS 24.501 [7], using the vnd.3gpp.5gnas content-type.

N1 SM Message may encode any 5GS NAS SM message specified in 3GPP TS 24.501 [7], as summarized in Table 6.1.6.4.2-1.

Table 6.1.6.4.2-1: N1 SM Message content

5GS NAS message	Reference (3GPP TS 24.501 [7])
PDU session establishment request	8.3.1
PDU session establishment accept	8.3.2
PDU session establishment reject	8.3.3
PDU session authentication command	8.3.4
PDU session authentication complete	8.3.5
PDU session authentication result	8.3.6
PDU session modification request	8.3.7
PDU session modification reject	8.3.8
PDU session modification command	8.3.9
PDU session modification complete	8.3.10
PDU session modification command reject	8.3.11
PDU session release request	8.3.12
PDU session release reject	8.3.13
PDU session release command	8.3.14
PDU session release complete	8.3.15
5GSM status	8.3.16
Service-level authentication command	8.3.17
Service-level authentication complete	8.3.18
Remote UE Report	8.3.19
Remote UE Report Response	8.3.20

6.1.6.4.3 N2 SM Information

N2 SM Information shall encode NG Application Protocol (NGAP) IEs, as specified in clause 9.3 of 3GPP TS 38.413 [9] (ASN.1 encoded), using the vnd.3gpp.ngap content-type.

N2 SM Information may encode any NGAP SMF related IE specified in 3GPP TS 38.413 [9], as summarized in Table 6.1.6.4.3-1.

Table 6.1.6.4.3-1: N2 SM Information content

N2 SM IE	Reference (3GPP TS 38.413 [9])	Related NGAP message
PDU Session Resource Setup Request Transfer	9.3.4.1	PDU SESSION RESOURCE SETUP REQUEST INITIAL CONTEXT SETUP REQUEST HANDOVER REQUEST
PDU Session Resource Setup Response Transfer	9.3.4.2	PDU SESSION RESOURCE SETUP RESPONSE INITIAL CONTEXT SETUP RESPONSE
PDU Session Resource Setup Unsuccessful Transfer	9.3.4.16	PDU SESSION RESOURCE SETUP RESPONSE INITIAL CONTEXT SETUP RESPONSE
PDU Session Resource Release Command Transfer	9.3.4.12	PDU SESSION RESOURCE RELEASE COMMAND
PDU Session Resource Release Response Transfer	9.3.4.21	PDU SESSION RESOURCE RELEASE RESPONSE UE CONTEXT RELEASE COMPLETE
PDU Session Resource Modify Request Transfer	9.3.4.3	PDU SESSION RESOURCE MODIFY REQUEST
PDU Session Resource Modify Response Transfer	9.3.4.4	PDU SESSION RESOURCE MODIFY RESPONSE
PDU Session Resource Modify Unsuccessful Transfer	9.3.4.17	PDU SESSION RESOURCE MODIFY RESPONSE
PDU Session Resource Notify Transfer	9.3.4.5	PDU SESSION RESOURCE NOTIFY
PDU Session Resource Notify Released Transfer	9.3.4.13	PDU SESSION RESOURCE NOTIFY
PDU Session Resource Modify Indication Transfer	9.3.4.6	PDU SESSION RESOURCE MODIFY INDICATION
PDU Session Resource Modify Confirm Transfer	9.3.4.7	PDU SESSION RESOURCE MODIFY CONFIRM
PDU Session Resource Modify Indication Unsuccessful Transfer	9.3.4.22	PDU SESSION RESOURCE MODIFY CONFIRM
Path Switch Request Transfer	9.3.4.8	PATH SWITCH REQUEST
Path Switch Request Setup Failed Transfer	9.3.4.15	PATH SWITCH REQUEST
Path Switch Request Acknowledge Transfer	9.3.4.9	PATH SWITCH REQUEST ACKNOWLEDGE
Path Switch Request Unsuccessful Transfer	9.3.4.20	PATH SWITCH REQUEST ACKNOWLEDGE PATH SWITCH REQUEST FAILURE
Handover Required Transfer	9.3.4.14	HANDOVER REQUIRED
Handover Request Acknowledge Transfer	9.3.4.11	HANDOVER REQUEST ACKNOWLEDGE
Handover Resource Allocation Unsuccessful Transfer	9.3.4.19	HANDOVER REQUEST ACKNOWLEDGE
Handover Command Transfer	9.3.4.10	HANDOVER COMMAND
Handover Preparation Unsuccessful Transfer	9.3.4.18	HANDOVER COMMAND
Secondary RAT Data Usage Report Transfer	9.3.4.23	SECONDARY RAT DATA USAGE REPORT
UE Context Resume Request Transfer	9.3.4.24	UE CONTEXT RESUME REQUEST
UE Context Resume Response Transfer	9.3.4.25	UE CONTEXT RESUME RESPONSE
UE Context Suspend Request Transfer	9.3.4.26	UE CONTEXT SUSPEND REQUEST

6.1.6.4.4 n1SmInfoFromUe, n1SmInfoToUe, unknownN1SmInfo

n1SmInfoFromUe, n1SmInfoToUe and unknownN1SmInfo shall encode one or more NAS SM IEs, including the Type and Length fields, as specified in 3GPP TS 24.501 [7], using the vnd.3gpp.5gnas content-type.

Clause 5.2.3.1 specifies the information that shall be included in these payloads.

n1SmInfoFromUe and n1SmInfoToUe may encode the 5GS NAS IEs listed in tables 6.1.6.4.4-1 and 6.1.6.4.4-2.

Table 6.1.6.4.4-1: n1SmInfoFromUE content

5GS NAS IE	Reference (3GPP TS 24.501 [7])	Related NAS SM message
Message type	9.7	All NAS SM messages
PDU session type	9.11.4.11	PDU Session Establishment Request
SSC mode	9.11.4.16	PDU Session Establishment Request
Maximum number of supported packet filters	9.11.4.9	PDU Session Establishment Request PDU Session Modification Request
Integrity protection maximum data rate	9.11.4.7	PDU Session Modification Request (NOTE 3)
SM PDU DN request container	9.11.4.15	PDU Session Establishment Request
Extended protocol configuration options	9.11.4.6	PDU Session Establishment Request PDU Session Authentication Complete PDU Session Modification Request PDU Session Modification Complete PDU Session Modification Command Reject PDU Session Release Request PDU Session Release Complete
EAP message	9.11.2.2	PDU Session Authentication Complete
Requested QoS rules	9.11.4.13	PDU Session Modification Request
Requested QoS flow descriptions	9.11.4.12	PDU Session Modification Request
5GSM cause	9.11.4.2	PDU Session Modification Request PDU Session Release Request PDU Session Release Complete (NOTE 2)
5GSM capability	9.11.4.1	PDU Session Establishment Request PDU Session Modification Request (NOTE 1)
Mapped EPS bearer contexts	9.11.4.8	PDU Session Modification Request
Remote UE context connected	9.11.4.29	Remote UE Report
Remote UE context disconnected	9.11.4.29	Remote UE Report
Non-3GPP delay budget	9.11.4.37	PDU Session Modification Request
URSP rule enforcement reports	9.11.4.38	PDU Session Establishment Request PDU Session Modification Request
Non-3GPP device identifier connection information	9.11.4.41	PDU Session Modification Request
Service-level-AA container	9.11.2.10	PDU Session Establishment Request PDU Session Modification Request (NOTE 4)

NOTE 1: The 5GSM capability IE shall be encoded as received from the UE. It may contain UE capabilities that the V-SMF (or I-SMF) only needs to transfer to the H-SMF (or SMF), e.g. support of reflective QoS, or support of multi-homed IPv6 PDU session, and/or capabilities to be interpreted and used by the V-SMF (or I-SMF).

NOTE 2: The 5GSM cause IE shall be encoded as received from the UE.
This information is defined as a "V" IE (i.e. without a Type field) in other NAS messages, e.g. PDU Session Modification Command Reject message, in which case it shall be sent as a separate n1SmCause IE over N16/N16a and not within the n1SmInfoToUE binary data.

NOTE 3: This information is defined as a "V" IE (i.e. without a Type field) in other NAS messages, e.g. PDU Session Establishment Request, in which case it shall be sent as separate maximum integrity protected data rate IEs over N16/N16a and not within the n1SmInfoFromUE binary data.

NOTE 4: The Service-level-AA container included in the SERVICE-LEVEL AUTHENTICATION COMMAND message is defined as "LV-E" IE (i.e. without IEI), therefore, in this case, the NAS IE "Service-level-AA container" shall be populated as a separate IE "ServiceLevelAaContainer" over N16/N16a and not within the n1SmInfoFromUE binary data.

Table 6.1.6.4.4-2: n1SmInfoToUE parameters

5GS NAS IE	Reference (3GPP TS 24.501 [7])	Related NAS SM message
Message type	9.7	All NAS SM messages
RQ timer value	9.11.2.3	PDU Session Establishment Accept PDU Session Modification Command
EAP message	9.11.2.2	PDU Session Establishment Accept PDU Session Establishment Reject PDU Session Authentication Command PDU Session Authentication Result PDU Session Release Command
Allowed SSC mode	9.11.4.5	PDU Session Establishment Reject
Extended protocol configuration options	9.11.4.6	PDU Session Establishment Accept PDU Session Establishment Reject PDU Session Authentication Command PDU Session Authentication Result PDU Session Modification Reject PDU Session Modification Command PDU Session Release Reject PDU Session Release Command
5GSM cause	9.11.4.2	PDU Session Establishment Accept PDU Session Modification Command (NOTE 1)
Mapped EPS bearer contexts	9.11.4.8	PDU Session Establishment Accept PDU Session Modification Command
ATSSS container	9.11.4.22	PDU Session Establishment Accept PDU Session Modification Command
N3QAI	9.11.4.36	PDU Session Establishment Accept PDU Session Modification Command (NOTE 2)
Service-level-AA container	9.11.2.10	PDU Session Establishment Accept PDU Session Establishment Reject PDU Session Modification Command PDU Session Release Command (NOTE 3)

NOTE 1: This IE indicates the 5GSM cause the H-SMF (or SMF) requires the V-SMF (or I-SMF) to send to the UE. The V-SMF (or I-SMF) shall transfer the received value to the UE without interpretation. This information is defined as a "V" IE (i.e. without a Type field) in other NAS messages, e.g. PDU Session Establishment Reject message, in which case it shall be sent as a separate n1SmCause IE over N16/N16a and not within the n1SmInfoToUE binary data.

NOTE 2: N3QAI is configured in SMF based on the S-NSSAI and DNN for PIN service (see clause 5.44.3.3 of 3GPP TS 23.501 [2]).

NOTE 3: The Service-level-AA container included in the SERVICE-LEVEL AUTHENTICATION COMPLETE message is defined as "LV-E" IE (i.e. without IEI), therefore, in this case, the NAS IE "Service-level-AA container" shall be populated as a separate IE "ServiceLevelAaContainer" over N16/N16a and not within the n1SmInfoToUE binary data.

The Message Type shall be present and encoded as the first 5GS NAS IE in any n1SmInfoFromUe, n1SmInfoToUe and unknownN1SmInfo binary data, to enable the receiver to decode the 5GS NAS IEs.

NOTE: The Information Element Identifier (see clause 11.2.1.1.3 of 3GPP TS 24.007 [8]) of a 5GS NAS IE uniquely identifies an IE in a given message.

6.1.6.4.5 N4 Message Payload

The N4 Message Payload shall encode a PFCP session related message as specified in 3GPP TS 29.244 [29], using the vnd.3gpp.pfcp content-type.

6.1.6.4.6 Mobile Originated Data

Mobile Originated Data shall encode the Data Contents of the CIoT small data container or Payload Container specified in 3GPP TS 24.501 [7], using the vnd.3gpp.5gnas content-type, as summarized in Table 6.1.6.4.6-1.

Table 6.1.6.4.6-1: Mobile Originated Data

Mobile Originated Data	Reference (3GPP TS 24.501 [7])	Related NAS SM message
Data contents in octet 4 to octet up to 257 of CIoT small data container contents.	9.11.3.18B (Figure 9.11.3.18B.2)	Control Plane Service Request
Payload container contents in octets 4 to n	9.11.3.39 (Figure 9.11.3.39.1)	Control Plane Service Request UL NAS Transport

6.1.6.4.7 Mobile Terminated Data

Mobile Terminated Data shall encode the Data Contents of the Payload Container specified in 3GPP TS 24.501 [7], using the vnd.3gpp.5gnas content-type, as summarized in Table 6.1.6.4.7-1.

Table 6.1.6.4.7-1: Mobile Terminated Data

Mobile Terminated Data	Reference (3GPP TS 24.501 [7])	Related NAS SM message
Payload container contents in octets 4 to n	9.11.3.39 (Figure 9.11.3.39.1)	DL NAS Transport

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].

The Cause codes mapping performed by AMF between the following HTTP responses returned by the SMF services to the AMF and the 5GMM related values is specified in clause 4.3.2 of 3GPP TS 29.524 [34].

In order to enable the AMF to figure out whether a request (e.g. PDU session establishment request) fails at the V-SMF/I-SMF or at the H-SMF/SMF for a HR PDU session or a PDU session with an I-SMF:

- a V-SMF/I-SMF that returns an HTTP error response to the AMF that was originated by the H-SMF/SMF shall include the remoteError attribute set to "true" in the ProblemDetails information in the HTTP error response;
- a V-SMF/I-SMF that originates an error to the AMF may include the remoteError attribute set to "false" in the ProblemDetails information in the HTTP error response.

For a HR PDU session or a PDU session with an I-SMF, if the V-SMF or I-SMF needs to reject the request from the AMF or the H-SMF/SMF because the H-SMF/SMF or the AMF is not reachable respectively (even after retrying alternative endpoint addresses e.g. according to the Binding Indication when available), the V-SMF or I-SMF shall send a 504 Gateway Timeout response including a problemDetails data structure with the cause attribute set to "PEER_NOT_RESPONDING" and with the remoteError attribute set to "false".

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 Table 5.2.7.2-1 of 3GPP TS 29.500 [4] may be used for the Nsmf_PDUSession service.

The following application errors listed in Table 6.1.7.3-1 are specific to the Nsmf_PDUSession service.

Table 6.1.7.3-1: Application errors

Application Error	HTTP status code	Description
N1_SM_ERROR	403 Forbidden	This indicates that an error, other than those listed in this table, was detected when processing the N1 SM information received in the request, e.g. N1 SM protocol error, or a PDU session establishment is rejected due to Operator Determined Barring.
SNSSAI_DENIED	403 Forbidden	The subscriber does not have the necessary subscription to access the SNSSAI.
DNN_DENIED	403 Forbidden	The subscriber does not have the necessary subscription to access the DNN.
PDUTYPE_DENIED	403 Forbidden	The subscriber does not have the necessary subscription for the requested PDU session type.
SSC_DENIED	403 Forbidden	The subscriber does not have the necessary subscription for the requested SSC mode.
SUBSCRIPTION_DENIED	403 Forbidden	This indicates an error, other than those listed in this table, due to lack of necessary subscription to serve the UE request.
DNN_NOT_SUPPORTED	403 Forbidden	The DNN is not supported by the SMF.
PDUTYPE_NOT_SUPPORTED	403 Forbidden	The requested PDU session type is not supported by the SMF for the PDN corresponding to the DNN.
SSC_NOT_SUPPORTED	403 Forbidden	The requested SSC mode is not supported by the SMF for the PDN corresponding to the DNN.
HOME_ROUTED_ROAMING_REQUIRED	403 Forbidden	It is used in LBO roaming, if the V-SMF is not able to process some part of the N1 SM information that requires Home Routed Roaming.
OUT_OF_LADN_SERVICE_AREA	403 Forbidden	The PDU session corresponds to a LADN and the UE is outside of the LADN Service Area.
N2_SM_ERROR	403 Forbidden	This indicates that an error, other than those listed in this table, was detected when processing the N2 SM information received in the request, e.g. N2 SM protocol error.
PRIORITIZED_SERVICES_ONLY	403 Forbidden	The SMF was notified that the UE is reachable only for regulatory prioritized service and the PDU Session to be activated is not for a regulatory prioritized service.
PDU_SESSION_ANCHOR_CHANGE	403 Forbidden	The SMF decided to change the PDU Session Anchor for the PDU Session.
TARGET_MME_CAPABILITY	403 Forbidden	A request to retrieve an SM context is rejected due to the target MME not capable to support the PDU session.
NO_EPS_5GS_CONTINUITY	403 Forbidden	It is used during an EPS to 5GS Idle mode mobility or handover, if the PDU session does not support seamless session continuity to 5GS.
UNABLE_TO_PAGE_UE	403 Forbidden	The request is rejected due to a temporarily inability to page the UE.
UE_NOT_RESPONDING	403 Forbidden	The UE did not respond to the request initiated by the network, e.g. paging.
REJECTED_BY_UE	403 Forbidden	The request is rejected by the UE.
REJECTED_DUE_VPLMN_POLICY	403 Forbidden	The request is rejected due to VPLMN operator policy.
HO_TAU_IN_PROGRESS	403 Forbidden	The request is rejected temporarily due to a mobilty procedure in progress.

INTEGRITY_PROTECTED_MDR_NOT_ACCEPTABLE	403 Forbidden	The integrity protected maximum data rate value provided by the UE is not acceptable for the PDU session based on local policy at the SMF. This error is applicable when the UP Security Policy for the PDU Session is determined to have Integrity Protection set to "Required". An NF service consumer that receives this error cause may use it for maintaining KPIs.
EBI_EXHAUSTED	403 Forbidden	The allocation of EPS Bearer ID failed due to exhaustion of EBI as the maximum number of EBIs has already been allocated to the UE.
EBI_REJECTED_LOCAL_POLICY	403 Forbidden	The allocation of EPS Bearer ID was rejected due to local policy in the Serving PLMN.
EBI_REJECTED_NO_N26	403 Forbidden	The allocation of EPS Bearer ID was rejected when the AMF is in a serving PLMN that does not support 5GS-EPS interworking procedures with N26 interface.
DEFAULT_EPS_BEARER_INACTIVE	403 Forbidden	It is used during EPS to 5GS mobility if the default EPS bearer context of the PDU session is reported as inactive by the UE in the epsBearerCtxStatus attribute.
HANDOVER_RESOURCE_ALLOCATION_FAILURE	403 Forbidden	It is used during a N2 handover preparation or an EPS to 5GS handover preparation, if no resource is allocated by the target NG-RAN for the PDU session.
LATE_OVERLAPPING_REQUEST	403 Forbidden	The request is rejected because it collides with an existing SM context or PDU session context with a more recent origination timestamp (see clause 5.2.3.3).
DEFAULT_EBI_NOT_TRANSFERRED	403 Forbidden	It is used during 5GS to EPS mobility if the EBI of the default EPS bearer is included in the notToTransferEbiList attribute.
NOT_SUPPORTED_WITH_ISMF	403 Forbidden	The request is rejected due to a requested functionality that is not supported for a PDU session with an I-SMF/V-SMF.
SERVICE_NOT_AUTHORIZED_BY_NEXT_HOP	403 Forbidden	The SMF is not authorized to access service provided by next hop NF producer, e.g. H-SMF or SMF or old I-SMF or old V-SMF.
NO_DATA_FORWARDING	403 Forbidden	The request to setup data forwarding tunnels is rejected because none of the EPS bearer contexts received in the request body contains an F-TEID for DL data forwarding.
S_NSSAI_UNAVAILABLE_DUE_TO_NSAC	403 Forbidden	The NSACF has returned error for the requested S-NSSAI and hence the PDU Session cannot be transferred from non-3gpp to 3gpp.
EXCEEDED_UE_SLICE_DATA_RATE	403 Forbidden	The request is rejected due to the maximum bit rate per S-NSSAI per UE is exceeded, when the SMF receives the same application error from the PCF.
EXCEEDED_SLICE_DATA_RATE	403 Forbidden	The request is rejected due to the maximum bit rate per S-NSSAI is exceeded, when the SMF receives the same application error from the PCF.
CONTEXT_NOT_FOUND	404 Not Found	It is used when no context corresponding to the request exists in the SMF.
HIGHER_PRIORITY_REQUEST_ONGOING	409 Conflict	The request is rejected temporarily due to procedure for higher priority session in progress.
UE_IN_CM_IDLE_STATE	409 Conflict	The request is rejected due to the UE being in CM-IDLE state for the PDU session associated to non-3GPP access.
INSUFFICIENT_RESOURCES_SLICE	500 Internal Server Error	The request cannot be provided due to insufficient resources for the specific slice.

INSUFFICIENT_RESOURCES_SLICE_DNN	500 Internal Server Error	The request cannot be provided due to insufficient resources for the specific slice and DNN.
DNN_CONGESTION	503 Service Unavailable	The SMF has detected congestion for the requested DNN and performs overload control for that DNN which does not allow the PDU session to be established.
S_NSSAI_CONGESTION	503 Service Unavailable	During PDU session establishment, the SMF has detected congestion for the requested S-NSSAI (including the congestion due to NSAC failure) and performs overload control for that S-NSSAI which does not allow the PDU session to be established. During handover between 3GPP access and non-3GPP access, the SMF has detected congestion for the requested S-NSSAI on the target access (e.g., due to NSAC) and performs overload control for that S-NSSAI on the target access which does not allow the PDU session to be handover to the target access.
PEER_NOT_RESPONDING	504 Gateway Timeout	No response is received from a remote peer, or the remote peer is known to be not reachable, e.g. to indicate that no response has been received from the H-SMF for a HR PDU session or the SMF for a PDU session with I-SMF.
NETWORK_FAILURE	504 Gateway Timeout	The request is rejected due to a network problem.
UPF_NOT_RESPONDING	504 Gateway Timeout	The request is rejected due to no response received from the UPF.
UE_NOT_REACHABLE	504 Gateway Timeout	The UE is not reachable for service.

6.1.8 Feature Negotiation

The feature negotiation mechanism specified in clause 6.6 of 3GPP TS 29.500 [4] shall be used to negotiate the features applicable between the SMF and the NF Service Consumer, for the Nsmf_PDUSession service, if any.

The NF Service Consumer shall indicate the features it supports for the Nsmf_PDUSession service, if any, by including the supportedFeatures attribute in the HTTP POST request when requesting the SMF to create an SM context or a PDU session resource. In scenarios with a change of NF Service Consumer (e.g. change of AMF, V-SMF or I-SMF change), the new NF Service Consumer shall indicate the features it supports for the Nsmf_PDUSession service, if any, by including the supportedFeatures attribute in the HTTP POST request when requesting the SMF to update an SM context or a PDU session resource to change the NF Service Consumer.

The SMF shall determine the supported features for the created SM context or PDU session resource, or for the updated SM context or PDU session resource in scenarios with a change of NF Service Consumer, as specified in clause 6.6 of 3GPP TS 29.500 [4] and shall indicate the supported features by including the supportedFeatures attribute in the representation of the SM context or PDU session resource it returns in the HTTP response confirming the creation or the modification of the resource.

In scenario with a change of SMF within the SMF Set, the new SMF needs not to indicate the features it supports in update request, since the new SMF supports the same features as the old SMF.

The syntax of the supportedFeatures attribute is defined in clause 5.2.2 of 3GPP TS 29.571 [13].

The following features are defined for the Nsmf_PDUSession service.

Table 6.1.8-1: Features of supportedFeatures attribute used by Nsmf_PDUSession service

Feature Number	Feature	M/O	Description
1	CIOT	O	Cellular IoT Support of this feature implies the support of all the CIoT features specified in clause 5.31 of 3GPP TS 23.501 [2], including in particular corresponding SMF PDUSession service's extensions to support: - NB-IoT and LTE-M RAT types; - Control Plane CIoT 5GS Optimisation; - Rate control of user data; - Idle mode mobility with data forwarding between EPS and 5GS using N26 interface. The SMF shall indicate its support of this feature in supportedFeatures attribute in its profile registered in NRF. A NF service consumer (e.g. AMF) shall only select SMF(s) that supports this feature for PDU sessions with Control Plane CIoT 5GS Optimisation enabled.
2	MAPDU	O	Multi-Access PDU Session An SMF that supports this feature shall support the procedures specified in3GPP TS 23.501 [2] and 3GPP TS 23.502 [3] related to Access Traffic Steering, Switching and Splitting.
3	DTSSA	O	Deployments Topologies with specific SMF Service Areas A NF Service Consumer and an SMF that support this feature shall support the procedures specified in clause 5.34 of 3GPP TS 23.501 [2] and in clause 4.23 of 3GPP TS 23.502 [3].
4	CARPT	O	SMF derived CN Assisted RAN parameters Tuning. A NF Service Consumer (e.g. AMF) and an SMF that support this feature shall support exchanging SMF derived CN assisted RAN parameters in Notify SM Context Status service operation (see clause 5.2.2.5.1).
5	CTXTR	O	This feature bit indicates whether the NF Service Consumer (e.g. AMF) and SMF supports Network Function/NF Service Context Transfer Procedures specified in clause 4.26 of 3GPP TS 23.502 [3]. The SMF shall only trigger these context transfer procedures if the NF Service Consumer has indicated support of this feature.
6	VQOS	O	VPLMN QoS An SMF that supports this feature shall support: - the handling of QoS constraints from the VPLMN during a HR PDU session establishment as specified in clause 4.3.2.2.2 of 3GPP TS 23.502 [3]; and - QoS modification requests initiated by the VPLMN, as specified in clause 4.3.3.3 of 3GPP TS 23.502 [3].
7	HOFAIL	M	This feature bit indicates whether the NF Service Consumer (e.g. AMF, V-SMF, I-SMF) and SMF supports the Notify (SM Context) Status procedure to indicate a handover failure with the Resource Status set to "UPDATED" between 3GPP access and non-3GPP access as specified in clauses 5.2.2.5.1 and 5.2.2.10.1. The SMF shall only trigger such a resource status notify procedure if the NF Service Consumer has indicated support of this feature.
8	ES3XX	M	Extended Support of HTTP 307/308 redirection An NF Service Consumer (e.g. AMF, V-SMF, I-SMF) that supports this feature shall support handling of HTTP 307/308 redirection for any service operation of the PDUSession service. An NF Service Consumer that does not support this feature does only support HTTP redirection as specified for 3GPP Release 15.

9	DCE2ER	O	Dual Connectivity based end to end Redundant User Plane Paths An NF service consumer (e.g. I-SMF) and SMF that supports this feature shall support the procedures specified in clause 5.33.2.1 of 3GPP TS 23.501 [2].
10	AASN	M	This feature bit indicates whether the NF Service Consumer (e.g. AMF) and the SMF support the Notify SM Context Status procedure to indicate that the PDU session is established towards an alternative anchor SMF, as specified in clause 5.2.2.5.1. The SMF shall only trigger such a Notify SM Context Status procedure if the NF Service Consumer has indicated support of this feature.
11	EnEDGE	O	Enhancement of Edge Computing in 5G Core network A NF Service Consumer and an SMF that support this feature shall support to signal the target DNAI in Notify (SM Context) Status and Create SM Context service operations, support to signal the URI of the SM Context resource in Notify SM Context Status, Create SM Context and create service operations / signal the URI of the PDU Session resource in Notify (SM Context) Status, Create SM Context and create service operations to retrieve the AF Coordination Information, as specified in 3GPP TS 23.501 [2], 3GPP TS 23.502 [3] and 3GPP TS 23.548 [39].
12	SCPBU	O	Simultaneous Change of PSA and BP or UL CL This feature bit indicates whether the NF Service Consumer (e.g. I-SMF) and the SMF support the n4InfoExt3 IE included in VsmfUpdateData, VsmfUpdatedData or VsmfUpdateError to support the simultaneous change of PSA and BP or UL CL controlled by I-SMF. The SMF shall only include the n4InfoExt3 IE in VsmfUpdateData if the NF Service Consumer has indicated support of this feature.
13	ENPN	O	Enhanced support of Non-Public Networks Support of this feature implies the support of the Remote Provisioning of UEs in Onboarding Network procedures, as specified in clause 5.30.2.10.4 of 3GPP TS 23.501 [2] and clause 4.3.2.2.1 of 3GPP TS 23.502 [3]. The SMF shall indicate its support of this feature in supportedFeatures attribute in its profile registered in NRF. A NF service consumer (e.g. AMF) shall select SMF(s) that supports this feature to setup PDU sessions for Remote Provisioning of UEs in Onboarding Network.
14	SPAE	O	SM Policy Association Events This feature bit indicates whether the NF Service Consumer (e.g. AMF) and the SMF supports the SM Policy Association establishment and termination event notification information handling, i.e. whereby the PCF for UE subscribes to SM Policy Association events to the PCF for SM Policy via the AMF and SMF, as specified in clause 4.3.2.2.1 and clause 4.3.3.2 of 3GPP TS 23.502 [3].
15	5GSAT	O	This feature bit indicates whether the NF Service Consumer (e.g. AMF, V-SMF, I-SMF) and SMF support the reporting of satellite backhaul information, as specified in clause 5.43.4 of 3GPP TS 23.501 [2].
16	UPIPE	O	User Plane Integrity Protection with EPS An NF service consumer (e.g. AMF) and SMF that supports this feature shall support the User Plane Integrity Protection with EPS specified in clauses 4.11.1 and 4.11.5.3 of 3GPP TS 23.502 [3].
17	BIUMR	O	This feature bit indicates whether the NF Service Consumer (e.g. AMF, V-SMF, I-SMF) and SMF supports Binding Indication Update for multiple resource contexts specified in clauses 6.12.1 and 5.2.3.2.6 of 3GPP TS 29.500 [4].

18	ACSCR	O	Absence of smfUri and hSmfUri attributes in Create SM Context Request for procedures with I-SMF/V-SMF insertion/change other than PDU session establishment and EPS to 5GS mobility procedures. This feature bit indicates that the NF Service Consumer (e.g. AMF) supports not including, and the I-SMF/V-SMF supports not receiving, the smfUri and hSmfUri attributes in the Create SM Context request in procedures with I-SMF/V-SMF insertion/change other than PDU session establishment and EPS to 5GS mobility procedures. An NF Service Consumer and I-SMF/V-SMF complying with this release of the specification shall support this feature if the DTSSA feature is supported. The support of this feature may remove the need for the AMF to fetch the smfUri or hsmfUri from the NRF where the anchor SMF profile is registered, e.g. enable the AMF to skip an inter-PLMN NF Discovery procedure towards the HPLMN during a V-SMF insertion/change when the AMF can determine by other means (e.g. using the anchorSmfSupportedFeatures attribute in PDU session context received over N14) whether the HPLMN supports the DTSSA feature, and accordingly, to fasten the execution of mobility (e.g. handover) scenarios.
19	PSETR	O	This feature bit indicates that the SMF is able to (re)select an alternative peer SMF (when available) when it detects the peer SMF has failed. See also clause 6.8 in 3GPP TS 23.527 [24]. An SMF implementation (complying with this release of the specification) should support the PSETR feature (i.e. support reselecting a peer SMF service instance when the peer SMF fails)
20	DLSET	O	This feature bit indicates that the PDU session resources served by the SMF are not exclusively bound to a SMF service instance, i.e. they are shared by multiple SMF service instances. See also clause 6.8 in 3GPP TS 23.527 [24].
21	N9FSC	O	N9 Forwarding between Branching Points or UL CLs controlled by the same or different I-SMFs for EAS Session Continuity. An NF Service Consumer and I-SMF/SMF that support this feature shall support the procedures specified in clauses 4.23.9.4 and 4.23.9.5 of 3GPP TS 23.502 [3] related to the N9 forwarding tunnel establishment between Branching Points or UL CLs controlled by the same or different I-SMFs to support EAS session continuity.
22	DTSSA-Ext1	O	This feature bit indicates that the full list of DNAIs of interest for PDU session, including DNAIs that may not be supported by the I-SMF and excluding the ones supported by the anchor SMF, can be provisioned by the anchor SMF or handled by the I-SMF, which enables the (target) I-SMF to receive such information earlier during an I-SMF insertion or change procedures, so that the I-SMF can decide to insert UL CL/BP and/or a local PSA earlier to save some signalling transactions.
23	5GSATB	O	This feature bit indicates whether the NF Service Consumer (e.g. AMF) is aware that the UE is accessing over a gNB using GEO satellite backhaul and GEO Satellite ID needs to be updated at the SMF (see clause 5.43.2 of 3GPP TS 23.501 [2].
24	HR-SBO	O	Home Routed Session BreakOut An NF service consumer (e.g. AMF and V-SMF) and SMF that supports this feature shall support local traffic routing in VPLMN for HR-SBO specified in clause 6.7 of 3GPP TS 23.548 [39].
25	N3GPS	O	Non-3GPP Access Path Switching An SMF or NF service consumer that supports this feature shall support the procedures specified in 3GPP TS 23.501 [2] and 3GPP TS 23.502 [3] related to non-3GPP access path switching while maintaining two N2 connections for non-3GPP access.
26	NSRP	O	Network Slice Replacement An NF service consumer (e.g., AMF, V-SMF or I-SMF) and SMF that supports this feature shall support network slice replacement as specified in clause 5.15.19 of 3GPP TS 23.501 [2].

27	UPCSMT	O	User Plane Connection Suspend State and MT handling This feature bit indicates whether the SMF supports the user plane connection suspend state for a UE entering RRC_Suspend or RRC_Inactive with long eDRX mode and to invoke Namf_MT EnableUEReachability service operation upon receiving subsequent DL Data Notification from the UPF.
28	PSER	O	PDU Session Establishment Rejection A SMF which support this feature shall allow the NF service consumer (i.e. the AMF) to indicate in the Create SM Context request that the PDU session establishment shall be rejected and shall reject the PDU session establishment according to the specific rejection cause received from the NF Service Consumer.
29	SCID	M	String based Charging Identifier A H-SMF shall indicate support of this feature when the SMF, the PCF and the CHF in the HPLMN all support handing of String based Charging Identifier, as specified in 3GPP TS 32.255 [25]. A V-SMF shall indicate support of this feature when the SMF and the CHF in the VPLMN both support handing of String based Charging Identifier, as specified in 3GPP TS 32.255 [25].
30	PDUSH	O	PDU Set based Handling for eXtended Reality (XR) and interactive media services An SMF which supports this feature shall support the requirements specified in clause 5.37.5 of 3GPP TS 23.501 [2], including the signaling of PDU Set QoS parameters and the Protocol Description for UL traffic over the N16/N16a interface.
31	EMECI	O	ECN marking for L4S and/or Exposure of congestion information for eXtended Reality (XR) and interactive media services An SMF which supports this feature shall support the requirements specified in clauses 5.37.3 and/or 5.37.4 of 3GPP TS 23.501 [2], including the signaling of ECN marking and/or Congestion Information Reporting request and status over the N16/N16a interface.
32	UEPSM	O	UE power saving management for eXtended Reality (XR) and interactive media services An SMF which supports this feature shall support the requirements specified in clause 5.37.8 of 3GPP TS 23.501 [2], including the signaling of Traffic Assistance Information (with the Periodicity and N6 Jitter Information) over the N16/N16a interface to enable Connected mode DRX power saving.
33	SAR	O	Slice Area Restriction Both SMF and AMF supporting this feature shall support handling of the S-NSSAI of the PDU session that is subject to slice area restriction and the AMF indicates the S-NSSAI of the PDU session is subject to slice area restriction. When the UE moves from an AMF supporting this feature to another AMF which does not support this feature, the SMF shall consider the S-NSSAI of the PDU session is no longer subject to area restriction.
34	QME	O	QoS Monitoring Enhancement An NF service consumer (e.g., AMF, V-SMF or I-SMF) and SMF that supports this feature shall support indicating the NG RAN QoS monitoring capabilities for packet delay and congestion as specified in clause 5.45.1 of 3GPP TS 23.501 [2].

35	NLIRN16	O	NetLoc Information Retrieval over N16/N16a A V-SMF/I-SMF and (H-)SMF which support this feature shall support NetLoc Information Retrieval over N16/N16a procedure as described in clause 5.2.2.8.3.12.
36	ISMF-LOM	O	I-SMF based Local Offloading Management An NF service consumer (e.g. AMF or I-SMF) and SMF that supports this feature shall support I-SMF based Local Offloading Management specified in 3GPP TS 23.548 [39].
37	N1N2BGER	O	N1/N2 information in 502 Bad Gateway Error Response An AMF or SMF supporting this feature shall support carrying N1/N2 information in 502 Bad Gateway error response for SM Context Create/Update service operations.
38	SUBDMIG	O	Subscription Data Migration The SMF and the NF consumer (e.g. AMF) supporting this feature shall support UDM re-discovery and resynchronization functions for Subscriber Data Migration.
39	AMF-RESYNCHED	O	The SMF and the NF consumer (e.g. AMF) supporting this feature shall support Data Restoration resynchronization functions with AMF indication of AMF Data Restoration resynchronization is initiated, as specified in clause 6.7.4 of 3GPP TS 23.527 [24].
40	5GSAT-ACCESS	O	This feature bit indicates whether the NF Service Consumer (i.e. AMF) is aware that the UE is accessing over a gNB on-board a satellite and the satellite ID needs to be sent to the SMF.
41	AVABIT	O	Available Bitrate Monitoring An NF service consumer (e.g., AMF, V-SMF or I-SMF) and SMF that supports this feature shall support: - indicating if the NG RAN support the available bitrate monitoring for a GBR QoS flow as specified in clauses 5.45.1 of 3GPP TS 23.501 [2]; - the relevant IEs related to the feature, e.g. AvailableBitrateMonitoringRequest, if the IEs are specified being applicable.
Feature number: The order number of the feature within the supportedFeatures attribute (starting with 1). Feature: A short name that can be used to refer to the bit and to the feature. M/O: Defines if the implementation of the feature is mandatory ("M") or optional ("O"). Description: A clear textual description of the feature.			

6.1.9 Security

As indicated in 3GPP TS 33.501 [17] and 3GPP TS 29.500 [4], the access to the Nsmf_PDUSession 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 authorization is used, an NF Service Consumer, prior to consuming services offered by the Nsmf_PDUSession 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 1: 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 Nsmf_PDUSession service.

NOTE 2: The security credentials for accessing a child resource URI of an sm-contexts or pdu-sessions collection distributed on different processing instances or hosts are the same as for accessing the collection URI.

The Nsmf_PDUSession API defines a single scope "nsmf-pdusession" for the entire service, and it does not define any additional scopes at resource and operation level.

6.1.10 HTTP redirection

An HTTP request may be redirected to a different SMF service instance, within the same SMF or a different SMF of an SMF set, e.g. when an SMF service instance is part of an SMF (service) set or when using indirect communications (see 3GPP TS 29.500 [4]). See also the ES3XX feature in clause 6.1.8.

An SCP that reselects a different SMF producer instance will return the NF Instance ID of the new SMF producer instance in the 3gpp-Sbi-Producer-Id header, as specified in clause 6.10.3.4 of 3GPP TS 29.500 [4].

If an SMF within an SMF set redirects a service request to a different SMF of the set using an 307 Temporary Redirect or 308 Permanent Redirect status code, the identity of the new SMF towards which the service request is redirected shall be indicated in the 3gpp-Sbi-Target-Nf-Id header of the 307 Temporary Redirect or 308 Permanent Redirect response as specified in clause 6.10.9.1 of 3GPP TS 29.500 [4].

For a HR PDU session or a PDU session with an I-SMF, the V-SMF or I-SMF shall update the AMF upon detecting a change of the H-SMF or SMF within the SMF set, by sending an SM context status notification with the resourceStatus set to "UPDATED", the cause in statusInfo set to "CHANGED_ANCHOR_SMF" and with the new H-SMF or SMF identity (see clause 5.2.2.5.1).

NOTE: This allows the AMF to receive the NF Instance ID of the new SMF handling the PDU session and to send the NF Instance ID of the last known SMF handling the PDU session during inter-AMF mobility.

Annex A (normative): OpenAPI specification

A.1 General

This Annex specifies the formal definition of the Nsmf_PDUSession service. It consists of OpenAPI 3.0.0 specifications, in YAML format.

This Annex takes precedence when being discrepant to other parts of the specification with respect to the encoding of information elements and methods within the API(s).

NOTE: The semantics and procedures, as well as conditions, e.g. for the applicability and allowed combinations of attributes or values, not expressed in the OpenAPI definitions but defined in other parts of the specification also apply.

Informative copies of the OpenAPI specification files contained in this 3GPP Technical Specification are available on a Git-based repository, that uses the GitLab software version control system (see 3GPP TS 29.501 [5] clause 5.3.1 and 3GPP TR 21.900 [7] clause 5B).

A.2 Nsmf_PDUSession API

```
openapi: 3.0.0

info:
  version: '1.4.0'
  title: 'Nsmf_PDUSession'
  description: |
    SMF PDU Session Service.
    © 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.

externalDocs:
  description: 3GPP TS 29.502 V19.5.0; 5G System; Session Management Services; Stage 3
  url: https://www.3gpp.org/ftp/Specs/archive/29_series/29.502/

servers:
  - url: '{apiRoot}/nsmf-pdusession/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: >
          apiRoot as defined in clause 4.4 of 3GPP TS 29.501. The sm-contexts and pdu-sessions
          resources can be distributed on different processing instances or hosts. Thus the
          authority and/or deployment-specific string of the apiRoot of the created individual
          sm context and pdu-session resources' URIs may differ from the authority and/or
          deployment-specific string of the apiRoot of the sm-contexts and pdu-sessions
          collections' URIs.

security:
  - {}
  - oAuth2ClientCredentials:
    - nsmf-pdusession

paths:
  /sm-contexts:
    post:
      summary:  Create SM Context
      tags:
        - SM contexts collection
      operationId: PostSmContexts
      requestBody:
        description: representation of the SM context to be created in the SMF
        required: true
        content:
          multipart/related:  # message with binary body part(s)
            schema:
              type: object
```

```
          properties: # Request parts
            jsonData:
              $ref: '#/components/schemas/SmContextCreateData'
            binaryDataN1SmMessage:
              type: string
              format: binary
            binaryDataN2SmInformation:
              type: string
              format: binary
            binaryDataN2SmInformationExt1:
              type: string
              format: binary
        encoding:
          jsonData:
            contentType:  application/json
          binaryDataN1SmMessage:
            contentType:  application/vnd.3gpp.5gnas
            headers:
              Content-Id:
                schema:
                  type: string
          binaryDataN2SmInformation:
            contentType:  application/vnd.3gpp.ngap
            headers:
              Content-Id:
                schema:
                  type: string
          binaryDataN2SmInformationExt1:
            contentType:  application/vnd.3gpp.ngap
            headers:
              Content-Id:
                schema:
                  type: string
callbacks:
  smContextStatusNotification:
    '{$request.body#/smContextStatusUri}':
      post:
        requestBody:  # contents of the callback message
          required: true
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/SmContextStatusNotification'
        responses:
          '204':
            description: successful notification
          '307':
            $ref: 'TS29571_CommonData.yaml#/components/responses/307'
          '308':
            $ref: 'TS29571_CommonData.yaml#/components/responses/308'
          '400':
            $ref: 'TS29571_CommonData.yaml#/components/responses/400'
          '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'

responses:
  '201':
    description: successful creation of an SM context
    content:
      application/json: # message without binary body part
        schema:
          $ref: '#/components/schemas/SmContextCreatedData'
```

```
      multipart/related:  # message with binary body part(s)
        schema:
          type: object
          properties: # Request parts
            jsonData:
              $ref: '#/components/schemas/SmContextCreatedData'
            binaryDataN2SmInformation:
              type: string
              format: binary
        encoding:
          jsonData:
            contentType:  application/json
          binaryDataN2SmInformation:
            contentType:  application/vnd.3gpp.ngap
            headers:
              Content-Id:
                schema:
                  type: string
    headers:
      Location:
        description: >
          Contains the URI of the newly created resource, according to the structure:
          {apiRoot}/nsmf-pdusession/<apiVersion>/sm-contexts/{smContextRef}
        required: true
        schema:
          type: string

  '307':
    $ref: 'TS29571_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29571_CommonData.yaml#/components/responses/308'
  '400':
    description: unsuccessful creation of an SM context - bad request
    content:
      application/json: # message without binary body part
        schema:
          $ref: '#/components/schemas/SmContextCreateError'
      application/problem+json:
        schema:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/ProblemDetails'
      multipart/related:  # message with binary body part(s)
        schema:
          type: object
          properties: # Request parts
            jsonData:
              $ref: '#/components/schemas/SmContextCreateError'
            binaryDataN1SmMessage:
              type: string
              format: binary
            binaryDataN2SmMessage:
              type: string
              format: binary
        encoding:
          jsonData:
            contentType:  application/json
          binaryDataN1SmMessage:
            contentType:  application/vnd.3gpp.5gnas
            headers:
              Content-Id:
                schema:
                  type: string
          binaryDataN2SmMessage:
            contentType:  application/vnd.3gpp.ngap
            headers:
              Content-Id:
                schema:
                  type: string
  '401':
    $ref: '#/components/responses/401'
  '403':
    description: unsuccessful creation of an SM context - forbidden
    content:
      application/json: # message without binary body part
        schema:
          $ref: '#/components/schemas/SmContextCreateError'
      application/problem+json:
        schema:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/ProblemDetails'
```

```
        multipart/related:  # message with binary body part(s)
          schema:
            type: object
            properties: # Request parts
              jsonData:
                $ref: '#/components/schemas/SmContextCreateError'
              binaryDataN1SmMessage:
                type: string
                format: binary
              binaryDataN2SmMessage:
                type: string
                format: binary
          encoding:
            jsonData:
              contentType:  application/json
            binaryDataN1SmMessage:
              contentType:  application/vnd.3gpp.5gnas
              headers:
                Content-Id:
                  schema:
                    type: string
            binaryDataN2SmMessage:
              contentType:  application/vnd.3gpp.ngap
              headers:
                Content-Id:
                  schema:
                    type: string
      '404':
        description: unsuccessful creation of an SM context - not found
        content:
          application/json: # message without binary body part
            schema:
              $ref: '#/components/schemas/SmContextCreateError'
          multipart/related:  # message with binary body part(s)
            schema:
              type: object
              properties: # Request parts
                jsonData:
                  $ref: '#/components/schemas/SmContextCreateError'
                binaryDataN1SmMessage:
                  type: string
                  format: binary
                binaryDataN2SmMessage:
                  type: string
                  format: binary
            encoding:
              jsonData:
                contentType:  application/json
              binaryDataN1SmMessage:
                contentType:  application/vnd.3gpp.5gnas
                headers:
                  Content-Id:
                    schema:
                      type: string
              binaryDataN2SmMessage:
                contentType:  application/vnd.3gpp.ngap
                headers:
                  Content-Id:
                    schema:
                      type: string
      '411':
        $ref: 'TS29571_CommonData.yaml#/components/responses/411'
      '413':
        $ref: '#/components/responses/413'
      '415':
        $ref: '#/components/responses/415'
      '429':
        $ref: '#/components/responses/429'
      '500':
        description: unsuccessful creation of an SM context - internal server error
        content:
          application/json: # message without binary body part
            schema:
              $ref: '#/components/schemas/SmContextCreateError'
          application/problem+json:
            schema:
              $ref: 'TS29571_CommonData.yaml#/components/schemas/ProblemDetails'
          multipart/related:  # message with binary body part(s)
```

```
          schema:
            type: object
            properties: # Request parts
              jsonData:
                $ref: '#/components/schemas/SmContextCreateError'
              binaryDataN1SmMessage:
                type: string
                format: binary
              binaryDataN2SmMessage:
                type: string
                format: binary
          encoding:
            jsonData:
              contentType:  application/json
            binaryDataN1SmMessage:
              contentType:  application/vnd.3gpp.5gnas
              headers:
                Content-Id:
                  schema:
                    type: string
            binaryDataN2SmMessage:
              contentType:  application/vnd.3gpp.ngap
              headers:
                Content-Id:
                  schema:
                    type: string
    '502':
      description: unsuccessful creation of an SM context – Bad Gateway
      content:
        application/problem+json:
          schema:
            $ref: '#/components/schemas/ExtProblemDetails'
        multipart/related:  # message with binary body part(s)
          schema:
            type: object
            properties: # Request parts
              jsonData:
                $ref: '#/components/schemas/SmContextCreateError'
              binaryDataN1SmMessage:
                type: string
                format: binary
              binaryDataN2SmMessage:
                type: string
                format: binary
          encoding:
            jsonData:
              contentType:  application/json
            binaryDataN1SmMessage:
              contentType:  application/vnd.3gpp.5gnas
              headers:
                Content-Id:
                  schema:
                    type: string
            binaryDataN2SmMessage:
              contentType:  application/vnd.3gpp.ngap
              headers:
                Content-Id:
                  schema:
                    type: string
    '503':
      description: unsuccessful creation of an SM context - service unavailable
      content:
        application/json: # message without binary body part
          schema:
            $ref: '#/components/schemas/SmContextCreateError'
        application/problem+json:
          schema:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/ProblemDetails'
        multipart/related:  # message with binary body part(s)
          schema:
            type: object
            properties: # Request parts
              jsonData:
                $ref: '#/components/schemas/SmContextCreateError'
              binaryDataN1SmMessage:
                type: string
                format: binary
              binaryDataN2SmMessage:
```

```
                type: string
                format: binary
            encoding:
              jsonData:
                contentType:  application/json
              binaryDataN1SmMessage:
                contentType:  application/vnd.3gpp.5gnas
                headers:
                  Content-Id:
                    schema:
                      type: string
              binaryDataN2SmMessage:
                contentType:  application/vnd.3gpp.ngap
                headers:
                  Content-Id:
                    schema:
                      type: string
      '504':
        description: unsuccessful creation of an SM context - gateway timeout
        content:
          application/json: # message without binary body part
            schema:
              $ref: '#/components/schemas/SmContextCreateError'
          application/problem+json:
            schema:
              $ref: 'TS29571_CommonData.yaml#/components/schemas/ProblemDetails'
          multipart/related:  # message with binary body part(s)
            schema:
              type: object
              properties: # Request parts
                jsonData:
                  $ref: '#/components/schemas/SmContextCreateError'
                binaryDataN1SmMessage:
                  type: string
                  format: binary
                binaryDataN2SmMessage:
                  type: string
                  format: binary
            encoding:
              jsonData:
                contentType:  application/json
              binaryDataN1SmMessage:
                contentType:  application/vnd.3gpp.5gnas
                headers:
                  Content-Id:
                    schema:
                      type: string
              binaryDataN2SmMessage:
                contentType:  application/vnd.3gpp.ngap
                headers:
                  Content-Id:
                    schema:
                      type: string
      default:
        $ref: 'TS29571_CommonData.yaml#/components/responses/default'


  /sm-contexts/{smContextRef}/retrieve:
    post:
      summary:  Retrieve SM Context
      tags:
        - Individual SM context
      operationId: RetrieveSmContext
      parameters:
        - name: smContextRef
          in: path
          description:  SM context reference
          required: true
          schema:
            type: string
      requestBody:
        description: parameters used to retrieve the SM context
        required: false
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/SmContextRetrieveData'
      responses:
```

```
        '200':
          description: successful retrieval of an SM context
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/SmContextRetrievedData'
        '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'
        '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'
        '504':
          $ref: 'TS29571_CommonData.yaml#/components/responses/504'
        default:
          $ref: 'TS29571_CommonData.yaml#/components/responses/default'

  /sm-contexts/{smContextRef}/modify:
    post:
      summary:  Update SM Context
      tags:
        - Individual SM context
      operationId: UpdateSmContext
      parameters:
        - name: smContextRef
          in: path
          description:  SM context reference
          required: true
          schema:
            type: string
      requestBody:
        description: representation of the updates to apply to the SM context
        required: true
        content:
          application/json: # message without binary body part
            schema:
              $ref: '#/components/schemas/SmContextUpdateData'
          multipart/related:  # message with binary body part(s)
            schema:
              type: object
              properties: # Request parts
                jsonData:
                  $ref: '#/components/schemas/SmContextUpdateData'
                binaryDataN1SmMessage:
                  type: string
                  format: binary
                binaryDataN2SmInformation:
                  type: string
                  format: binary
                binaryDataN2SmInformationExt1:
                  type: string
                  format: binary
            encoding:
              jsonData:
                contentType:  application/json
              binaryDataN1SmMessage:
                contentType:  application/vnd.3gpp.5gnas
                headers:
```

```
            Content-Id:
              schema:
                type: string
        binaryDataN2SmInformation:
          contentType:  application/vnd.3gpp.ngap
          headers:
            Content-Id:
              schema:
                type: string
        binaryDataN2SmInformationExt1:
          contentType:  application/vnd.3gpp.ngap
          headers:
            Content-Id:
              schema:
                type: string
responses:
  '200':
    description: successful update of an SM context with content in the response
    content:
      application/json: # message without binary body part
        schema:
          $ref: '#/components/schemas/SmContextUpdatedData'
      multipart/related:  # message with binary body part(s)
        schema:
          type: object
          properties: # Request parts
            jsonData:
              $ref: '#/components/schemas/SmContextUpdatedData'
            binaryDataN1SmMessage:
              type: string
              format: binary
            binaryDataN2SmInformation:
              type: string
              format: binary
        encoding:
          jsonData:
            contentType:  application/json
          binaryDataN1SmMessage:
            contentType:  application/vnd.3gpp.5gnas
            headers:
              Content-Id:
                schema:
                  type: string
          binaryDataN2SmInformation:
            contentType:  application/vnd.3gpp.ngap
            headers:
              Content-Id:
                schema:
                  type: string
  '204':
    description: successful update of an SM context without content in the response
  '307':
    $ref: 'TS29571_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29571_CommonData.yaml#/components/responses/308'
  '400':
    description: unsuccessful update of an SM context - bad request
    content:
      application/json: # message without binary body part
        schema:
          $ref: '#/components/schemas/SmContextUpdateError'
      application/problem+json:
        schema:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/ProblemDetails'
      multipart/related:  # message with binary body part(s)
        schema:
          type: object
          properties: # Request parts
            jsonData:
              $ref: '#/components/schemas/SmContextUpdateError'
            binaryDataN1SmMessage:
              type: string
              format: binary
            binaryDataN2SmInformation:
              type: string
              format: binary
        encoding:
          jsonData:
```

```
          contentType:  application/json
        binaryDataN1SmMessage:
          contentType:  application/vnd.3gpp.5gnas
          headers:
            Content-Id:
              schema:
                type: string
        binaryDataN2SmInformation:
          contentType:  application/vnd.3gpp.ngap
          headers:
            Content-Id:
              schema:
                type: string
'401':
  $ref: '#/components/responses/401'
'403':
  description: unsuccessful update of an SM context - forbidden
  content:
    application/json: # message without binary body part
      schema:
        $ref: '#/components/schemas/SmContextUpdateError'
    application/problem+json:
      schema:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/ProblemDetails'
    multipart/related:  # message with binary body part(s)
      schema:
        type: object
        properties: # Request parts
          jsonData:
            $ref: '#/components/schemas/SmContextUpdateError'
          binaryDataN1SmMessage:
            type: string
            format: binary
          binaryDataN2SmInformation:
            type: string
            format: binary
      encoding:
        jsonData:
          contentType:  application/json
        binaryDataN1SmMessage:
          contentType:  application/vnd.3gpp.5gnas
          headers:
            Content-Id:
              schema:
                type: string
        binaryDataN2SmInformation:
          contentType:  application/vnd.3gpp.ngap
          headers:
            Content-Id:
              schema:
                type: string
'404':
  description: unsuccessful update of an SM context - not found
  content:
    application/json: # message without binary body part
      schema:
        $ref: '#/components/schemas/SmContextUpdateError'
    multipart/related:  # message with binary body part(s)
      schema:
        type: object
        properties: # Request parts
          jsonData:
            $ref: '#/components/schemas/SmContextUpdateError'
          binaryDataN1SmMessage:
            type: string
            format: binary
          binaryDataN2SmInformation:
            type: string
            format: binary
      encoding:
        jsonData:
          contentType:  application/json
        binaryDataN1SmMessage:
          contentType:  application/vnd.3gpp.5gnas
          headers:
            Content-Id:
              schema:
                type: string
```

```
        binaryDataN2SmInformation:
          contentType:  application/vnd.3gpp.ngap
          headers:
            Content-Id:
              schema:
                type: string
'411':
  $ref: 'TS29571_CommonData.yaml#/components/responses/411'
'413':
  $ref: '#/components/responses/413'
'415':
  $ref: '#/components/responses/415'
'429':
  $ref: '#/components/responses/429'
'500':
  description: unsuccessful update of an SM context - Internal server error
  content:
    application/json: # message without binary body part
      schema:
        $ref: '#/components/schemas/SmContextUpdateError'
    application/problem+json:
      schema:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/ProblemDetails'
    multipart/related:  # message with binary body part(s)
      schema:
        type: object
        properties: # Request parts
          jsonData:
            $ref: '#/components/schemas/SmContextUpdateError'
          binaryDataN1SmMessage:
            type: string
            format: binary
          binaryDataN2SmInformation:
            type: string
            format: binary
      encoding:
        jsonData:
          contentType:  application/json
        binaryDataN1SmMessage:
          contentType:  application/vnd.3gpp.5gnas
          headers:
            Content-Id:
              schema:
                type: string
        binaryDataN2SmInformation:
          contentType:  application/vnd.3gpp.ngap
          headers:
            Content-Id:
              schema:
                type: string
'502':
  description: unsuccessful update of an SM context – Bad Gateway
  content:
    application/problem+json:
      schema:
        $ref: '#/components/schemas/ExtProblemDetails'
    multipart/related:  # message with binary body part(s)
      schema:
        type: object
        properties: # Request parts
          jsonData:
            $ref: '#/components/schemas/SmContextUpdateError'
          binaryDataN1SmMessage:
            type: string
            format: binary
          binaryDataN2SmInformation:
            type: string
            format: binary
      encoding:
        jsonData:
          contentType:  application/json
        binaryDataN1SmMessage:
          contentType:  application/vnd.3gpp.5gnas
          headers:
            Content-Id:
              schema:
                type: string
        binaryDataN2SmInformation:
```

```
          contentType:  application/vnd.3gpp.ngap
          headers:
            Content-Id:
              schema:
                type: string
'503':
  description: unsuccessful update of an SM context - Service Unavailable
  content:
    application/json: # message without binary body part
      schema:
        $ref: '#/components/schemas/SmContextUpdateError'
    application/problem+json:
      schema:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/ProblemDetails'
    multipart/related:  # message with binary body part(s)
      schema:
        type: object
        properties: # Request parts
          jsonData:
            $ref: '#/components/schemas/SmContextUpdateError'
          binaryDataN1SmMessage:
            type: string
            format: binary
          binaryDataN2SmInformation:
            type: string
            format: binary
      encoding:
        jsonData:
          contentType:  application/json
        binaryDataN1SmMessage:
          contentType:  application/vnd.3gpp.5gnas
          headers:
            Content-Id:
              schema:
                type: string
        binaryDataN2SmInformation:
          contentType:  application/vnd.3gpp.ngap
          headers:
            Content-Id:
              schema:
                type: string
'504':
  description: unsuccessful update of an SM context - gateway timeout
  content:
    application/json: # message without binary body part
      schema:
        $ref: '#/components/schemas/SmContextUpdateError'
    application/problem+json:
      schema:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/ProblemDetails'
    multipart/related:  # message with binary body part(s)
      schema:
        type: object
        properties: # Request parts
          jsonData:
            $ref: '#/components/schemas/SmContextUpdateError'
          binaryDataN1SmMessage:
            type: string
            format: binary
          binaryDataN2SmInformation:
            type: string
            format: binary
      encoding:
        jsonData:
          contentType:  application/json
        binaryDataN1SmMessage:
          contentType:  application/vnd.3gpp.5gnas
          headers:
            Content-Id:
              schema:
                type: string
        binaryDataN2SmInformation:
          contentType:  application/vnd.3gpp.ngap
          headers:
            Content-Id:
              schema:
                type: string
default:
```

```
        $ref: 'TS29571_CommonData.yaml#/components/responses/default'

  /sm-contexts/{smContextRef}/release:
    post:
      summary:  Release SM Context
      tags:
        - Individual SM context
      operationId: ReleaseSmContext
      parameters:
        - name: smContextRef
          in: path
          description:  SM context reference
          required: true
          schema:
            type: string
      requestBody:
        description: representation of the data to be sent to the SMF when releasing the SM context
        required: false
        content:
          application/json: # message without binary body part
            schema:
              $ref: '#/components/schemas/SmContextReleaseData'
          multipart/related:  # message with binary body part(s)
            schema:
              type: object
              properties: # Request parts
                jsonData:
                  $ref: '#/components/schemas/SmContextReleaseData'
                binaryDataN2SmInformation:
                  type: string
                  format: binary
            encoding:
              jsonData:
                contentType:  application/json
              binaryDataN2SmInformation:
                contentType:  application/vnd.3gpp.ngap
                headers:
                  Content-Id:
                    schema:
                      type: string

      responses:
        '200':
          description: successful release of a PDU session with content in the response
          content:
            application/json: # message without binary body part
              schema:
                $ref: '#/components/schemas/SmContextReleasedData'
        '204':
          description: successful release of an SM context without content in the 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'
        '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:
          $ref: 'TS29571_CommonData.yaml#/components/responses/default'
```

```
  /sm-contexts/{smContextRef}/send-mo-data:
    post:
      summary:  Send MO Data
      tags:
        - Individual SM context
      operationId: SendMoData
      parameters:
        - name: smContextRef
          in: path
          description:  SM context reference
          required: true
          schema:
            type: string
      requestBody:
        description: representation of the content of Send MO Data Request
        required: true
        content:
          multipart/related:  # message with a binary body part
            schema:
              type: object
              properties:
                jsonData:
                  $ref: '#/components/schemas/SendMoDataReqData'
                binaryMoData:
                  type: string
                  format: binary
            encoding:
              jsonData:
                contentType:  application/json
              binaryMoData:
                contentType:  application/vnd.3gpp.5gnas
                headers:
                  Content-Id:
                    schema:
                      type: string
      responses:
        '204':
          description: successful sending of MO data
        '307':
          $ref: 'TS29571_CommonData.yaml#/components/responses/307'
        '308':
          $ref: 'TS29571_CommonData.yaml#/components/responses/308'
        '400':
          $ref: '#/components/responses/400'
        '401':
          $ref: '#/components/responses/401'
        '403':
          $ref: '#/components/responses/403'
        '404':
          $ref: '#/components/responses/404'
        '411':
          $ref: 'TS29571_CommonData.yaml#/components/responses/411'
        '413':
          $ref: '#/components/responses/413'
        '415':
          $ref: '#/components/responses/415'
        '429':
          $ref: '#/components/responses/429'
        '500':
          $ref: '#/components/responses/500'
        '502':
          $ref: '#/components/responses/502'
        '503':
          $ref: '#/components/responses/503'
        default:
          $ref: 'TS29571_CommonData.yaml#/components/responses/default'

  /pdu-sessions:
    post:
      summary:  Create
      tags:
        - PDU sessions collection
      operationId: PostPduSessions
      requestBody:
        description: representation of the PDU session to be created in the H-SMF or SMF
        required: true
        content:
```

```
      application/json: # message without binary body part
        schema:
          $ref: '#/components/schemas/PduSessionCreateData'
      multipart/related:  # message with binary body part(s)
        schema:
          type: object
          properties: # Request parts
            jsonData:
              $ref: '#/components/schemas/PduSessionCreateData'
            binaryDataN1SmInfoFromUe:
              type: string
              format: binary
            binaryDataUnknownN1SmInfo:
              type: string
              format: binary
        encoding:
          jsonData:
            contentType:  application/json
          binaryDataN1SmInfoFromUe:
            contentType:  application/vnd.3gpp.5gnas
            headers:
              Content-Id:
                schema:
                  type: string
          binaryDataUnknownN1SmInfo:
            contentType:  application/vnd.3gpp.5gnas
            headers:
              Content-Id:
                schema:
                  type: string
callbacks:
  statusNotification:
    '{$request.body#/vsmfPduSessionUri}':
      post:
        summary:  Notify Status
        tags:
          - Individual PDU session (V-SMF)
        operationId: NotifyStatus
        requestBody:
          $ref: '#/components/requestBodies/NotifyStatusRequestBody'
        responses:
          '204':
            description: successful notificationof the status change
          '307':
            $ref: 'TS29571_CommonData.yaml#/components/responses/307'
          '308':
            $ref: 'TS29571_CommonData.yaml#/components/responses/308'
          '400':
            $ref: 'TS29571_CommonData.yaml#/components/responses/400'
          '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:
            $ref: 'TS29571_CommonData.yaml#/components/responses/default'
  statusNotification-ismf:
    '{$request.body#/ismfPduSessionUri}':
      post:
        summary:  Notify Status
        tags:
          - Individual PDU session (I-SMF)
        operationId: NotifyStatus-isfm
        requestBody:
          $ref: '#/components/requestBodies/NotifyStatusRequestBody'
```

```
      responses:
        '204':
          description: successful notificationof the status change
        '307':
          $ref: 'TS29571_CommonData.yaml#/components/responses/307'
        '308':
          $ref: 'TS29571_CommonData.yaml#/components/responses/308'
        '400':
          $ref: 'TS29571_CommonData.yaml#/components/responses/400'
        '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:
          $ref: 'TS29571_CommonData.yaml#/components/responses/default'


  update:
    '{$request.body#/vsmfPduSessionUri}/modify':
      post:
        summary:  Update (initiated by H-SMF)
        tags:
          - Individual PDU session (V-SMF)
        operationId: ModifyPduSession
        requestBody:
          $ref: '#/components/requestBodies/VsmfUpdateRequestBody'
        responses:
          '200':
            $ref: '#/components/responses/VsmfUpdateResponse200'
          '204':
            description: successful update of a PDU session without content in the response
          '307':
            $ref: 'TS29571_CommonData.yaml#/components/responses/307'
          '308':
            $ref: 'TS29571_CommonData.yaml#/components/responses/308'
          '400':
            $ref: '#/components/responses/VsmfUpdateError'
          '403':
            $ref: '#/components/responses/VsmfUpdateError'
          '404':
            $ref: '#/components/responses/VsmfUpdateError'
          '409':
            $ref: '#/components/responses/VsmfUpdateError'
          '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: '#/components/responses/VsmfUpdateError'
          '502':
            $ref: 'TS29571_CommonData.yaml#/components/responses/502'
          '503':
            $ref: '#/components/responses/VsmfUpdateError'
          '504':
            $ref: '#/components/responses/VsmfUpdateError'
          default:
            $ref: 'TS29571_CommonData.yaml#/components/responses/default'

  update-ismf:
    '{$request.body#/ismfPduSessionUri}/modify':
```

```
    post:
      summary:  Update (initiated by SMF)
      tags:
        - Individual PDU session (I-SMF)
      operationId: ModifyPduSession-ismf
      requestBody:
        $ref: '#/components/requestBodies/VsmfUpdateRequestBody'
      responses:
        '200':
          $ref: '#/components/responses/VsmfUpdateResponse200'
        '204':
          description: successful update of a PDU session without content in the response
        '307':
          $ref: 'TS29571_CommonData.yaml#/components/responses/307'
        '308':
          $ref: 'TS29571_CommonData.yaml#/components/responses/308'
        '400':
          $ref: '#/components/responses/VsmfUpdateError'
        '403':
          $ref: '#/components/responses/VsmfUpdateError'
        '404':
          $ref: '#/components/responses/VsmfUpdateError'
        '409':
          $ref: '#/components/responses/VsmfUpdateError'
        '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: '#/components/responses/VsmfUpdateError'
        '502':
          $ref: 'TS29571_CommonData.yaml#/components/responses/502'
        '503':
          $ref: '#/components/responses/VsmfUpdateError'
        '504':
          $ref: '#/components/responses/VsmfUpdateError'
        default:
          $ref: 'TS29571_CommonData.yaml#/components/responses/default'

  transferMtData:
    '{$request.body#/vsmfPduSessionUri}/transfer-mt-data':
      post:
        summary:  Transfer MT Data (by H-SMF)
        tags:
          - Individual PDU session (V-SMF)
        operationId: TransferMtData
        requestBody:
          description: representation of the content of Transfer MT Data Request
          required: true
          content:
            multipart/related:  # message with a binary body part
              schema:
                type: object
                properties:
                  jsonData:
                    $ref: '#/components/schemas/TransferMtDataReqData'
                  binaryMtData:
                    type: string
                    format: binary
              encoding:
                jsonData:
                  contentType:  application/json
                binaryMtData:
                  contentType:  application/vnd.3gpp.5gnas
                  headers:
                    Content-Id:
                      schema:
                        type: string
        responses:
          '204':
            description: successful transfering of MT data
          '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'
          '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'
          '504':
            description: unsuccessful delivery of mobile terminated data - gateway timeout
            content:
              application/json:
                schema:
                  $ref: '#/components/schemas/TransferMtDataError'
        default:
          $ref: 'TS29571_CommonData.yaml#/components/responses/default'

  transferMtData-ismf:
    '{$request.body#/ismfPduSessionUri}/transfer-mt-data':
      post:
        summary:  Transfer MT Data (by SMF)
        tags:
          - Individual PDU session (I-SMF)
        operationId: TransferMtData-ismf
        requestBody:
          description: representation of the content of Transfer MT Data Request
          required: true
          content:
            multipart/related:  # message with a binary body part
              schema:
                type: object
                properties:
                  jsonData:
                    $ref: '#/components/schemas/TransferMtDataReqData'
                  binaryMtData:
                    type: string
                    format: binary
              encoding:
                jsonData:
                  contentType:  application/json
                binaryMtData:
                  contentType:  application/vnd.3gpp.5gnas
                  headers:
                    Content-Id:
                      schema:
                        type: string
        responses:
          '204':
            description: successful transfering of MT data
          '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'
          '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'
            '504':
              description: unsuccessful delivery of mobile terminated data - gateway timeout
              content:
                application/json:
                  schema:
                    $ref: '#/components/schemas/TransferMtDataError'
            default:
              $ref: 'TS29571_CommonData.yaml#/components/responses/default'

    responses:
      '201':
        description: successful creation of a PDU session
        content:
          application/json: # message without binary body part
            schema:
              $ref: '#/components/schemas/PduSessionCreatedData'
          multipart/related:  # message with binary body part(s)
            schema:
              type: object
              properties: # Request parts
                jsonData:
                  $ref: '#/components/schemas/PduSessionCreatedData'
                binaryDataN1SmInfoToUe:
                  type: string
                  format: binary
            encoding:
              jsonData:
                contentType:  application/json
              binaryDataN1SmInfoToUe:
                contentType:  application/vnd.3gpp.5gnas
                headers:
                  Content-Id:
                    schema:
                      type: string
        headers:
          Location:
            description: >
              Contains the URI of the newly created resource, according to the structure:
              {apiRoot}/nsmf-pdusession/<apiVersion>/pdu-sessions/{pduSessionRef}
            required: true
            schema:
              type: string
      '307':
        $ref: 'TS29571_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29571_CommonData.yaml#/components/responses/308'
      '400':
        $ref: '#/components/responses/PduSessionCreateError'
      '401':
        $ref: 'TS29571_CommonData.yaml#/components/responses/401'
      '403':
        $ref: '#/components/responses/PduSessionCreateError'
      '404':
        $ref: '#/components/responses/PduSessionCreateError'
      '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: '#/components/responses/PduSessionCreateError'
      '502':
        $ref: 'TS29571_CommonData.yaml#/components/responses/502'
```

```
      '503':
        $ref: '#/components/responses/PduSessionCreateError'
      '504':
        $ref: '#/components/responses/PduSessionCreateError'
      default:
        $ref: 'TS29571_CommonData.yaml#/components/responses/default'

/pdu-sessions/{pduSessionRef}/modify:
  post:
    summary:  Update (initiated by V-SMF or I-SMF)
    tags:
      - Individual PDU session (H-SMF or SMF)
    operationId: UpdatePduSession
    parameters:
      - name: pduSessionRef
        in: path
        description:  PDU session reference
        required: true
        schema:
          type: string
    requestBody:
      description: representation of the updates to apply to the PDU session
      required: true
      content:
        application/json: # message without binary body part
          schema:
            $ref: '#/components/schemas/HsmfUpdateData'
        multipart/related:  # message with binary body part(s)
          schema:
            type: object
            properties: # Request parts
              jsonData:
                $ref: '#/components/schemas/HsmfUpdateData'
              binaryDataN1SmInfoFromUe:
                type: string
                format: binary
              binaryDataUnknownN1SmInfo:
                type: string
                format: binary
              binaryDataN4Information:
                type: string
                format: binary
              binaryDataN4InformationExt1:
                type: string
                format: binary
              binaryDataN4InformationExt2:
                type: string
                format: binary
          encoding:
            jsonData:
              contentType:  application/json
            binaryDataN1SmInfoFromUe:
              contentType:  application/vnd.3gpp.5gnas
              headers:
                Content-Id:
                  schema:
                    type: string
            binaryDataUnknownN1SmInfo:
              contentType:  application/vnd.3gpp.5gnas
              headers:
                Content-Id:
                  schema:
                    type: string
            binaryDataN4Information:
              contentType:  application/vnd.3gpp.pfcp
              headers:
                Content-Id:
                  schema:
                    type: string
            binaryDataN4InformationExt1:
              contentType:  application/vnd.3gpp.pfcp
              headers:
                Content-Id:
                  schema:
                    type: string
            binaryDataN4InformationExt2:
              contentType:  application/vnd.3gpp.pfcp
              headers:
```

```
            Content-Id:
              schema:
                type: string
responses:
  '200':
    description: successful update of a PDU session with content in the response
    content:
      application/json: # message without binary body part
        schema:
          $ref: '#/components/schemas/HsmfUpdatedData'
      multipart/related:  # message with binary body part(s)
        schema:
          type: object
          properties: # Request parts
            jsonData:
              $ref: '#/components/schemas/HsmfUpdatedData'
            binaryDataN1SmInfoToUe:
              type: string
              format: binary
            binaryDataN4Information:
              type: string
              format: binary
            binaryDataN4InformationExt1:
              type: string
              format: binary
            binaryDataN4InformationExt2:
              type: string
              format: binary
        encoding:
          jsonData:
            contentType:  application/json
          binaryDataN1SmInfoToUe:
            contentType:  application/vnd.3gpp.5gnas
            headers:
              Content-Id:
                schema:
                  type: string
          binaryDataN4Information:
            contentType:  application/vnd.3gpp.pfcp
            headers:
              Content-Id:
                schema:
                  type: string
          binaryDataN4InformationExt1:
            contentType:  application/vnd.3gpp.pfcp
            headers:
              Content-Id:
                schema:
                  type: string
          binaryDataN4InformationExt2:
            contentType:  application/vnd.3gpp.pfcp
            headers:
              Content-Id:
                schema:
                  type: string
  '204':
    description: successful update of a PDU session without content in the response
  '307':
    $ref: 'TS29571_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29571_CommonData.yaml#/components/responses/308'
  '400':
    $ref: '#/components/responses/HsmfUpdateError'
  '401':
    $ref: 'TS29571_CommonData.yaml#/components/responses/401'
  '403':
    $ref: '#/components/responses/HsmfUpdateError'
  '404':
    $ref: '#/components/responses/HsmfUpdateError'
  '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: '#/components/responses/HsmfUpdateError'
      '502':
        $ref: 'TS29571_CommonData.yaml#/components/responses/502'
      '503':
        $ref: '#/components/responses/HsmfUpdateError'
      default:
        $ref: 'TS29571_CommonData.yaml#/components/responses/default'

  /pdu-sessions/{pduSessionRef}/release:
    post:
      summary:  Release
      tags:
        - Individual PDU session (H-SMF or SMF)
      operationId: ReleasePduSession
      parameters:
        - name: pduSessionRef
          in: path
          description:  PDU session reference
          required: true
          schema:
            type: string
      requestBody:
        description: data sent to H-SMF or SMF when releasing the PDU session
        required: false
        content:
          application/json: # message without binary body part
            schema:
              $ref: '#/components/schemas/ReleaseData'
          multipart/related:  # message with binary body part(s)
            schema:
              type: object
              properties:
                jsonData:
                  $ref: '#/components/schemas/ReleaseData'
                binaryDataN4Information:
                  type: string
                  format: binary
                binaryDataN4InformationExt1:
                  type: string
                  format: binary
                binaryDataN4InformationExt2:
                  type: string
                  format: binary
            encoding:
              jsonData:
                contentType:  application/json
              binaryDataN4Information:
                contentType:  application/vnd.3gpp.pfcp
                headers:
                  Content-Id:
                    schema:
                      type: string
              binaryDataN4InformationExt1:
                contentType:  application/vnd.3gpp.pfcp
                headers:
                  Content-Id:
                    schema:
                      type: string
              binaryDataN4InformationExt2:
                contentType:  application/vnd.3gpp.pfcp
                headers:
                  Content-Id:
                    schema:
                      type: string

      responses:
        '200':
          description: successful release of a PDU session with content in the response
          content:
            application/json: # message without binary body part
              schema:
                $ref: '#/components/schemas/ReleasedData'
            multipart/related:  # message with binary body part(s)
              schema:
                type: object
                properties:
                  jsonData:
                    $ref: '#/components/schemas/ReleasedData'
```

```
                binaryDataN4Information:
                  type: string
                  format: binary
                binaryDataN4InformationExt1:
                  type: string
                  format: binary
                binaryDataN4InformationExt2:
                  type: string
                  format: binary
            encoding:
              jsonData:
                contentType:  application/json
              binaryDataN4Information:
                contentType:  application/vnd.3gpp.pfcp
                headers:
                  Content-Id:
                    schema:
                      type: string
              binaryDataN4InformationExt1:
                contentType:  application/vnd.3gpp.pfcp
                headers:
                  Content-Id:
                    schema:
                      type: string
              binaryDataN4InformationExt2:
                contentType:  application/vnd.3gpp.pfcp
                headers:
                  Content-Id:
                    schema:
                      type: string
      '204':
        description: successful release of a PDU session
      '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'
      '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:
        $ref: 'TS29571_CommonData.yaml#/components/responses/default'

  /pdu-sessions/{pduSessionRef}/retrieve:
    post:
      summary:  Retrieve
      tags:
        - Individual PDU session (H-SMF or SMF)
      operationId: RetrievePduSession
      parameters:
        - name: pduSessionRef
          in: path
          description:  PDU session reference
          required: true
          schema:
            type: string
      requestBody:
        description: representation of the content of the Retrieve Request
        required: true
        content:
```

```
        application/json:
          schema:
            $ref: '#/components/schemas/RetrieveData'
      responses:
        '200':
          description: successful information retrieval
          content:
            application/json: # message without binary body part
              schema:
                $ref: '#/components/schemas/RetrievedData'
        '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'
        '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'
        '504':
          $ref: 'TS29571_CommonData.yaml#/components/responses/504'
        default:
          $ref: 'TS29571_CommonData.yaml#/components/responses/default'

  /pdu-sessions/{pduSessionRef}/transfer-mo-data:
    post:
      summary:  Transfer MO Data
      tags:
        - Individual PDU session (H-SMF or SMF)
      operationId: TransferMoData
      parameters:
        - name: pduSessionRef
          in: path
          description:  PDU session reference
          required: true
          schema:
            type: string
      requestBody:
        description: representation of the content of Transfer MO Data Request
        required: true
        content:
          multipart/related:  # message with a binary body part
            schema:
              type: object
              properties:
                jsonData:
                  $ref: '#/components/schemas/TransferMoDataReqData'
                binaryMoData:
                  type: string
                  format: binary
            encoding:
              jsonData:
                contentType:  application/json
              binaryMoData:
                contentType:  application/vnd.3gpp.5gnas
                headers:
                  Content-Id:
                    schema:
                      type: string
      responses:
        '204':
```

```
          description: successful transfering of MO data
        '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'
        '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:
          $ref: 'TS29571_CommonData.yaml#/components/responses/default'

components:
  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{nrfApiRoot}/oauth2/token'
          scopes:
            nsmf-pdusession: Access to the nsmf-pdusession API

  schemas:
#
# STRUCTURED DATA TYPES
#
    SmContextCreateData:
      description: Data within Create SM Context Request
      type: object
      properties:
        supi:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Supi'
        unauthenticatedSupi:
          type: boolean
          default:  false
        roamingUeInd:
          type: boolean
        pei:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Pei'
        gpsi:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
        pduSessionId:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/PduSessionId'
        dnn:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnn'
        selectedDnn:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnn'
        sNssai:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
        altSnssai:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
        hplmnSnssai:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
        altHplmnSnssai:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
        servingNfId:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
        guami:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Guami'
        serviceName:
```

```
      $ref: 'TS29510_Nnrf_NFManagement.yaml#/components/schemas/ServiceName'
    servingNetwork:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/PlmnIdNid'
    requestType:
      $ref: '#/components/schemas/RequestType'
    n1SmMsg:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/RefToBinaryData'
    anType:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/AccessType'
    additionalAnType:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/AccessType'
    ratType:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/RatType'
    presenceInLadn:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/PresenceState'
    perLadnDnnSnssaiInd:
      type: boolean
      default: false
    ueLocation:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UserLocation'
    ueTimeZone:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/TimeZone'
    addUeLocation:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UserLocation'
    smContextStatusUri:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
    hSmfUri:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
    hSmfId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
    hSmfSetId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/NfSetId'
    smfUri:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
    smfId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
    smfSetId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/NfSetId'
    additionalHsmfUri:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
      minItems: 1
    additionalHsmfId:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
      minItems: 1
    additionalHsmfSetIdList:
      type: object
      description: >
        'Map carrying the SMF Set ID per additional H-SMF which supports SMF Set.
        The key of the map is the NF instance ID of the corresponding additional H-SMF'
      additionalProperties:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/NfSetId'
      minProperties: 1
    additionalSmfUri:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
      minItems: 1
    additionalSmfId:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
      minItems: 1
    additionalSmfSetIdList:
      type: object
      description: >
        'Map carrying the SMF Set ID per additional SMF which supports SMF Set.
        The key of the map is the NF instance ID of the corresponding additional SMF'
      additionalProperties:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/NfSetId'
      minProperties: 1
    oldPduSessionId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/PduSessionId'
    pduSessionsActivateList:
      type: array
```

```
    items:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/PduSessionId'
    minItems: 1
  ueEpsPdnConnection:
    $ref: '#/components/schemas/EpsPdnCnxContainer'
  hoState:
    $ref: '#/components/schemas/HoState'
  pcfId:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
  pcfGroupId:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/NfGroupId'
  pcfSetId:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/NfSetId'
  nrfUri:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
  supportedFeatures:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
  anchorSmfFeatures:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
  additionalAnchorSmfFeatures:
    type: array
    items:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
    minItems: 1
  selMode:
    $ref: '#/components/schemas/DnnSelectionMode'
  backupAmfInfo:
    type: array
    items:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/BackupAmfInfo'
    minItems: 1
  traceData:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/TraceData'
  udmGroupId:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/NfGroupId'
  routingIndicator:
    type: string
  hNwPubKeyId:
    type: integer
  epsInterworkingInd:
    $ref: '#/components/schemas/EpsInterworkingIndication'
  indirectForwardingFlag:
    type: boolean
  directForwardingFlag:
    type: boolean
  targetId:
    $ref: 'TS29518_Namf_Communication.yaml#/components/schemas/NgRanTargetId'
  epsBearerCtxStatus:
    $ref: '#/components/schemas/EpsBearerContextStatus'
  cpCiotEnabled:
    type: boolean
    default: false
  cpOnlyInd:
    type: boolean
    default: false
  invokeNef:
    type: boolean
    default: false
  maRequestInd:
    type: boolean
    default: false
  maNwUpgradeInd:
    type: boolean
    default: false
  n3gPathSwitchSupportInd:
    type: boolean
    default: false
  n2SmInfo:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/RefToBinaryData'
  n2SmInfoType:
    $ref: '#/components/schemas/N2SmInfoType'
  n2SmInfoExt1:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/RefToBinaryData'
  n2SmInfoTypeExt1:
    $ref: '#/components/schemas/N2SmInfoType'
  smContextRef:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
  smContextSmfPlmnId:
```

```
      $ref: 'TS29571_CommonData.yaml#/components/schemas/PlmnIdNid'
    smContextSmfId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
    smContextSmfSetId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/NfSetId'
    smContextSmfServiceSetId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/NfServiceSetId'
    smContextSmfBinding:
      $ref: 'TS29518_Namf_Communication.yaml#/components/schemas/SbiBindingLevel'
    upCnxState:
      $ref: '#/components/schemas/UpCnxState'
    smallDataRateStatus:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SmallDataRateStatus'
    apnRateStatus:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/ApnRateStatus'
    extendedNasSmTimerInd:
      type: boolean
      default: false
    dlDataWaitingInd:
      type: boolean
      default: false
    ddnFailureSubs:
      $ref: '#/components/schemas/DdnFailureSubs'
    smfTransferInd:
      type: boolean
      default: false
    oldSmfId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
    oldSmContextRef:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
    wAgfInfo:
      $ref: 'TS29510_Nnrf_NFManagement.yaml#/components/schemas/WAgfInfo'
    tngfInfo:
      $ref: 'TS29510_Nnrf_NFManagement.yaml#/components/schemas/TngfInfo'
    twifInfo:
      $ref: 'TS29510_Nnrf_NFManagement.yaml#/components/schemas/TwifInfo'
    ranUnchangedInd:
      type: boolean
    samePcfSelectionInd:
      type: boolean
      default: false
    targetDnai:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnai'
    nrfManagementUri:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
    nrfDiscoveryUri:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
    nrfAccessTokenUri:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
    nrfOauth2Required:
      type: object
      description: 'Map indicating whether the NRF requires Oauth2-based authorization for
      accessing its services. The key of the map shall be the name of an NRF service, e.g.
      "nnrf-nfm" or "nnrf-disc"'
      additionalProperties:
        type: boolean
      minProperties: 1
    smfBindingInfo:
      type: string
    pvsInfo:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/ServerAddressingInfo'
      minItems: 1
    onboardingInd:
      type: boolean
      default: false
    oldPduSessionRef:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
    smPolicyNotifyInd:
      type: boolean
      default: false
    pcfUeCallbackInfo:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/PcfUeCallbackInfo'
    satelliteBackhaulCat:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SatelliteBackhaulCategory'
    upipSupported:
      type: boolean
```

```
        default: false
      disasterRoamingInd:
        type: boolean
        default: false
      anchorSmfOauth2Required:
        type: boolean
      smContextSmfOauth2Required:
        type: boolean
      geoSatelliteId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/GeoSatelliteId'
      servingSatelliteId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/SatelliteId'
      hrsboAllowedInd:
        type: boolean
        default: false
      estabRejectionInd:
        type: boolean
        enum:
          - true
      estabRejectionCause:
        $ref: '#/components/schemas/EstablishmentRejectionCause'
      sliceAreaRestrictInd:
        type: boolean
        enum:
         - true
      qosMonitoringPdSupported:
        $ref: '#/components/schemas/QosMonitoringPdSupported'
      qosMonitoringPdMethods:
        type: array
        items:
          $ref: '#/components/schemas/QosMonitoringPdMethod'
        minItems: 1
      qosMonitoringCongestionSupported:
        $ref: '#/components/schemas/QosMonitoringCongestionSupported'
      availBitRateMonSupported:
        $ref: '#/components/schemas/AvailBitRateMonSupported'
      ueLevelMeasConfig:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/UeLevelMeasurementsConfiguration'
      pgwChangeInd:
        type: boolean
        enum:
          - true
      localOffloadingMgtAllowedInd:
        type: boolean
        enum:
         - true
      priorityUserInd:
        type: boolean
        enum:
         - true
    required:
      - servingNfId
      - servingNetwork
      - anType
      - smContextStatusUri

  SmContextCreatedData:
    description: Data within Create SM Context Response
    type: object
    properties:
      hSmfUri:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
      hSmfInstanceId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
      smfUri:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
      smfInstanceId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
      pduSessionId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/PduSessionId'
      sNssai:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
      additionalSnssai:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
      upCnxState:
        $ref: '#/components/schemas/UpCnxState'
      n2SmInfo:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/RefToBinaryData'
```

```
      n2SmInfoType:
        $ref: '#/components/schemas/N2SmInfoType'
      allocatedEbiList:
        type: array
        items:
          $ref: '#/components/schemas/EbiArpMapping'
        minItems: 1
      hoState:
        $ref: '#/components/schemas/HoState'
      gpsi:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
      smfServiceInstanceId:
        type: string
      recoveryTime:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
      supportedFeatures:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
      selectedSmfId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
      selectedOldSmfId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
      interPlmnApiRoot:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
      udmGroupId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/NfGroupId'
      pcfGroupId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/NfGroupId'
      pduSessionPrio:
        $ref: '#/components/schemas/PduSessionPriority'

  SmContextUpdateData:
    description: Data within Update SM Context Request
    type: object
    properties:
      pei:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Pei'
      servingNfId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
      guami:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Guami'
      servingNetwork:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/PlmnIdNid'
      backupAmfInfo:
        type: array
        items:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/BackupAmfInfo'
        minItems: 1
        nullable: true
      anType:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/AccessType'
      additionalAnType:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/AccessType'
      anTypeToReactivate:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/AccessType'
      anTypeOfN1N2Info:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/AccessType'
      ratType:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/RatType'
      presenceInLadn:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/PresenceState'
      ueLocation:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/UserLocation'
      ueTimeZone:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/TimeZone'
      addUeLocation:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/UserLocation'
      upCnxState:
        $ref: '#/components/schemas/UpCnxState'
      hoState:
        $ref: '#/components/schemas/HoState'
      toBeSwitched:
        type: boolean
        default: false
      failedToBeSwitched:
        type: boolean
      n1SmMsg:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/RefToBinaryData'
      n2SmInfo:
```

```
      $ref: 'TS29571_CommonData.yaml#/components/schemas/RefToBinaryData'
    n2SmInfoType:
      $ref: '#/components/schemas/N2SmInfoType'
    targetId:
      $ref: 'TS29518_Namf_Communication.yaml#/components/schemas/NgRanTargetId'
    targetServingNfId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
    smContextStatusUri:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
    dataForwarding:
      type: boolean
      default: false
    n9ForwardingTunnel:
      $ref: '#/components/schemas/TunnelInfo'
    n9DlForwardingTnlList:
      type: array
      items:
        $ref: '#/components/schemas/IndirectDataForwardingTunnelInfo'
      minItems: 1
    n9UlForwardingTnlList:
      type: array
      items:
        $ref: '#/components/schemas/IndirectDataForwardingTunnelInfo'
      minItems: 1
    n9DlForwardingTunnel:
      $ref: '#/components/schemas/TunnelInfo'
    n9InactivityTimer:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DurationSec'
    epsBearerSetup:
      type: array
      items:
        $ref: '#/components/schemas/EpsBearerContainer'
      minItems: 0
    revokeEbiList:
      type: array
      items:
        $ref: '#/components/schemas/EpsBearerId'
      minItems: 1
    release:
      type: boolean
      default: false
    cause:
      $ref: '#/components/schemas/Cause'
    ngApCause:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/NgApCause'
    5gMmCauseValue:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/5GMmCause'
    sNssai:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
    traceData:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/TraceData'
    epsInterworkingInd:
      $ref: '#/components/schemas/EpsInterworkingIndication'
    anTypeCanBeChanged:
      type: boolean
      default: false
    n2SmInfoExt1:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/RefToBinaryData'
    n2SmInfoTypeExt1:
      $ref: '#/components/schemas/N2SmInfoType'
    maReleaseInd:
      $ref: '#/components/schemas/MaReleaseIndication'
    maNwUpgradeInd:
      type: boolean
      default: false
    maRequestInd:
      type: boolean
      default: false
    n3gPathSwitchExecutionInd:
      type: boolean
      enum:
       - true
    exemptionInd:
      $ref: '#/components/schemas/ExemptionInd'
    supportedFeatures:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
    moExpDataCounter:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/MoExpDataCounter'
```

```
      extendedNasSmTimerInd:
        type: boolean
      forwardingFTeid:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Bytes'
      forwardingBearerContexts:
        type: array
        items:
          $ref: '#/components/schemas/ForwardingBearerContainer'
        minItems: 1
      ddnFailureSubs:
        $ref: '#/components/schemas/DdnFailureSubs'
      skipN2PduSessionResRelInd:
        type: boolean
        default: false
      secondaryRatUsageDataReportContainer:
        type: array
        items:
          $ref: '#/components/schemas/SecondaryRatUsageDataReportContainer'
        minItems: 1
      smPolicyNotifyInd:
        type: boolean
        enum:
         - true
      pcfUeCallbackInfo:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/PcfUeCallbackInfo'
      satelliteBackhaulCat:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/SatelliteBackhaulCategory'
      cnBasedMt:
        type: boolean
        enum:
         - true
      geoSatelliteId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/GeoSatelliteId'
      servingSatelliteId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/SatelliteId'
      altSnssai:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
      altHplmnSnssai:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
      nsReplTerminInd:
        type: boolean
        enum:
         - true
      sliceAreaRestrictInd:
        type: boolean
      qosMonitoringPdSupported:
        $ref: '#/components/schemas/QosMonitoringPdSupported'
      qosMonitoringPdMethods:
        type: array
        items:
          $ref: '#/components/schemas/QosMonitoringPdMethod'
        minItems: 1
      qosMonitoringCongestionSupported:
        $ref: '#/components/schemas/QosMonitoringCongestionSupported'
      availBitRateMonSupported:
        $ref: '#/components/schemas/AvailBitRateMonSupported'
      ueLevelMeasConfig:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/UeLevelMeasurementsConfiguration'
      udmGroupId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/NfGroupId'
      amfResynchedInd:
        type: boolean
        enum:
          - true
      localOffloadingMgtAllowedInd:
        type: boolean

    SmContextUpdatedData:
      description: Data within Update SM Context Response
      type: object
      properties:
        upCnxState:
          $ref: '#/components/schemas/UpCnxState'
        hoState:
          $ref: '#/components/schemas/HoState'
        releaseEbiList:
          type: array
          items:
```

```
          $ref: '#/components/schemas/EpsBearerId'
        minItems: 1
      allocatedEbiList:
        type: array
        items:
          $ref: '#/components/schemas/EbiArpMapping'
        minItems: 1
      modifiedEbiList:
        type: array
        items:
          $ref: '#/components/schemas/EbiArpMapping'
        minItems: 1
      n1SmMsg:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/RefToBinaryData'
      n2SmInfo:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/RefToBinaryData'
      n2SmInfoType:
        $ref: '#/components/schemas/N2SmInfoType'
      epsBearerSetup:
        type: array
        items:
          $ref: '#/components/schemas/EpsBearerContainer'
        minItems: 1
      dataForwarding:
        type: boolean
      n3DlForwardingTnlList:
        type: array
        items:
          $ref: '#/components/schemas/IndirectDataForwardingTunnelInfo'
        minItems: 1
      n3UlForwardingTnlList:
        type: array
        items:
          $ref: '#/components/schemas/IndirectDataForwardingTunnelInfo'
        minItems: 1
      n9UlForwardingTunnel:
        $ref: '#/components/schemas/TunnelInfo'
      cause:
        $ref: '#/components/schemas/Cause'
      maAcceptedInd:
        type: boolean
        default: false
      supportedFeatures:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
      forwardingFTeid:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Bytes'
      forwardingBearerContexts:
        type: array
        items:
          $ref: '#/components/schemas/ForwardingBearerContainer'
        minItems: 1
      selectedSmfId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
      selectedOldSmfId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
      interPlmnApiRoot:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
      anchorSmfFeatures:
        $ref: '#/components/schemas/AnchorSmfFeatures'
      pduSessionPrio:
        $ref: '#/components/schemas/PduSessionPriority'

  SmContextReleaseData:
    description: Data within Release SM Context Request
    type: object
    properties:
      cause:
        $ref: '#/components/schemas/Cause'
      ngApCause:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/NgApCause'
      5gMmCauseValue:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/5GMmCause'
      ueLocation:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/UserLocation'
      ueTimeZone:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/TimeZone'
      addUeLocation:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/UserLocation'
```

```
      vsmfReleaseOnly:
        type: boolean
        default: false
      n2SmInfo:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/RefToBinaryData'
      n2SmInfoType:
        $ref: '#/components/schemas/N2SmInfoType'
      ismfReleaseOnly:
        type: boolean
        default: false

    SmContextReleasedData:
      description: Data within Release SM Context Response
      type: object
      properties:
        smallDataRateStatus:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SmallDataRateStatus'
        apnRateStatus:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/ApnRateStatus'

    SmContextStatusNotification:
      description: Data within Notify SM Context Status Request
      type: object
      properties:
        statusInfo:
          $ref: '#/components/schemas/StatusInfo'
        smallDataRateStatus:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SmallDataRateStatus'
        apnRateStatus:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/ApnRateStatus'
        ddnFailureStatus:
          type: boolean
          default: false
        notifyCorrelationIdsForddnFailure:
          type: array
          items:
            type: string
          minItems: 1
        newIntermediateSmfId:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
        newSmfId:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
        newSmfSetId:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/NfSetId'
        oldSmfId:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
        oldSmContextRef:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
        altAnchorSmfUri:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
        altAnchorSmfId:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
        targetDnaiInfo:
          $ref: '#/components/schemas/TargetDnaiInfo'
        oldPduSessionRef:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
        interPlmnApiRoot:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
        targetDnai:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnai'
        oldGuami:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Guami'
      required:
        - statusInfo

    PduSessionCreateData:
      description: Data within Create Request
      type: object
      properties:
        supi:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Supi'
        unauthenticatedSupi:
          type: boolean
          default: false
        pei:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Pei'
        pduSessionId:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/PduSessionId'
```

```
dnn:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnn'
selectedDnn:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnn'
sNssai:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
altSnssai:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
hplmnSnssai:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
vsmfId:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
ismfId:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
iupfId:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
servingNetwork:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/PlmnIdNid'
requestType:
  $ref: '#/components/schemas/RequestType'
epsBearerId:
  type: array
  items:
    $ref: '#/components/schemas/EpsBearerId'
  minItems: 1
pgwS8cFteid:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/Bytes'
vsmfPduSessionUri:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
ismfPduSessionUri:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
vcnTunnelInfo:
  $ref: '#/components/schemas/TunnelInfo'
icnTunnelInfo:
  $ref: '#/components/schemas/TunnelInfo'
n9ForwardingTunnelInfo:
  $ref: '#/components/schemas/TunnelInfo'
additionalCnTunnelInfo:
  $ref: '#/components/schemas/TunnelInfo'
anType:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/AccessType'
additionalAnType:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/AccessType'
ratType:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/RatType'
ueLocation:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/UserLocation'
ueTimeZone:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/TimeZone'
addUeLocation:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/UserLocation'
gpsi:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
n1SmInfoFromUe:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/RefToBinaryData'
unknownN1SmInfo:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/RefToBinaryData'
supportedFeatures:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
hPcfId:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
pcfId:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
pcfGroupId:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/NfGroupId'
pcfSetId:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/NfSetId'
hoPreparationIndication:
  type: boolean
selMode:
  $ref: '#/components/schemas/DnnSelectionMode'
alwaysOnRequested:
  type: boolean
  default: false
udmGroupId:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/NfGroupId'
routingIndicator:
  type: string
```

```
        hNwPubKeyId:
          type: integer
        epsInterworkingInd:
          $ref: '#/components/schemas/EpsInterworkingIndication'
        vSmfServiceInstanceId:
          type: string
        iSmfServiceInstanceId:
          type: string
        recoveryTime:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
        roamingChargingProfile:
          $ref: 'TS32291_Nchf_ConvergedCharging.yaml#/components/schemas/RoamingChargingProfile'
        chargingId:
          type: string
          pattern: '^(0|([1-9]{1}[0-9]{0,9}))$'
        smfChargingId:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SmfChargingId'
        oldPduSessionId:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/PduSessionId'
        epsBearerCtxStatus:
          $ref: '#/components/schemas/EpsBearerContextStatus'
        amfNfId:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
        guami:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Guami'
        maxIntegrityProtectedDataRateUl:
          $ref: '#/components/schemas/MaxIntegrityProtectedDataRate'
        maxIntegrityProtectedDataRateDl:
          $ref: '#/components/schemas/MaxIntegrityProtectedDataRate'
        cpCiotEnabled:
          type: boolean
          default: false
        cpOnlyInd:
          type: boolean
          default: false
        invokeNef:
          type: boolean
          default: false
        maRequestInd:
          type: boolean
          default: false
        maNwUpgradeInd:
          type: boolean
          default: false
        dnaiList:
          type: array
          items:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnai'
          minItems: 1
        presenceInLadn:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/PresenceState'
        secondaryRatUsageInfo:
          type: array
          items:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/SecondaryRatUsageInfo'
          minItems: 1
        smallDataRateStatus:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SmallDataRateStatus'
        apnRateStatus:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/ApnRateStatus'
        dlServingPlmnRateCtl:
          type: integer
          minimum: 10
        upSecurityInfo:
          $ref: '#/components/schemas/UpSecurityInfo'
        vplmnQos:
          $ref: '#/components/schemas/VplmnQos'
        oldSmContextRef:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
        redundantPduSessionInfo:
          $ref: '#/components/schemas/RedundantPduSessionInformation'
        oldPduSessionRef:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
        smPolicyNotifyInd:
          type: boolean
          default: false
        pcfUeCallbackInfo:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/PcfUeCallbackInfo'
```

```
      satelliteBackhaulCat:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/SatelliteBackhaulCategory'
      upipSupported:
        type: boolean
        default: false
      upCnxState:
        $ref: '#/components/schemas/UpCnxState'
      disasterRoamingInd:
        type: boolean
        default: false
      hrsboInfo:
        $ref: '#/components/schemas/HrsboInfoFromVplmn'
      ecsAddrConfigInfos:
        type: array
        items:
          $ref: 'TS29503_Nudm_PP.yaml#/components/schemas/EcsAddrConfigInfo'
        minItems: 1
      localOffloadMgtInfo:
        $ref: '#/components/schemas/LocalOffloadingMgtInfoFromIsmf'
      pduSetSupportInd:
        type: boolean
        default: false
      ecnMarkingCongestionInfoStatus:
        type: array
        items:
          $ref: '#/components/schemas/EcnMarkingCongestionInfoStatus'
        minItems: 1
      qosMonitoringPdSupported:
        $ref: '#/components/schemas/QosMonitoringPdSupported'
      qosMonitoringPdMethods:
        type: array
        items:
          $ref: '#/components/schemas/QosMonitoringPdMethod'
        minItems: 1
      qosMonitoringCongestionSupported:
        $ref: '#/components/schemas/QosMonitoringCongestionSupported'
      availBitRateMonSupported:
        $ref: '#/components/schemas/AvailBitRateMonSupported'
      pgwChangeInd:
        type: boolean
        enum:
          - true
    required:
      - dnn
      - servingNetwork
      - anType
    oneOf:
      - required: [ vsmfId, vsmfPduSessionUri ]
      - required: [ ismfId, ismfPduSessionUri ]

  PduSessionCreatedData:
    description: Data within Create Response
    type: object
    properties:
      pduSessionType:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/PduSessionType'
      sscMode:
        type: string
        pattern: '^[0-7]$'
      hcnTunnelInfo:
        $ref: '#/components/schemas/TunnelInfo'
      cnTunnelInfo:
        $ref: '#/components/schemas/TunnelInfo'
      additionalCnTunnelInfo:
        $ref: '#/components/schemas/TunnelInfo'
      sessionAmbr:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Ambr'
      qosFlowsSetupList:
        type: array
        items:
          $ref: '#/components/schemas/QosFlowSetupItem'
        minItems: 1
      hSmfInstanceId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
      smfInstanceId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
      pduSessionId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/PduSessionId'
```

```
        sNssai:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
        additionalSnssai:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
        enablePauseCharging:
          type: boolean
          default: false
        ueIpv4Address:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv4Addr'
        ueIpv6Prefix:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv6Prefix'
        n1SmInfoToUe:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/RefToBinaryData'
        epsPdnCnxInfo:
          $ref: '#/components/schemas/EpsPdnCnxInfo'
        epsBearerInfo:
          type: array
          items:
            $ref: '#/components/schemas/EpsBearerInfo'
          minItems: 1
        supportedFeatures:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
        maxIntegrityProtectedDataRate:
          $ref: '#/components/schemas/MaxIntegrityProtectedDataRate'
        maxIntegrityProtectedDataRateDl:
          $ref: '#/components/schemas/MaxIntegrityProtectedDataRate'
        alwaysOnGranted:
          type: boolean
          default: false
        gpsi:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
        upSecurity:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/UpSecurity'
        roamingChargingProfile:
          $ref: 'TS32291_Nchf_ConvergedCharging.yaml#/components/schemas/RoamingChargingProfile'
        hSmfServiceInstanceId:
          type: string
        smfServiceInstanceId:
          type: string
        recoveryTime:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
        dnaiList:
          type: array
          items:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnai'
          minItems: 1
        ipv6MultiHomingInd:
          type: boolean
          default: false
        maAcceptedInd:
          type: boolean
          default: false
        homeProvidedChargingId:
          type: string
          pattern: '^(0|([1-9]{1}[0-9]{0,9}))$'
        homeProvidedSmfChargingId:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SmfChargingId'
        nefExtBufSupportInd:
          type: boolean
          default: false
        smallDataRateControlEnabled:
          type: boolean
          default: false
        ueIpv6InterfaceId:
          type: string
          pattern: '^[A-Fa-f0-9]{16}$'
        ipv6Index:
          $ref: 'TS29519_Policy_Data.yaml#/components/schemas/IpIndex'
        dnAaaAddress:
          $ref: '#/components/schemas/IpAddress'
        redundantPduSessionInfo:
          $ref: '#/components/schemas/RedundantPduSessionInformation'
        nspuSupportInd:
          type: boolean
        interPlmnApiRoot:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
        intraPlmnApiRoot:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
```

```
      udmGroupId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/NfGroupId'
      pcfGroupId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/NfGroupId'
      hrsboInfo:
        $ref: '#/components/schemas/HrsboInfoFromHplmn'
      localOffloadMgtInfo:
        $ref: '#/components/schemas/LocalOffloadingMgtInfoToIsmf'
      pendingUpdateInfoList:
        type: array
        items:
          $ref: '#/components/schemas/PendingUpdateInfo'
        minItems: 1
      uliChangeGranularity:
        $ref: '#/components/schemas/UliChangeGranularity'
    required:
      - pduSessionType
      - sscMode
    oneOf:
      - required: [ hSmfInstanceId ]
      - required: [ smfInstanceId ]

  HsmfUpdateData:
    description: Data within Update Request towards H-SMF, or from I-SMF to SMF
    type: object
    properties:
      requestIndication:
        $ref: '#/components/schemas/RequestIndication'
      pei:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Pei'
      vcnTunnelInfo:
        $ref: '#/components/schemas/TunnelInfo'
      icnTunnelInfo:
        $ref: '#/components/schemas/TunnelInfo'
      additionalCnTunnelInfo:
        $ref: '#/components/schemas/TunnelInfo'
      servingNetwork:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/PlmnIdNid'
      anType:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/AccessType'
      additionalAnType:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/AccessType'
      ratType:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/RatType'
      ueLocation:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/UserLocation'
      ueTimeZone:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/TimeZone'
      addUeLocation:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/UserLocation'
      pauseCharging:
        type: boolean
      pti:
        $ref: '#/components/schemas/ProcedureTransactionId'
      n1SmInfoFromUe:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/RefToBinaryData'
      unknownN1SmInfo:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/RefToBinaryData'
      qosFlowsRelNotifyList:
        type: array
        items:
          $ref: '#/components/schemas/QosFlowItem'
        minItems: 1
      qosFlowsVsmfRejectedList:
        type: array
        items:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Qfi'
        minItems: 1
      qosFlowsNotifyList:
        type: array
        items:
          $ref: '#/components/schemas/QosFlowNotifyItem'
        minItems: 1
      NotifyList:
        type: array
        items:
          $ref: '#/components/schemas/PduSessionNotifyItem'
        minItems: 1
```

```
# The attribute name does not follow the naming conventions specified in 3GPP TS 29.501. The
attribute name is kept though as defined in the current specification for backward compatibility
reason.
        epsBearerId:
          type: array
          items:
            $ref: '#/components/schemas/EpsBearerId'
          minItems: 0
        hoPreparationIndication:
          type: boolean
        revokeEbiList:
          type: array
          items:
            $ref: '#/components/schemas/EpsBearerId'
          minItems: 1
        cause:
          $ref: '#/components/schemas/Cause'
        ngApCause:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/NgApCause'
        5gMmCauseValue:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/5GMmCause'
        alwaysOnRequested:
          type: boolean
          default: false
        epsInterworkingInd:
          $ref: '#/components/schemas/EpsInterworkingIndication'
        secondaryRatUsageReport:
          type: array
          items:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/SecondaryRatUsageReport'
          minItems: 1
        secondaryRatUsageInfo:
          type: array
          items:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/SecondaryRatUsageInfo'
          minItems: 1
        anTypeCanBeChanged:
          type: boolean
          default: false
        maReleaseInd:
          $ref: '#/components/schemas/MaReleaseIndication'
        maNwUpgradeInd:
          type: boolean
          default: false
        maRequestInd:
          type: boolean
          default: false
        unavailableAccessInd:
          $ref: '#/components/schemas/UnavailableAccessIndication'
        psaInfo:
          type: array
          items:
            $ref: '#/components/schemas/PsaInformation'
          minItems: 1
        ulclBpInfo:
          $ref: '#/components/schemas/UlclBpInformation'
        n4Info:
          $ref: '#/components/schemas/N4Information'
        n4InfoExt1:
          $ref: '#/components/schemas/N4Information'
        n4InfoExt2:
          $ref: '#/components/schemas/N4Information'
        presenceInLadn:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/PresenceState'
        vsmfPduSessionUri:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
        vsmfId:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
        vSmfServiceInstanceId:
          type: string
        ismfPduSessionUri:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
        ismfId:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
        iupfId:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
        iSmfServiceInstanceId:
          type: string
```

```
        dlServingPlmnRateCtl:
          type: integer
          minimum: 10
          nullable: true
        dnaiList:
          type: array
          items:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnai'
          minItems: 1
        supportedFeatures:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
        roamingChargingProfile:
          $ref: 'TS32291_Nchf_ConvergedCharging.yaml#/components/schemas/RoamingChargingProfile'
        moExpDataCounter:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/MoExpDataCounter'
        vplmnQos:
          $ref: '#/components/schemas/VplmnQos'
        securityResult:
          $ref: '#/components/schemas/SecurityResult'
        upSecurityInfo:
          $ref: '#/components/schemas/UpSecurityInfo'
        amfNfId:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
        guami:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Guami'
        secondaryRatUsageDataReportContainer:
          type: array
          items:
            $ref: '#/components/schemas/SecondaryRatUsageDataReportContainer'
          minItems: 1
        smPolicyNotifyInd:
          type: boolean
          enum:
           - true
        pcfUeCallbackInfo:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/PcfUeCallbackInfo'
        satelliteBackhaulCat:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SatelliteBackhaulCategory'
        maxIntegrityProtectedDataRateUl:
          $ref: '#/components/schemas/MaxIntegrityProtectedDataRate'
        maxIntegrityProtectedDataRateDl:
          $ref: '#/components/schemas/MaxIntegrityProtectedDataRate'
        upCnxState:
          $ref: '#/components/schemas/UpCnxState'
        ecsAddrConfigInfos:
          type: array
          items:
            $ref: 'TS29503_Nudm_PP.yaml#/components/schemas/EcsAddrConfigInfo'
          minItems: 1
        hrsboInfo:
          $ref: '#/components/schemas/HrsboInfoFromVplmn'
        localOffloadMgtInfo:
          $ref: '#/components/schemas/LocalOffloadingMgtInfoFromIsmf'
        altSnssai:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
        nsReplTerminInd:
          type: boolean
          enum:
           - true
        disasterRoamingInd:
          type: boolean
          enum:
           - true
        pduSetSupportInd:
          type: boolean
        ecnMarkingCongestionInfoStatus:
          type: array
          items:
            $ref: '#/components/schemas/EcnMarkingCongestionInfoStatus'
          minItems: 1
        qosMonitoringPdSupported:
          $ref: '#/components/schemas/QosMonitoringPdSupported'
        qosMonitoringPdMethods:
          type: array
          items:
            $ref: '#/components/schemas/QosMonitoringPdMethod'
          minItems: 1
        qosMonitoringCongestionSupported:
```

```
        $ref: '#/components/schemas/QosMonitoringCongestionSupported'
      availBitRateMonSupported:
        $ref: '#/components/schemas/AvailBitRateMonSupported'
      udmGroupId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/NfGroupId'
      amfResynchedInd:
        type: boolean
        enum:
          - true
    required:
      - requestIndication

  HsmfUpdatedData:
    description: Data within Update Response from H-SMF, or from SMF to I-SMF
    type: object
    properties:
      n1SmInfoToUe:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/RefToBinaryData'
      n4Info:
        $ref: '#/components/schemas/N4Information'
      n4InfoExt1:
        $ref: '#/components/schemas/N4Information'
      n4InfoExt2:
        $ref: '#/components/schemas/N4Information'
      dnaiList:
        type: array
        items:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnai'
        minItems: 1
      supportedFeatures:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
      roamingChargingProfile:
        $ref: 'TS32291_Nchf_ConvergedCharging.yaml#/components/schemas/RoamingChargingProfile'
      homeProvidedChargingId:
        type: string
        pattern: '^(0|([1-9]{1}[0-9]{0,9}))$'
      homeProvidedSmfChargingId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/SmfChargingId'
      upSecurity:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/UpSecurity'
      maxIntegrityProtectedDataRateUl:
        $ref: '#/components/schemas/MaxIntegrityProtectedDataRate'
      maxIntegrityProtectedDataRateDl:
        $ref: '#/components/schemas/MaxIntegrityProtectedDataRate'
      ipv6MultiHomingInd:
        type: boolean
        default: false
      qosFlowsSetupList:
        type: array
        items:
          $ref: '#/components/schemas/QosFlowSetupItem'
        minItems: 1
      sessionAmbr:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Ambr'
      epsPdnCnxInfo:
        $ref: '#/components/schemas/EpsPdnCnxInfo'
      epsBearerInfo:
        type: array
        items:
          $ref: '#/components/schemas/EpsBearerInfo'
        minItems: 1
      pti:
        $ref: '#/components/schemas/ProcedureTransactionId'
      interPlmnApiRoot:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
      intraPlmnApiRoot:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
      hrsboInfo:
        $ref: '#/components/schemas/HrsboInfoFromHplmn'
      localOffloadMgtInfo:
        $ref: '#/components/schemas/LocalOffloadingMgtInfoToIsmf'
      uliChangeGranularity:
        $ref: '#/components/schemas/UliChangeGranularity'

  ReleaseData:
    description: Data within Release Request
    type: object
    properties:
```

```
      cause:
        $ref: '#/components/schemas/Cause'
      ngApCause:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/NgApCause'
      5gMmCauseValue:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/5GMmCause'
      ueLocation:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/UserLocation'
      ueTimeZone:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/TimeZone'
      addUeLocation:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/UserLocation'
      secondaryRatUsageReport:
        type: array
        items:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SecondaryRatUsageReport'
        minItems: 1
      secondaryRatUsageInfo:
        type: array
        items:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SecondaryRatUsageInfo'
        minItems: 1
      n4Info:
        $ref: '#/components/schemas/N4Information'
      n4InfoExt1:
        $ref: '#/components/schemas/N4Information'
      n4InfoExt2:
        $ref: '#/components/schemas/N4Information'

    ReleasedData:
      description: Data within Release Response
      type: object
      properties:
        smallDataRateStatus:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SmallDataRateStatus'
        apnRateStatus:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/ApnRateStatus'
        n4Info:
          $ref: '#/components/schemas/N4Information'
        n4InfoExt1:
          $ref: '#/components/schemas/N4Information'
        n4InfoExt2:
          $ref: '#/components/schemas/N4Information'

    VsmfUpdateData:
      description: Data within Update Request towards V-SMF, or from SMF to I-SMF
      type: object
      properties:
        requestIndication:
          $ref: '#/components/schemas/RequestIndication'
        sessionAmbr:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Ambr'
        qosFlowsAddModRequestList:
          type: array
          items:
            $ref: '#/components/schemas/QosFlowAddModifyRequestItem'
          minItems: 1
        qosFlowsRelRequestList:
          type: array
          items:
            $ref: '#/components/schemas/QosFlowReleaseRequestItem'
          minItems: 1
        epsBearerInfo:
          type: array
          items:
            $ref: '#/components/schemas/EpsBearerInfo'
          minItems: 1
        assignEbiList:
          type: array
          items:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/Arp'
          minItems: 1
        revokeEbiList:
          type: array
          items:
            $ref: '#/components/schemas/EpsBearerId'
          minItems: 1
        modifiedEbiList:
```

```
      type: array
      items:
        $ref: '#/components/schemas/EbiArpMapping'
      minItems: 1
    pti:
      $ref: '#/components/schemas/ProcedureTransactionId'
    n1SmInfoToUe:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/RefToBinaryData'
    alwaysOnGranted:
      type: boolean
      default: false
    hsmfPduSessionUri:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
    newSmfId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
    newSmfPduSessionUri:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
    supportedFeatures:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
    cause:
      $ref: '#/components/schemas/Cause'
    n1smCause:
      type: string
    backOffTimer:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DurationSec'
    maReleaseInd:
      $ref: '#/components/schemas/MaReleaseIndication'
    maAcceptedInd:
      type: boolean
      default: false
    additionalCnTunnelInfo:
      $ref: '#/components/schemas/TunnelInfo'
    dnaiList:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnai'
    n4Info:
      $ref: '#/components/schemas/N4Information'
    n4InfoExt1:
      $ref: '#/components/schemas/N4Information'
    n4InfoExt2:
      $ref: '#/components/schemas/N4Information'
    n4InfoExt3:
      $ref: '#/components/schemas/N4Information'
    smallDataRateControlEnabled:
      type: boolean
    qosMonitoringInfo:
      $ref: '#/components/schemas/QosMonitoringInfo'
    epsPdnCnxInfo:
      $ref: '#/components/schemas/EpsPdnCnxInfo'
    n9DataForwardingInd:
      type: boolean
      default: false
    n9InactivityTimer:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DurationSec'
    hrsboInfo:
      $ref: '#/components/schemas/HrsboInfoFromHplmn'
    localOffloadMgtInfo:
      $ref: '#/components/schemas/LocalOffloadingMgtInfoToIsmf'
    altHplmnSnssai:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
    pduSessionRetainInd:
      type: boolean
      enum:
       - true
    pendingUpdateInfoList:
      type: array
      items:
        $ref: '#/components/schemas/PendingUpdateInfo'
    netLocInfoReqInd:
      type: boolean
      enum:
        - true
    uliChangeGranularity:
      $ref: '#/components/schemas/UliChangeGranularity'
    serviceLevelAaContainer:
      $ref: '#/components/schemas/ServiceLevelAaContainer'
  required:
```

```
      - requestIndication

    VsmfUpdatedData:
      description: Data within Update Response from V-SMF, or from I-SMF to SMF
      type: object
      properties:
        qosFlowsAddModList:
          type: array
          items:
            $ref: '#/components/schemas/QosFlowItem'
          minItems: 1
        qosFlowsRelList:
          type: array
          items:
            $ref: '#/components/schemas/QosFlowItem'
          minItems: 1
        qosFlowsFailedtoAddModList:
          type: array
          items:
            $ref: '#/components/schemas/QosFlowItem'
          minItems: 1
        qosFlowsVsmfRejectedAddModList:
          type: array
          items:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/Qfi'
          minItems: 1
        qosFlowsFailedtoRelList:
          type: array
          items:
            $ref: '#/components/schemas/QosFlowItem'
          minItems: 1
        n1SmInfoFromUe:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/RefToBinaryData'
        unknownN1SmInfo:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/RefToBinaryData'
        ueLocation:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/UserLocation'
        ueTimeZone:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/TimeZone'
        addUeLocation:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/UserLocation'
        assignedEbiList:
          type: array
          items:
            $ref: '#/components/schemas/EbiArpMapping'
          minItems: 1
        failedToAssignEbiList:
          type: array
          items:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/Arp'
          minItems: 1
        releasedEbiList:
          type: array
          items:
            $ref: '#/components/schemas/EpsBearerId'
          minItems: 1
        secondaryRatUsageReport:
          type: array
          items:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/SecondaryRatUsageReport'
          minItems: 1
        secondaryRatUsageInfo:
          type: array
          items:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/SecondaryRatUsageInfo'
          minItems: 1
        n4Info:
          $ref: '#/components/schemas/N4Information'
        n4InfoExt1:
          $ref: '#/components/schemas/N4Information'
        n4InfoExt2:
          $ref: '#/components/schemas/N4Information'
        n4InfoExt3:
          $ref: '#/components/schemas/N4Information'
        modifiedEbiListNotDelivered:
          type: boolean
        ecnMarkingCongestionInfoStatus:
          type: array
```

```
        items:
          $ref: '#/components/schemas/EcnMarkingCongestionInfoStatus'
        minItems: 1
      pduSetSupportInd:
        type: boolean
      qosMonitoringPdSupported:
        $ref: '#/components/schemas/QosMonitoringPdSupported'
      qosMonitoringPdMethods:
        type: array
        items:
          $ref: '#/components/schemas/QosMonitoringPdMethod'
        minItems: 1
      qosMonitoringCongestionSupported:
        $ref: '#/components/schemas/QosMonitoringCongestionSupported'
      availBitRateMonSupported:
        $ref: '#/components/schemas/AvailBitRateMonSupported'
      serviceLevelAaContainer:
        $ref: '#/components/schemas/ServiceLevelAaContainer'

  StatusNotification:
    description: Data within Notify Status Request
    type: object
    properties:
      statusInfo :
        $ref: '#/components/schemas/StatusInfo'
      smallDataRateStatus:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/SmallDataRateStatus'
      apnRateStatus:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/ApnRateStatus'
      targetDnaiInfo:
        $ref: '#/components/schemas/TargetDnaiInfo'
      oldPduSessionRef:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
      newSmfId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
      epsPdnCnxInfo:
        $ref: '#/components/schemas/EpsPdnCnxInfo'
      interPlmnApiRoot:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
      intraPlmnApiRoot:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
    required:
      - statusInfo

  QosFlowItem:
    description: Individual QoS flow
    type: object
    properties:
      qfi:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Qfi'
      cause:
        $ref: '#/components/schemas/Cause'
      currentQosProfileIndex:
        type: integer
        minimum: 1
        maximum: 8
      nullQoSProfileIndex:
        type: boolean
      ngApCause:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/NgApCause'
    required:
      - qfi

  QosFlowSetupItem:
    description: Individual QoS flow to setup
    type: object
    properties:
      qfi:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Qfi'
      qosRules:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Bytes'
      protocDesc:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Bytes'
      ebi:
        $ref: '#/components/schemas/EpsBearerId'
      qosFlowDescription:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Bytes'
      qosFlowProfile:
```

```
        $ref: '#/components/schemas/QosFlowProfile'
      associatedAnType:
        $ref: '#/components/schemas/QosFlowAccessType'
      defaultQosRuleInd:
        type: boolean
      ecnMarkingCongestInfoReq:
        $ref: '#/components/schemas/EcnMarkingCongestionInfoReq'
      transpLevelMarkInd:
        type: boolean
        enum:
          - true
    required:
      - qfi
      - qosRules

  QosFlowAddModifyRequestItem:
    description: Individual QoS flow requested to be created or modified
    type: object
    properties:
      qfi:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Qfi'
      ebi:
        $ref: '#/components/schemas/EpsBearerId'
      qosRules:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Bytes'
      protocDesc:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Bytes'
      qosFlowDescription:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Bytes'
      qosFlowProfile:
        $ref: '#/components/schemas/QosFlowProfile'
      associatedAnType:
        $ref: '#/components/schemas/QosFlowAccessType'
      ecnMarkingCongestInfoReq:
        $ref: '#/components/schemas/EcnMarkingCongestionInfoReq'
      tscaiUl:
        $ref: '#/components/schemas/TscAssistanceInformation'
      tscaiDl:
        $ref: '#/components/schemas/TscAssistanceInformation'
      transpLevelMarkInd:
        type: boolean
        enum:
          - true
    required:
      - qfi

  QosFlowReleaseRequestItem:
    description: Individual QoS flow requested to be released
    type: object
    properties:
      qfi:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Qfi'
      qosRules:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Bytes'
      qosFlowDescription:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Bytes'
    required:
      - qfi

  QosFlowProfile:
    description: QoS flow profile
    type: object
    properties:
      5qi:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/5Qi'
      nonDynamic5Qi:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/NonDynamic5Qi'
      dynamic5Qi:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Dynamic5Qi'
      arp:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Arp'
      gbrQosFlowInfo:
        $ref: '#/components/schemas/GbrQosFlowInformation'
      rqa:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/ReflectiveQoSAttribute'
      additionalQosFlowInfo:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/AdditionalQosFlowInfo'
      qosMonitoringReq:
```

```
        $ref: '#/components/schemas/QosMonitoringReq'
      qosRepPeriod:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/DurationSec'
      pduSetQosDl:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/PduSetQosPara'
      pduSetQosUl:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/PduSetQosPara'
      dlPduSetMarkSupInd:
        type: boolean
        enum:
          - true
      multiModalId:
        $ref: 'TS29514_Npcf_PolicyAuthorization.yaml#/components/schemas/MultiModalId'
      ulBitrateAdaptInd:
        type: boolean
      noQosMonPdWoN3DlTeid:
        type: boolean
        enum:
          - true
    required:
      - 5qi

  GbrQosFlowInformation:
    description: GBR QoS flow information
    type: object
    properties:
      maxFbrDl:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/BitRate'
      maxFbrUl:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/BitRate'
      guaFbrDl:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/BitRate'
      guaFbrUl:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/BitRate'
      notifControl:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/NotificationControl'
      maxPacketLossRateDl:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/PacketLossRate'
      maxPacketLossRateUl:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/PacketLossRate'
      alternativeQosProfileList:
        type: array
        items:
          $ref: '#/components/schemas/AlternativeQosProfile'
      availBitrateMonReq:
        $ref: '#/components/schemas/AvailableBitrateMonitoringRequest'
    required:
      - maxFbrDl
      - maxFbrUl
      - guaFbrDl
      - guaFbrUl

  QosFlowNotifyItem:
    description: Notification related to a QoS flow
    type: object
    properties:
      qfi:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Qfi'
      notificationCause:
        $ref: '#/components/schemas/NotificationCause'
      currentQosProfileIndex:
        type: integer
        minimum: 1
        maximum: 8
      nullQoSProfileIndex:
        type: boolean
    required:
      - qfi
      - notificationCause


  SmContextRetrieveData:
    description: Data within Retrieve SM Context Request
    type: object
    properties:
      targetMmeCap:
        $ref: '#/components/schemas/MmeCapabilities'
      smContextType:
```

```
        $ref: '#/components/schemas/SmContextType'
      servingNetwork:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/PlmnId'
      notToTransferEbiList:
        type: array
        items:
          $ref: '#/components/schemas/EpsBearerId'
        minItems: 1
      ranUnchangedInd:
        type: boolean
        default: false
      hrsboSupportInd:
        type: boolean
        default: false
      ismfLomSupportInd:
        type: boolean
        default: false
      storedOffloadIds:
        type: array
        items:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/OffloadIdentifier'
        minItems: 1

  SmContextRetrievedData:
    description: Data within Retrieve SM Context Response
    type: object
    properties:
      ueEpsPdnConnection:
        $ref: '#/components/schemas/EpsPdnCnxContainer'
      smContext:
        $ref: '#/components/schemas/SmContext'
      smallDataRateStatus:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/SmallDataRateStatus'
      apnRateStatus:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/ApnRateStatus'
      dlDataWaitingInd:
        type: boolean
        default: false
      afCoordinationInfo:
        $ref: '#/components/schemas/AfCoordinationInfo'
    required:
      - ueEpsPdnConnection

  MmeCapabilities:
    description: MME capabilities
    type: object
    properties:
      nonIpSupported:
        type: boolean
        default: false
      ethernetSupported:
        type: boolean
        default: false
      upipSupported:
        type: boolean
        default: false

  TunnelInfo:
    description: Tunnel Information
    type: object
    properties:
      ipv4Addr:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv4Addr'
      ipv6Addr:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv6Addr'
      gtpTeid:
        $ref: '#/components/schemas/Teid'
      anType:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/AccessType'
    required:
      - gtpTeid

  StatusInfo:
    description: Status of SM context or of PDU session
    type: object
    properties:
      resourceStatus:
        $ref: '#/components/schemas/ResourceStatus'
```

```
      cause:
        $ref: '#/components/schemas/Cause'
      remoteError:
        type: boolean
      cnAssistedRanPara:
        $ref: '#/components/schemas/CnAssistedRanPara'
      anType:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/AccessType'
    required:
      - resourceStatus


  EpsPdnCnxInfo:
    description: EPS PDN Connection Information from H-SMF to V-SMF, or from SMF to I-SMF
    type: object
    properties:
      pgwS8cFteid:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Bytes'
      pgwNodeName:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Bytes'
      pgwChangeInfo:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Bytes'
      linkedBearerId:
        $ref: '#/components/schemas/EpsBearerId'
    required:
      - pgwS8cFteid

  EpsBearerInfo:
    description: EPS Bearer Information from H-SMF to V-SMF, or from SMF to I-SMF
    type: object
    properties:
      ebi:
        $ref: '#/components/schemas/EpsBearerId'
      pgwS8uFteid:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Bytes'
      bearerLevelQoS:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Bytes'
    required:
      - ebi
      - pgwS8uFteid
      - bearerLevelQoS

  PduSessionNotifyItem:
    description: Notification related to a PDU session
    type: object
    properties:
      notificationCause:
        $ref: '#/components/schemas/NotificationCause'
    required:
      - notificationCause

  EbiArpMapping:
    description: EBI to ARP mapping
    type: object
    properties:
      epsBearerId:
        $ref: '#/components/schemas/EpsBearerId'
      arp:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Arp'
    required:
      - epsBearerId
      - arp

  SmContextCreateError:
    description: Error within Create SM Context Response
    type: object
    properties:
      error:
        $ref: '#/components/schemas/ExtProblemDetails'
      n1SmMsg:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/RefToBinaryData'
      n2SmInfo:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/RefToBinaryData'
      n2SmInfoType:
        $ref: '#/components/schemas/N2SmInfoType'
      recoveryTime:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
    required:
```

```
      - error

    SmContextUpdateError:
      description: Error within Update SM Context Response
      type: object
      properties:
        error:
          $ref: '#/components/schemas/ExtProblemDetails'
        n1SmMsg:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/RefToBinaryData'
        n2SmInfo:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/RefToBinaryData'
        n2SmInfoType:
          $ref: '#/components/schemas/N2SmInfoType'
        upCnxState:
          $ref: '#/components/schemas/UpCnxState'
        recoveryTime:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
      required:
        - error

    PduSessionCreateError:
      description: Error within Create Response
      type: object
      properties:
        error:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/ProblemDetails'
        n1smCause:
          type: string
          pattern: '^[A-F0-9]{2}$'
        n1SmInfoToUe:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/RefToBinaryData'
        backOffTimer:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/DurationSec'
        recoveryTime:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
      required:
        - error

    HsmfUpdateError:
      description: Error within Update Response from H-SMF, or from SMF to I-SMF
      type: object
      properties:
        error:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/ProblemDetails'
        pti:
          $ref: '#/components/schemas/ProcedureTransactionId'
        n1smCause:
          type: string
          pattern: '^[A-F0-9]{2}$'
        n1SmInfoToUe:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/RefToBinaryData'
        backOffTimer:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/DurationSec'
        recoveryTime:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
      required:
        - error

    VsmfUpdateError:
      description: Error within Update Response from V-SMF, or from I-SMF to SMF
      type: object
      properties:
        error:
          $ref: '#/components/schemas/ExtProblemDetails'
        pti:
          $ref: '#/components/schemas/ProcedureTransactionId'
        n1smCause:
          type: string
          pattern: '^[A-F0-9]{2}$'
        n1SmInfoFromUe:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/RefToBinaryData'
        unknownN1SmInfo:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/RefToBinaryData'
        failedToAssignEbiList:
          type: array
          items:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/Arp'
```

```
        minItems: 1
      ngApCause:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/NgApCause'
      5gMmCauseValue:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/5GMmCause'
      recoveryTime:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
      n4Info:
        $ref: '#/components/schemas/N4Information'
      n4InfoExt1:
        $ref: '#/components/schemas/N4Information'
      n4InfoExt2:
        $ref: '#/components/schemas/N4Information'
      n4InfoExt3:
        $ref: '#/components/schemas/N4Information'
      retryAfter:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uinteger'
      maxWaitingTime:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/DurationSec'
    required:
      - error

  SmContext:
    description: Complete SM Context
    type: object
    properties:
      pduSessionId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/PduSessionId'
      dnn:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnn'
      selectedDnn:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnn'
      sNssai:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
      altSnssai:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
      hplmnSnssai:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
      altHplmnSnssai:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
      pduSessionType:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/PduSessionType'
      gpsi:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Gpsi'
      hSmfUri:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
      smfUri:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
      pduSessionRef:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
      interPlmnApiRoot:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
      intraPlmnApiRoot:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
      pcfId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
      pcfGroupId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/NfGroupId'
      pcfSetId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/NfSetId'
      selMode:
        $ref: '#/components/schemas/DnnSelectionMode'
      udmGroupId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/NfGroupId'
      routingIndicator:
        type: string
      hNwPubKeyId:
        type: integer
      sessionAmbr:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Ambr'
      qosFlowsList:
        type: array
        items:
          $ref: '#/components/schemas/QosFlowSetupItem'
        minItems: 1
      hSmfInstanceId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
      smfInstanceId:
```

```
      $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
    pduSessionSmfSetId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/NfSetId'
    pduSessionSmfServiceSetId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/NfServiceSetId'
    pduSessionSmfBinding:
      $ref: 'TS29518_Namf_Communication.yaml#/components/schemas/SbiBindingLevel'
    enablePauseCharging:
      type: boolean
      default: false
    ueIpv4Address:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv4Addr'
    ueIpv6Prefix:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv6Prefix'
    epsPdnCnxInfo:
      $ref: '#/components/schemas/EpsPdnCnxInfo'
    epsBearerInfo:
      type: array
      items:
        $ref: '#/components/schemas/EpsBearerInfo'
      minItems: 1
    maxIntegrityProtectedDataRate:
      $ref: '#/components/schemas/MaxIntegrityProtectedDataRate'
    maxIntegrityProtectedDataRateDl:
      $ref: '#/components/schemas/MaxIntegrityProtectedDataRate'
    alwaysOnGranted:
      type: boolean
      default: false
    upSecurity:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UpSecurity'
    hSmfServiceInstanceId:
      type: string
    smfServiceInstanceId:
      type: string
    recoveryTime:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
    forwardingInd:
      type: boolean
      default: false
    psaTunnelInfo:
      $ref: '#/components/schemas/TunnelInfo'
    chargingId:
      type: string
      pattern: '^(0|([1-9]{1}[0-9]{0,9}))$'
    smfChargingId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SmfChargingId'
    chargingInfo:
      $ref: 'TS29512_Npcf_SMPolicyControl.yaml#/components/schemas/ChargingInformation'
    roamingChargingProfile:
      $ref: 'TS32291_Nchf_ConvergedCharging.yaml#/components/schemas/RoamingChargingProfile'
    nefExtBufSupportInd:
      type: boolean
      default: false
    ipv6Index:
      $ref: 'TS29519_Policy_Data.yaml#/components/schemas/IpIndex'
    dnAaaAddress:
      $ref: '#/components/schemas/IpAddress'
    redundantPduSessionInfo:
      $ref: '#/components/schemas/RedundantPduSessionInformation'
    ranTunnelInfo:
      $ref: '#/components/schemas/QosFlowTunnel'
    addRanTunnelInfo:
      type: array
      items:
        $ref: '#/components/schemas/QosFlowTunnel'
      minItems: 1
    redRanTunnelInfo:
      $ref: '#/components/schemas/QosFlowTunnel'
    addRedRanTunnelInfo:
      type: array
      items:
        $ref: '#/components/schemas/QosFlowTunnel'
      minItems: 1
    nspuSupportInd:
      type: boolean
    smfBindingInfo:
      type: string
    satelliteBackhaulCat:
```

```
        $ref: 'TS29571_CommonData.yaml#/components/schemas/SatelliteBackhaulCategory'
      sscMode:
        type: string
        pattern: '^[0-7]$'
      dlsetSupportInd:
        type: boolean
      n9fscSupportInd:
        type: boolean
      anchorSmfOauth2Required:
        type: boolean
      fullDnaiList:
        type: array
        items:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnai'
        minItems: 1
      hrsboAuthReqInd:
        type: boolean
      hDnsAddr:
        $ref: '#/components/schemas/IpAddress'
      hPlmnAddr:
        $ref: '#/components/schemas/IpAddress'
      vplmnOffloadingInfoList:
        type: array
        items:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/VplmnOffloadingInfo'
        minItems: 1
      vplmnDlAmbr:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/VplmnDlAmbr'
      offloadIds:
        type: array
        items:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/OffloadIdentifier'
        minItems: 1
      targetDnai:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnai'
      trafficInfluInfo:
        $ref: '#/components/schemas/TrafficInfluenceInfo'
      pendingUpdateInfoList:
        type: array
        items:
          $ref: '#/components/schemas/PendingUpdateInfo'
        minItems: 1
      easInfoToRefresh:
        $ref: '#/components/schemas/EasInfoToRefresh'
      localOffloadingMgtAllowedInd:
        type: boolean
      dnsAddr:
        $ref: '#/components/schemas/IpAddress'
      psaUpfAddr:
        $ref: '#/components/schemas/IpAddress'
      localOffloadingInfoList:
        type: array
        items:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/LocalOffloadingManagementInfo'
        minItems: 1
      priorityUserInd:
        type: boolean
        enum:
         - true
      qosMonitoringInfo:
        $ref: '#/components/schemas/QosMonitoringInfo'
    required:
      - pduSessionId
      - dnn
      - sNssai
      - pduSessionType
      - sessionAmbr
      - qosFlowsList

  ExemptionInd:
    description: Exemption Indication
    type: object
    properties:
      dnnCongestion:
        type: boolean
        default: false
      snssaiOnlyCongestion:
        type: boolean
```

```
        default: false
      snssaiDnnCongestion:
        type: boolean
        default: false

  PsaInformation:
    description: PSA Information
    type: object
    properties:
      psaInd:
        $ref: '#/components/schemas/PsaIndication'
      dnaiList:
        type: array
        items:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnai'
        minItems: 1
      ueIpv6Prefix:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv6Prefix'
      psaUpfId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
      upfEvents:
        type: array
        items:
          $ref: 'TS29564_Nupf_EventExposure.yaml#/components/schemas/EventType'
        minItems: 1

  DnaiInformation:
    description: DNAI Information
    type: object
    properties:
      dnai:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnai'
      noDnaiChangeInd:
        type: boolean
      noLocalPsaChangeInd:
        type: boolean
    required:
      - dnai

  N4Information:
    description: N4 Information
    type: object
    properties:
      n4MessageType:
        $ref: '#/components/schemas/N4MessageType'
      n4MessagePayload:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/RefToBinaryData'
      n4DnaiInfo:
        $ref: '#/components/schemas/DnaiInformation'
      psaUpfId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
      ulClBpId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
      n9UlPdrIdList:
        type: array
        items:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint16'
        minItems: 1
    required:
      - n4MessageType
      - n4MessagePayload

  IndirectDataForwardingTunnelInfo:
    description: Indirect Data Forwarding Tunnel Information
    type: object
    properties:
      ipv4Addr:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv4Addr'
      ipv6Addr:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv6Addr'
      gtpTeid:
        $ref: '#/components/schemas/Teid'
      drbId:
        $ref: '#/components/schemas/DrbId'
      additionalTnlNb:
        $ref: '#/components/schemas/AdditionalTnlNb'
    required:
      - gtpTeid
```

```
      not:
        required: [ drbId, additionalTnlNb ]

    SendMoDataReqData:
      description: Data within Send MO Data Request
      type: object
      properties:
        moData:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/RefToBinaryData'
        moExpDataCounter:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/MoExpDataCounter'
        ueLocation:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/UserLocation'
      required:
        - moData

    CnAssistedRanPara:
      description: SMF derived CN assisted RAN parameters tuning
      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'
        trafficProfile:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/TrafficProfile'
        batteryIndication:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/BatteryIndication'

    UlclBpInformation:
      description: UL CL or BP Information
      type: object
      properties:
        ulclBpUpfId:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
        upfEvents:
          type: array
          items:
            $ref: 'TS29564_Nupf_EventExposure.yaml#/components/schemas/EventType'
          minItems: 1

    TransferMoDataReqData:
      description: Data within Transfer MO Data Request
      type: object
      properties:
        moData:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/RefToBinaryData'
        moExpDataCounter:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/MoExpDataCounter'
        ueLocation:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/UserLocation'
      required:
        - moData

    TransferMtDataReqData:
      description: Data within Transfer MT Data Request
      type: object
      properties:
        mtData:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/RefToBinaryData'
      required:
        - mtData

    TransferMtDataError:
      description: Transfer MT Data Error Response
      allOf:
      - $ref: '#/components/schemas/ExtProblemDetails'
      - $ref: '#/components/schemas/TransferMtDataAddInfo'

    TransferMtDataAddInfo:
      description: Transfer MT Data Error Response Additional Information
      type: object
```

```
    properties:
      maxWaitingTime:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/DurationSec'

  VplmnQos:
    description: VPLMN QoS
    type: object
    properties:
      5qi:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/5Qi'
      add5QiList:
        type: array
        items:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/5Qi'
        minItems: 1
      arp:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Arp'
      sessionAmbr:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Ambr'
      maxFbrDl:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/BitRate'
      maxFbrUl:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/BitRate'
      guaFbrDl:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/BitRate'
      guaFbrUl:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/BitRate'
      5qiPL:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/5QiPriorityLevel'

  DdnFailureSubs:
    description: DDN Failure Subscription
    type: object
    properties:
      ddnFailureSubsInd:
        type: boolean
        default: false
      ddnFailureSubsInfoList:
        type: array
        items:
          $ref: '#/components/schemas/DdnFailureSubInfo'
        minItems: 1

  DdnFailureSubInfo:
    description: DDN Failure Subscription Information
    type: object
    required:
      - notifyCorrelationId
    properties:
      notifyCorrelationId:
        type: string
      dddTrafficDescriptorList:
        type: array
        items:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/DddTrafficDescriptor'
        minItems: 1

  RetrieveData:
    description: Data within Retrieve Request
    type: object
    properties:
      smallDataRateStatusReq:
        type: boolean
        default: false
      pduSessionContextType:
        $ref: '#/components/schemas/PduSessionContextType'

  RetrievedData:
    description: Data within Retrieve Response
    type: object
    properties:
      smallDataRateStatus:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/SmallDataRateStatus'
      afCoordinationInfo:
        $ref: '#/components/schemas/AfCoordinationInfo'

  SecurityResult:
    description: Security Result
```

```
    type: object
    properties:
      integrityProtectionResult:
        $ref: '#/components/schemas/ProtectionResult'
      confidentialityProtectionResult:
        $ref: '#/components/schemas/ProtectionResult'

  UpSecurityInfo:
    description: User Plane Security Information
    type: object
    properties:
      upSecurity:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/UpSecurity'
      maxIntegrityProtectedDataRateUl:
        $ref: '#/components/schemas/MaxIntegrityProtectedDataRate'
      maxIntegrityProtectedDataRateDl:
        $ref: '#/components/schemas/MaxIntegrityProtectedDataRate'
      securityResult:
        $ref: '#/components/schemas/SecurityResult'
    required:
      - upSecurity

  AlternativeQosProfile:
    description: Alternative QoS Profile
    type: object
    properties:
      index:
        type: integer
        minimum: 1
        maximum: 8
      guaFbrDl:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/BitRate'
      guaFbrUl:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/BitRate'
      packetDelayBudget:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/PacketDelBudget'
      packetErrRate:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/PacketErrRate'
      maxDataBurstVol:
        type: integer
        minimum: 1
        maximum: 2000000
      pduSetQosDl:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/PduSetQosPara'
      pduSetQosUl:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/PduSetQosPara'
    required:
      - index

  ExtProblemDetails:
    description: Extended Problem Details
    allOf:
    - $ref: 'TS29571_CommonData.yaml#/components/schemas/ProblemDetails'
    - $ref: '#/components/schemas/ProblemDetailsAddInfo'


  ProblemDetailsAddInfo:
    description: Problem Details Additional Information
    type: object
    properties:
      remoteError:
        type: boolean

  QosMonitoringInfo:
    description: QoS Monitoring Information
    type: object
    properties:
      qosMonitoringInd:
        type: boolean
        default: false

  IpAddress:
    description: IP Address
    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'

  RedundantPduSessionInformation:
    description: Redundant PDU Session Information
    type: object
    properties:
      rsn:
        $ref: '#/components/schemas/Rsn'
      pduSessionPairId:
        type: integer
        minimum: 0
        maximum: 255
    required:
      - rsn

  QosFlowTunnel:
    description: Tunnel Information per QoS Flow
    type: object
    properties:
      qfiList:
        type: array
        items:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Qfi'
        minItems: 1
      tunnelInfo:
        $ref: '#/components/schemas/TunnelInfo'
    required:
      - qfiList
      - tunnelInfo

  TargetDnaiInfo:
    description: Target DNAI Information
    type: object
    properties:
      targetDnai:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnai'
      smfSelectionType:
        $ref: '#/components/schemas/SmfSelectionType'
    required:
      - smfSelectionType

  AfCoordinationInfo:
    description: AF Coordination Information
    type: object
    properties:
      sourceDnai:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnai'
      sourceUeIpv4Addr:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv4Addr'
      sourceUeIpv6Prefix:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv6Prefix'
      notificationInfoList:
        type: array
        items:
          $ref: '#/components/schemas/NotificationInfo'
        minItems: 1

  NotificationInfo:
    description: >
      Notification Correlation ID and Notification URI provided by the NF service consumer
    type: object
    properties:
      notifId:
        type: string
      notifUri:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
      upBufferInd:
        type: boolean
        default: false
```

```
      required:
        - notifId
        - notifUri

    AnchorSmfFeatures:
      description: Anchor SMF supported features
      type: object
      properties:
        psetrSupportInd:
          type: boolean

    HrsboInfoFromVplmn:
      description: HR-SBO Information in request message
      type: object
      properties:
        hrsboAuthReqInd:
          type: boolean
          enum:
           - true
        vEasdfAddr:
          $ref: '#/components/schemas/IpAddress'
        localDnsAddr:
          $ref: '#/components/schemas/IpAddress'
        easRediscoveryInd:
          type: boolean
          enum:
           - true
        easInfoToRefresh:
          $ref: '#/components/schemas/EasInfoToRefresh'
        storedOffloadIds:
          type: array
          items:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/OffloadIdentifier'
          minItems: 1
        easIpReplSupportInd:
          type: boolean
          default: false
        vEasdfSecurityInfo:
          type: array
          items:
            $ref: '#/components/schemas/DnsServerSecurityInformation'
          minItems: 1
        localDnsSecurityInfo:
          type: array
          items:
            $ref: '#/components/schemas/DnsServerSecurityInformation'
          minItems: 1

    HrsboInfoFromHplmn:
      description: HR-SBO Information in response message
      type: object
      properties:
        hrsboAuthResult:
          type: boolean
        hDnsAddr:
          $ref: '#/components/schemas/IpAddress'
        hPlmnAddr:
          $ref: '#/components/schemas/IpAddress'
        vplmnOffloadingInfoList:
          type: array
          items:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/VplmnOffloadingInfo'
        vplmnDlAmbr:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/VplmnDlAmbr'
        offloadIds:
          type: array
          items:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/OffloadIdentifier'
        internalGroupIds:
          type: array
          items:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/GroupId'
          minItems: 1
        targetDnai:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnai'
        trafficInfluInfo:
          $ref: '#/components/schemas/TrafficInfluenceInfo'
```

```
    EasInfoToRefresh:
      description: EAS information to be refreshed for EAS re-discovery
      type: object
      properties:
        ipv4AddressRanges:
          type: array
          items:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv4AddressRange'
          minItems: 1
        ipv6AddressRanges:
          type: array
          items:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv6AddressRange'
          minItems: 1
        fqdnList:
          type: array
          items:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/Fqdn'
          minItems: 1

    EcnMarkingCongestionInfoReq:
      description: ECN Marking or Congestion Information Request
      type: object
      properties:
        ecnMarkingRanReq:
          $ref: '#/components/schemas/EcnMarkingReq'
        ecnMarkingUpfReq:
          $ref: '#/components/schemas/EcnMarkingReq'
        congestionInfoReq:
          $ref: '#/components/schemas/CongestionInfoReq'
      oneOf:
        - required: [ ecnMarkingRanReq ]
        - required: [ ecnMarkingUpfReq ]
        - required: [ congestionInfoReq ]

    EcnMarkingCongestionInfoStatus:
      description: ECN Marking or Congestion Information Status
      type: object
      properties:
        qfi:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Qfi'
        activationStatus:
          $ref: '#/components/schemas/ActivationStatus'
      required:
        - qfi
        - activationStatus

    TscAssistanceInformation:
      description: TSC Assistance Information
      type: object
      properties:
        periodicity:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
        n6JitterInformation:
          $ref: '#/components/schemas/N6JitterInformation'

    N6JitterInformation:
      description: Jitter information associated with the Periodicity in downlink
      type: object
      properties:
        lowerJitterInfo:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Int32'
        higherJitterInfo:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Int32'

    TrafficInfluenceInfo:
      description: Traffic influence information applicable at the VPLMN for an HR-SBO PDU session
      type: object
      properties:
        traffInfluData:
          type: array
          items:
            $ref: '#/components/schemas/TrafficInfluenceData'
          minItems: 1
        traffContDecs:
          type: object
          description: >
            Map of Traffic Control data policy decisions. The key used in this map for each entry
```

```
          is the tcId attribute of the corresponding TrafficControlData.
        additionalProperties:
          $ref: 'TS29512_Npcf_SMPolicyControl.yaml#/components/schemas/TrafficControlData'
        minProperties: 1

    TrafficInfluenceData:
      description: >
        Traffic influence data comprising the Service Data Flow description and the Application
        Function influence on traffic routing Enforcement Control parameters of a PCC rule.
      type: object
      properties:
        flowInfos:
          type: array
          items:
            $ref: 'TS29512_Npcf_SMPolicyControl.yaml#/components/schemas/FlowInformation'
          minItems: 1
          description: An array of IP flow packet filter information.
        appId:
          type: string
          description: A reference to the application detection filter configured at the UPF.
        precedence:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Uinteger'
        refTcData:
          type: array
          items:
            type: string
          minItems: 1
          maxItems: 1
          description: >
            A reference to the TrafficControlData policy decision type. It is the tcId described
            in clause 5.6.2.10 of 3GPP TS 29.512 [30].

    LocalOffloadingMgtInfoFromIsmf:
      description: >
        Information signaled by the I-SMF to the SMF for I-SMF based Local Offloading Management
      type: object
      properties:
        localOffloadingMgtAllowedInd:
          type: boolean
        easdfAddr:
          $ref: '#/components/schemas/IpAddress'
        easdfSecurityInfo:
          type: array
          items:
            $ref: '#/components/schemas/DnsServerSecurityInformation'
          minItems: 1
        easRediscoveryInd:
          type: boolean
          enum:
           - true
        easInfoToRefresh:
          $ref: '#/components/schemas/EasInfoToRefresh'
        storedOffloadIds:
          type: array
          items:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/OffloadIdentifier'
          minItems: 1

    LocalOffloadingMgtInfoToIsmf:
      description: >
        Information signaled by the SMF to the I-SMF for I-SMF based Local Offloading Management
      type: object
      properties:
        localOffloadingMgtAllowedInd:
          type: boolean
        dnsAddr:
          $ref: '#/components/schemas/IpAddress'
        psaUpfAddr:
          $ref: '#/components/schemas/IpAddress'
        localOffloadingInfoList:
          type: array
          items:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/LocalOffloadingManagementInfo'
        offloadIds:
          type: array
          items:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/OffloadIdentifier'
        trafficInfluInfo:
```

```
          $ref: '#/components/schemas/TrafficInfluenceInfo'

    AvailableBitrateMonitoringRequest:
      description: Available Bitrate Monitoring Request
      type: object
      properties:
        availBitrateReq:
          $ref: '#/components/schemas/AvailableBitrateRequest'
        availBitrateUlThrs:
          type: array
          items:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/BitRate'
          minItems: 1
          maxItems: 8
        availBitrateDlThrs:
          type: array
          items:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/BitRate'
          minItems: 1
          maxItems: 8
      required:
        - availBitrateReq

#
# SIMPLE DATA TYPES
#
    ProcedureTransactionId:
      description: Procedure Transaction Identifier
      type: integer
      minimum: 0
      maximum: 255

    EpsBearerId:
      description: EPS Bearer Identifier
      type: integer
      minimum: 0
      maximum: 15

    EpsPdnCnxContainer:
      description: UE EPS PDN Connection container from SMF to AMF
      type: string
      format: byte

    EpsBearerContainer:
      description: EPS Bearer container from SMF to AMF
      type: string
      format: byte

    Teid:
      type: string
      description: GTP Tunnel Endpoint Identifier
      pattern: '^[A-Fa-f0-9]{8}$'

    EpsBearerContextStatus:
      description: EPS bearer context status
      type: string
      pattern: '^[A-Fa-f0-9]{4}$'

    DrbId:
      description: Data Radio Bearer Identity
      type: integer
      minimum: 1
      maximum: 32

    AdditionalTnlNb:
      description: indicates first, second or third additional indirect data forwarding tunnel
      type: integer
      minimum: 1
      maximum: 3

    ForwardingBearerContainer:
      description: Forwarding Bearer Container
      type: string
      format: byte

    SecondaryRatUsageDataReportContainer:
      description: Secondary Rat Usage Data Report Container
      type: string
```

```
      format: byte

    DnsServerSecurityInformation:
      description: DNS server security information
      type: string
      format: byte

    PduSessionPriority:
      description: The priority of the PDU session
      type: integer

    ServiceLevelAaContainer:
      description: Service Level AA Container
      type: string
      format: byte

#
# ENUMERATIONS
#
    UpCnxState:
      anyOf:
      - type: string
        enum:
          - ACTIVATED
          - DEACTIVATED
          - ACTIVATING
          - SUSPENDED
      - 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: User Plane Connection State

    HoState:
      anyOf:
      - type: string
        enum:
          - NONE
          - PREPARING
          - PREPARED
          - COMPLETED
          - CANCELLED
      - 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: Handover state

    RequestType:
      anyOf:
      - type: string
        enum:
          - INITIAL_REQUEST
          - EXISTING_PDU_SESSION
          - INITIAL_EMERGENCY_REQUEST
          - EXISTING_EMERGENCY_PDU_SESSION
      - 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: Request Type in Create (SM context) service operation

    RequestIndication:
      anyOf:
      - type: string
        enum:
          - UE_REQ_PDU_SES_MOD
          - UE_REQ_PDU_SES_REL
          - PDU_SES_MOB
          - NW_REQ_PDU_SES_AUTH
          - NW_REQ_PDU_SES_MOD
          - NW_REQ_PDU_SES_REL
          - EBI_ASSIGNMENT_REQ
          - REL_DUE_TO_5G_AN_REQUEST
      - 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: Request Indication in Update (SM context) service operation

  NotificationCause:
    anyOf:
    - type: string
      enum:
        - QOS_FULFILLED
        - QOS_NOT_FULFILLED
        - QOS_NOT_FULFILLED_DL
        - QOS_NOT_FULFILLED_UL
        - UP_SEC_FULFILLED
        - UP_SEC_NOT_FULFILLED
    - 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: Cause for generating a notification

  Cause:
    anyOf:
    - type: string
      enum:
        - REL_DUE_TO_HO
        - EPS_FALLBACK
        - REL_DUE_TO_UP_SEC
        - DNN_CONGESTION
        - S_NSSAI_CONGESTION
        - REL_DUE_TO_REACTIVATION
        - 5G_AN_NOT_RESPONDING
        - REL_DUE_TO_SLICE_NOT_AVAILABLE
        - REL_DUE_TO_DUPLICATE_SESSION_ID
        - PDU_SESSION_STATUS_MISMATCH
        - HO_FAILURE
        - INSUFFICIENT_UP_RESOURCES
        - PDU_SESSION_HANDED_OVER
        - PDU_SESSION_RESUMED
        - CN_ASSISTED_RAN_PARAMETER_TUNING
        - ISMF_CONTEXT_TRANSFER
        - SMF_CONTEXT_TRANSFER
        - REL_DUE_TO_PS_TO_CS_HO
        - REL_DUE_TO_SUBSCRIPTION_CHANGE
        - HO_CANCEL
        - REL_DUE_TO_SLICE_NOT_AUTHORIZED
        - PDU_SESSION_HAND_OVER_FAILURE
        - DDN_FAILURE_STATUS
        - REL_DUE_TO_CP_ONLY_NOT_APPLICABLE
        - NOT_SUPPORTED_WITH_ISMF
        - CHANGED_ANCHOR_SMF
        - CHANGED_INTERMEDIATE_SMF
        - TARGET_DNAI_NOTIFICATION
        - REL_DUE_TO_VPLMN_QOS_FAILURE
        - REL_DUE_TO_SMF_NOT_SUPPORT_PSETR
        - REL_DUE_TO_SNPN_SNPN_MOBILITY
        - REL_DUE_TO_NO_HR_AGREEMENT
        - REL_DUE_TO_UNSPECIFIED_REASON
        - REL_DUE_TO_MOB_ACCESS_RESTRICTIONS
        - REL_DUE_TO_SLICE_INACTIVITY
        - REL_DUE_TO_NSI_NOT_AVAILABLE
        - REL_DUE_TO_SNSSAI_DENIED
        - REL_DUE_TO_DNN_DENIED
        - REL_DUE_TO_PDUTYPE_DENIED
        - REL_DUE_TO_SSC_DENIED
        - REL_DUE_TO_SUBSCRIPTION_DENIED
        - REL_DUE_TO_DNN_NOT_SUPPORTED
        - REL_DUE_TO_PDUTYPE_NOT_SUPPORTED
        - REL_DUE_TO_SSC_NOT_SUPPORTED
        - REL_DUE_TO_INSUFFICIENT_RESOURCES_SLICE
        - REL_DUE_TO_INSUFFICIENT_RESOURCES_SLICE_DNN
        - REL_DUE_TO_DNN_CONGESTION
        - REL_DUE_TO_S_NSSAI_CONGESTION
        - REL_DUE_TO_PEER_NOT_RESPONDING
        - REL_DUE_TO_NETWORK_FAILURE
        - REL_DUE_TO_UPF_NOT_RESPONDING
```

```
        - REL_DUE_TO_NO_EPS_5GS_CONTINUITY
        - REL_DUE_TO_NOT_SUPPORTED_WITH_ISMF
        - REL_DUE_TO_EXCEEDED_UE_SLICE_DATA_RATE
        - REL_DUE_TO_EXCEEDED_SLICE_DATA_RATE
        - REL_DUE_TO_CONTEXT_NOT_FOUND
        - REL_DUE_TO_MBSR_NOT_AUTHORIZED
        - DEACT_DUE_TO_UE_OUT_OF_SLICE_SUPPORT_AREA
        - REJECT_DUE_TO_N1_SM_ERROR
        - REL_DUE_TO_DUPLICATE_SESSION_EPDG
        - REL_DUE_TO_AF_REQUESTED_SLICE_REPLACEMENT
    - 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: Cause information

  ResourceStatus:
    anyOf:
    - type: string
      enum:
        - RELEASED
        - UNCHANGED
        - TRANSFERRED
        - UPDATED
        - ALT_ANCHOR_SMF
    - 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: Status of SM context or PDU session resource

  DnnSelectionMode:
    anyOf:
    - type: string
      enum:
        - VERIFIED
        - UE_DNN_NOT_VERIFIED
        - NW_DNN_NOT_VERIFIED
    - 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: DNN Selection Mode

  EpsInterworkingIndication:
    anyOf:
    - type: string
      enum:
        - NONE
        - WITH_N26
        - WITHOUT_N26
        - IWK_NON_3GPP
    - 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: EPS Interworking Indication

  N2SmInfoType:
    anyOf:
    - type: string
      enum:
        - PDU_RES_SETUP_REQ
        - PDU_RES_SETUP_RSP
        - PDU_RES_SETUP_FAIL
        - PDU_RES_REL_CMD
        - PDU_RES_REL_RSP
        - PDU_RES_MOD_REQ
        - PDU_RES_MOD_RSP
        - PDU_RES_MOD_FAIL
        - PDU_RES_NTY
        - PDU_RES_NTY_REL
        - PDU_RES_MOD_IND
        - PDU_RES_MOD_CFM
```

```
        - PATH_SWITCH_REQ
        - PATH_SWITCH_SETUP_FAIL
        - PATH_SWITCH_REQ_ACK
        - PATH_SWITCH_REQ_FAIL
        - HANDOVER_REQUIRED
        - HANDOVER_CMD
        - HANDOVER_PREP_FAIL
        - HANDOVER_REQ_ACK
        - HANDOVER_RES_ALLOC_FAIL
        - SECONDARY_RAT_USAGE
        - PDU_RES_MOD_IND_FAIL
        - UE_CONTEXT_RESUME_REQ
        - UE_CONTEXT_RESUME_RSP
        - UE_CONTEXT_SUSPEND_REQ
    - 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: N2 SM Information Type

  MaxIntegrityProtectedDataRate:
    anyOf:
    - type: string
      enum:
        - 64_KBPS
        - MAX_UE_RATE
    - 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: Maximum Integrity Protected Data Rate

  MaReleaseIndication:
    anyOf:
    - type: string
      enum:
        - REL_MAPDU_OVER_3GPP
        - REL_MAPDU_OVER_N3GPP
    - 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: Multi-Access PDU session release Indication

  SmContextType:
    anyOf:
    - type: string
      enum:
        - EPS_PDN_CONNECTION
        - SM_CONTEXT
        - AF_COORDINATION_INFO
    - type: string
      description: >
        This string provides forward-compatibility with future
        extensions to the enumeration but is not used to encode
        content defined in the present version of this API.
    description: Type of SM Context information

  PsaIndication:
    anyOf:
    - type: string
      enum:
        - PSA_INSERTED
        - PSA_REMOVED
        - PSA_INSERTED_ONLY
        - PSA_REMOVED_ONLY
    - 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: Indication of whether a PSA is inserted or removed

  N4MessageType:
    anyOf:
```

```
    - type: string
      enum:
        - PFCP_SES_EST_REQ
        - PFCP_SES_EST_RSP
        - PFCP_SES_MOD_REQ
        - PFCP_SES_MOD_RSP
        - PFCP_SES_DEL_REQ
        - PFCP_SES_DEL_RSP
        - PFCP_SES_REP_REQ
        - PFCP_SES_REP_RSP
    - 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: N4 Message Type

  QosFlowAccessType:
    anyOf:
    - type: string
      enum:
        - 3GPP
        - NON_3GPP
        - 3GPP_AND_NON_3GPP
    - 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: Access type associated with a QoS Flow

  UnavailableAccessIndication:
    anyOf:
    - type: string
      enum:
        - 3GA_UNAVAILABLE
        - N3GA_UNAVAILABLE
    - type: string
      description: >
        This string provides forward-compatibility with future
        extensions to the enumeration but is not used to encode
        content defined in the present version of this API.
    description: Indicates the access type of a MA PDU session that is unavailable

  ProtectionResult:
    anyOf:
    - type: string
      enum:
        - PERFORMED
        - NOT_PERFORMED
    - 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: Protection Result of the security policy indicated as "preferred"

  QosMonitoringReq:
    anyOf:
    - type: string
      enum:
        - UL
        - DL
        - BOTH
        - NONE
    - 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: QoS monitoring request

  Rsn:
    anyOf:
    - type: string
      enum:
        - V1
        - V2
```

```
        - NONE
    - 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: Redundancy Sequence Number

  SmfSelectionType:
    anyOf:
    - type: string
      enum:
        - CURRENT_PDU_SESSION
        - NEXT_PDU_SESSION
    - 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: Smf Selection Type

  PduSessionContextType:
    anyOf:
    - type: string
      enum:
        - AF_COORDINATION_INFO
    - type: string
      description: >
        This string provides forward-compatibility with future
        extensions to the enumeration but is not used to encode
        content defined in the present version of this API.
    description: Type of PDU Session information

  PendingUpdateInfo:
    anyOf:
    - type: string
      enum:
        - UE_LOCATION
        - TIMEZONE
        - ACCESS_TYPE
        - RAT_TYPE
        - AMF_ID
    - 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: Pending Update Information

  EstablishmentRejectionCause:
    anyOf:
    - type: string
      enum:
        - OPERATOR_DETERMINED_BARRING
    - 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: PDU Session Establishment Rejection Cause

  EcnMarkingReq:
    anyOf:
    - type: string
      enum:
        - UL
        - DL
        - BOTH
        - STOP
    - type: string
      description: >
        This string provides forward-compatibility with future
        extensions to the enumeration but is not used to encode
        content defined in the present version of this API.
    description: ECN Marking Request Type

  CongestionInfoReq:
    anyOf:
```

```
    - type: string
      enum:
        - UL
        - DL
        - BOTH
        - STOP
    - type: string
      description: >
        This string provides forward-compatibility with future
        extensions to the enumeration but is not used to encode
        content defined in the present version of this API.
    description: Congestion Information Request Type

  ActivationStatus:
    anyOf:
    - type: string
      enum:
        - ACTIVE
        - NOT_ACTIVE
    - 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: Activation Status

  QosMonitoringPdSupported:
    anyOf:
    - type: string
      enum:
        - SUPPORTED
        - NOT_SUPPORTED
        - UNKNOWN
    - type: string
      description: >
        This string provides forward-compatibility with future
        extensions to the enumeration but is not used to encode
        content defined in the present version of this API.
    description: QoS Monitoring for packet delay supported information

  QosMonitoringCongestionSupported:
    anyOf:
    - type: string
      enum:
        - SUPPORTED
        - NOT_SUPPORTED
        - UNKNOWN
    - type: string
      description: >
        This string provides forward-compatibility with future
        extensions to the enumeration but is not used to encode
        content defined in the present version of this API.
    description: QoS Monitoring for congestion supported information

  AvailableBitrateRequest:
    anyOf:
    - type: string
      enum:
        - UL
        - DL
        - BOTH
        - STOP
    - type: string
      description: >
        This string provides forward-compatibility with future
        extensions to the enumeration but is not used to encode
        content defined in the present version of this API.
    description: Available Bitrate Monitoring Request Type

  AvailBitRateMonSupported:
    anyOf:
    - type: string
      enum:
        - SUPPORTED
        - NOT_SUPPORTED
        - UNKNOWN
    - type: string
      description: >
```

```
          This string provides forward-compatibility with future
          extensions to the enumeration but is not used to encode
          content defined in the present version of this API.
      description: >
        Available bitrate monitoring supported information.

    UliChangeGranularity:
      anyOf:
      - type: string
        enum:
          - GNB
          - TAI
      - 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: ULI Change Granularity

    QosMonitoringPdMethod:
      anyOf:
      - type: string
        enum:
          - USING_TIMESTAMP
          - USING_GTP_U_PATH
      - 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: Supported Method(s) for QoS Monitoring for packet delay in the NG-RAN



#
# HTTP request bodies
#
  requestBodies:
    'VsmfUpdateRequestBody':
      description: representation of updates to apply to the PDU session
      required: true
      content:
        application/json:   # message without binary body part
          schema:
            $ref: '#/components/schemas/VsmfUpdateData'
        multipart/related:  # message with binary body part(s)
          schema:
            type: object
            properties:     # Request parts
              jsonData:
                $ref: '#/components/schemas/VsmfUpdateData'
              binaryDataN1SmInfoToUe:
                type: string
                format: binary
              binaryDataN4Information:
                type: string
                format: binary
              binaryDataN4InformationExt1:
                type: string
                format: binary
              binaryDataN4InformationExt2:
                type: string
                format: binary
              binaryDataN4InformationExt3:
                type: string
                format: binary
          encoding:
            jsonData:
              contentType:  application/json
            binaryDataN1SmInfoToUe:
              contentType:  application/vnd.3gpp.5gnas
              headers:
                Content-Id:
                  schema:
                    type: string
            binaryDataN4Information:
              contentType:  application/vnd.3gpp.pfcp
              headers:
```

```
                Content-Id:
                  schema:
                    type: string
            binaryDataN4InformationExt1:
              contentType:  application/vnd.3gpp.pfcp
              headers:
                Content-Id:
                  schema:
                    type: string
            binaryDataN4InformationExt2:
              contentType:  application/vnd.3gpp.pfcp
              headers:
                Content-Id:
                  schema:
                    type: string
            binaryDataN4InformationExt3:
              contentType:  application/vnd.3gpp.pfcp
              headers:
                Content-Id:
                  schema:
                    type: string

    'NotifyStatusRequestBody':
      description: representation of the status notification
      required: true
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/StatusNotification'

#
# HTTP responses
#
  responses:
    'VsmfUpdateResponse200':
      description: successful update of a PDU session with content in the response
      content:
        application/json: # message without binary body part
          schema:
            $ref: '#/components/schemas/VsmfUpdatedData'
        multipart/related:  # message with binary body part(s)
          schema:
            type: object
            properties: # Request parts
              jsonData:
                $ref: '#/components/schemas/VsmfUpdatedData'
              binaryDataN1SmInfoFromUe:
                type: string
                format: binary
              binaryDataUnknownN1SmInfo:
                type: string
                format: binary
              binaryDataN4Information:
                type: string
                format: binary
              binaryDataN4InformationExt1:
                type: string
                format: binary
              binaryDataN4InformationExt2:
                type: string
                format: binary
              binaryDataN4InformationExt3:
                type: string
                format: binary
            encoding:
              jsonData:
                contentType:  application/json
              binaryDataN1SmInfoFromUe:
                contentType:  application/vnd.3gpp.5gnas
                headers:
                  Content-Id:
                    schema:
                      type: string
              binaryDataUnknownN1SmInfo:
                contentType:  application/vnd.3gpp.5gnas
                headers:
                  Content-Id:
                    schema:
```

```
              type: string
        binaryDataN4Information:
          contentType:  application/vnd.3gpp.pfcp
          headers:
            Content-Id:
              schema:
                type: string
        binaryDataN4InformationExt1:
          contentType:  application/vnd.3gpp.pfcp
          headers:
            Content-Id:
              schema:
                type: string
        binaryDataN4InformationExt2:
          contentType:  application/vnd.3gpp.pfcp
          headers:
            Content-Id:
              schema:
                type: string
        binaryDataN4InformationExt3:
          contentType:  application/vnd.3gpp.pfcp
          headers:
            Content-Id:
              schema:
                type: string

'PduSessionCreateError':
  description: unsuccessful creation of a PDU session
  content:
    application/json: # message without binary body part
      schema:
        $ref: '#/components/schemas/PduSessionCreateError'
    application/problem+json:
      schema:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/ProblemDetails'
    multipart/related:  # message with binary body part(s)
      schema:
        type: object
        properties: # Request parts
          jsonData:
            $ref: '#/components/schemas/PduSessionCreateError'
          binaryDataN1SmInfoToUe:
            type: string
            format: binary
      encoding:
        jsonData:
          contentType:  application/json
        binaryDataN1SmInfoToUe:
          contentType:  application/vnd.3gpp.5gnas
          headers:
            Content-Id:
              schema:
                type: string

'HsmfUpdateError':
  description: unsuccessful update of a PDU session
  content:
    application/json: # message without binary body part
      schema:
        $ref: '#/components/schemas/HsmfUpdateError'
    application/problem+json:
      schema:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/ProblemDetails'
    multipart/related:  # message with binary body part(s)
      schema:
        type: object
        properties: # Request parts
          jsonData:
            $ref: '#/components/schemas/HsmfUpdateError'
          binaryDataN1SmInfoToUe:
            type: string
            format: binary
      encoding:
        jsonData:
          contentType:  application/json
        binaryDataN1SmInfoToUe:
          contentType:  application/vnd.3gpp.5gnas
          headers:
```

```
            Content-Id:
              schema:
                type: string

'VsmfUpdateError':
  description: unsuccessful update of a PDU session
  content:
    application/json: # message without binary body part
      schema:
        $ref: '#/components/schemas/VsmfUpdateError'
    application/problem+json:
      schema:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/ProblemDetails'
    multipart/related:  # message with binary body part(s)
      schema:
        type: object
        properties: # Request parts
          jsonData:
            $ref: '#/components/schemas/VsmfUpdateError'
          binaryDataN1SmInfoFromUe:
            type: string
            format: binary
          binaryDataUnknownN1SmInfo:
            type: string
            format: binary
          binaryDataN4Information:
            type: string
            format: binary
          binaryDataN4InformationExt1:
            type: string
            format: binary
          binaryDataN4InformationExt2:
            type: string
            format: binary
          binaryDataN4InformationExt3:
            type: string
            format: binary
      encoding:
        jsonData:
          contentType:  application/json
        binaryDataN1SmInfoFromUe:
          contentType:  application/vnd.3gpp.5gnas
          headers:
            Content-Id:
              schema:
                type: string
        binaryDataUnknownN1SmInfo:
          contentType:  application/vnd.3gpp.5gnas
          headers:
            Content-Id:
              schema:
                type: string
        binaryDataN4Information:
          contentType:  application/vnd.3gpp.pfcp
          headers:
            Content-Id:
              schema:
                type: string
        binaryDataN4InformationExt1:
          contentType:  application/vnd.3gpp.pfcp
          headers:
            Content-Id:
              schema:
                type: string
        binaryDataN4InformationExt2:
          contentType:  application/vnd.3gpp.pfcp
          headers:
            Content-Id:
              schema:
                type: string
        binaryDataN4InformationExt3:
          contentType:  application/vnd.3gpp.pfcp
          headers:
            Content-Id:
              schema:
                type: string

'400':
```

```
      description: Bad request
      content:
        application/problem+json:
          schema:
            $ref: '#/components/schemas/ExtProblemDetails'
    '401':
      description: Unauthorized
      content:
        application/problem+json:
          schema:
            $ref: '#/components/schemas/ExtProblemDetails'
    '403':
      description: Forbidden
      content:
        application/problem+json:
          schema:
            $ref: '#/components/schemas/ExtProblemDetails'
    '404':
      description: Not Found
      content:
        application/problem+json:
          schema:
            $ref: '#/components/schemas/ExtProblemDetails'
    '413':
      description: Content Too Large
      content:
        application/problem+json:
          schema:
            $ref: '#/components/schemas/ExtProblemDetails'
    '415':
      description: Unsupported Media Type
      content:
        application/problem+json:
          schema:
            $ref: '#/components/schemas/ExtProblemDetails'
    '429':
      description: Too Many Requests
      content:
        application/problem+json:
          schema:
            $ref: '#/components/schemas/ExtProblemDetails'
    '500':
      description: Internal Server Error
      content:
        application/problem+json:
          schema:
            $ref: '#/components/schemas/ExtProblemDetails'
    '502':
      description: Bad Gateway
      content:
        application/problem+json:
          schema:
            $ref: '#/components/schemas/ExtProblemDetails'
    '503':
      description: Service Unavailable
      content:
        application/problem+json:
          schema:
            $ref: '#/components/schemas/ExtProblemDetails'
```

Annex B (Informative): HTTP Multipart Messages

B.1 Example of HTTP multipart message

B.1.1 General

This clause provides a (partial) example of HTTP multipart message. The example does not aim to be a complete representation of the HTTP message, e.g. additional information or headers can be included.

This Annex is informative and the normative descriptions in this specification prevail over the description in this Annex if there is any difference.

B.1.2 Example HTTP multipart message with N1 SM Message binary data

```
POST /example.com/nsmf-pdusession/v1/sm-contexts HTTP/2
Content-Type: multipart/related; type="application/json"; boundary=----Boundary
Content-Length: xyz

------Boundary
Content-Type: application/json

{
    "supi": "imsi-<IMSI>",
    "pduSessionId": 235,
    "dnn": "<DNN>",
    "sNssai": {
      "sst": 0
    },
    "servingNfId": "<AMF Identifier>",
    "n1SmMsg": {
      "contentId": "n1msg"
    },
    "anType": "3GPP_ACCESS",
    "smContextStatusUri": "<URI>"
}
------Boundary
Content-Type: application/vnd.3gpp.5gnas
Content-Id: n1msg

{ … N1 SM Message binary data …}
------Boundary
```

Annex C (Normative): ABNF grammar for 3GPP SBI HTTP custom headers

C.1 General

This Annex contains a self-contained set of ABNF rules, comprising the re-used rules from IETF RFCs, and the rules defined by the 3GPP custom headers defined in this specification (see clause 6.1.2.3).

This grammar may be used as input to existing tools to help implementations to parse 3GPP custom headers.

C.2 ABNF definitions (Filename: "TS29502_CustomHeaders.abnf")

```
; ----------------------------------------
;   RFC 5234
; ----------------------------------------

HTAB  = %x09 ; horizontal tab

SP    = %x20

DIGIT = %x30-39 ; 0-9



; ----------------------------------------
;   RFC 9110
; ----------------------------------------

OWS = *( SP / HTAB )


date1       = day SP month SP year ; e.g., 02 Jun 1982

day         = 2DIGIT

month       = %x4A.61.6E ; "Jan", case-sensitive
            / %x46.65.62 ; "Feb", case-sensitive
            / %x4D.61.72 ; "Mar", case-sensitive
            / %x41.70.72 ; "Apr", case-sensitive
            / %x4D.61.79 ; "May", case-sensitive
            / %x4A.75.6E ; "Jun", case-sensitive
            / %x4A.75.6C ; "Jul", case-sensitive
            / %x41.75.67 ; "Aug", case-sensitive
            / %x53.65.70 ; "Sep", case-sensitive
            / %x4F.63.74 ; "Oct", case-sensitive
            / %x4E.6F.76 ; "Nov", case-sensitive
            / %x44.65.63 ; "Dec", case-sensitive

year        = 4DIGIT

day-name    = %x4D.6F.6E ; Mon
            / %x54.75.65 ; Tue
            / %x57.65.64 ; Wed
            / %x54.68.75 ; Thu
            / %x46.72.69 ; Fri
            / %x53.61.74 ; Sat
            / %x53.75.6E ; Sun

time-of-day = hour ":" minute ":" second

hour        = 2DIGIT

minute      = 2DIGIT

second      = 2DIGIT
```

```
; ----------------------------------------
;   3GPP TS 29.502
;
;   Version: 18.5.0 (December 2023)
;
;   (c) 2023, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
; ----------------------------------------

;
; Header: 3gpp-Sbi-Origination-Timestamp
;

Sbi-Origination-Timestamp-Header = "3gpp-Sbi-Origination-Timestamp:" OWS day-name ","
                                   SP date1 SP time-of-day "." milliseconds SP "GMT" OWS

milliseconds                     = 3DIGIT
```

Annex D (Informative): Charging Identifier Handling

D.1 Usage of Charging ID and SMF Charging ID

D.1.1 General

The Charging ID has been defined (from Rel-15 onwards) as a Uint32 value which is unique within one SMF (the V-SMF or H-SMF that assigns it). To avoid possible charging identifiers' collision in H-SMF for Home Routed PDU sessions, an SMF Charging ID has been defined (from Rel-18 onwards) as a string which contains the Uint32 value and the SMF NF Instance ID (see 3GPP TS 29.571 [13]).

This clause summarizes the principles on using Charging ID and SMF Charging ID for HR PDU sessions, especially when not all the V-SMF(s) and H-SMF of a PDU session support the SMF Charging ID.

This Annex is informative and the normative requirements in this specification or in other 3GPP specifications prevail over the description in this Annex if there is any difference.

D.1.2 HPLMN supporting the SMF Charging ID

An SMF, CHF and PCF complying with Rel-18 onwards support the SMF Charging ID.

If the HPLMN (H-SMF, CHF and PCF) supports the SMF Charging ID, the H-SMF indicates support of the SCID (String based Charging Identifier) feature (in its NF Profile in NRF and towards the V-SMF).

The HPLMN uses the SMF Charging ID as the charging identifier for the PDU session.

If the VPLMN supports the SMF Charging ID:

- The VPLMN uses the SMF Charging ID as the charging identifier for the PDU session.

If the VPLMN does not support the SMF Charging ID (e.g. the V-SMF complies with a release earlier than Rel-18):

- The VPLMN uses the Charging ID as the charging identifier for the PDU session.
- The VPLMN only provides the Charging ID to the H-SMF during the HR PDU session establishment. The H-SMF derives the SMF Charging ID using the received Charging ID and V-SMF Instance ID.

D.1.3 HPLMN not supporting the SMF Charging ID

When the HPLMN does not support the SMF Charging ID (e.g. the H-SMF complies with a release earlier than Rel-18), the charging identifier used by both the V-SMF and the H-SMF is the Charging ID.

NOTE: This applies even if the V-SMF supports the SCID feature.

D.1.4 Transfer of (SMF) Charging ID between SMFs

The following principles applies to support mobility scenarios where the source and/or target (V-) SMF may or may not support the SCID feature:

- During a HR PDU session establishment:
  - the V-SMF provides the Charging ID to the H-SMF; and
  - the V-SMF additionally provides the SMF Charging ID if both the V-SMF and H-SMF support the SCID feature.

- During a V-SMF change or insertion:
  - the Charging ID is passed from the source (V-)SMF to the target V-SMF;
  - the SMF Charging ID is also passed from the source (V-)SMF to the target V-SMF, if it is available at the source (V-)SMF and both the source and target (V-)SMFs support the SCID feature; and
  - the H-SMF provides the SMF Charging ID to the new V-SMF if both the H-SMF and the new V-SMF support the SCID feature.

NOTE: This enables the SMF Charging ID to be used by the new V-SMF and H-SMF, when both the new V-SMF and H-SMF support the SCID feature but the source V-SMF does not support the SCID feature.

- During EPS to 5GS mobility:
  - the H-SMF provides the Charging ID to the new V-SMF; and
  - the H-SMF additionally provides the SMF Charging ID to the new V-SMF if both the H-SMF and the V-SMF support the SCID feature.

Annex E (informative): Change history

Change history							
Date	Meeting	TDoc	CR	Rev	Cat	Subject/Comment	New version
2017-10	CT4#80	C4-175050				Initial Draft.	0.1.0
2017-10	CT4#80	C4-175392				Inclusion of pCRs agreed during CT4#80.	0.2.0
2017-12	CT4#81	C4-176435				Inclusion of pCRs agreed during CT4#81.	0.3.0
2018-01	CT4#82	C4-181389				Inclusion of pCRs agreed during CT4#82.	0.4.0
2018-03	CT4#83	C4-182432				Inclusion of pCRs agreed during CT4#83.	0.5.0
2018-03	CT#79	CP-180030				Presented for information	1.0.0
2018-04	CT4#84	C4-183514				Inclusion of pCRs agreed during CT4#84.	1.1.0
2018-05	CT4#85	C4-184619				Inclusion of pCRs agreed during CT4#85.	1.2.0
2018-06	CT#80	CP-181100				Presented for approval	2.0.0
2018-06	CT#80					Approved in CT#80.	15.0.0
2018-09	CT#81	CP-182055	0002		F	Corrections to missing application errors in API response body description	15.1.0
2018-09	CT#81	CP-182068	0006		B	Add support for 5G Trace	15.1.0
2018-09	CT#81	CP-182055	0007		F	Error Responses	15.1.0
2018-09	CT#81	CP-182055	0015		F	Network Sharing	15.1.0
2018-09	CT#81	CP-182055	0016		F	RAT Type in Create and Update (SM Context) service operations	15.1.0
2018-09	CT#81	CP-182055	0001	1	F	Application specific error cause for Not Acceptable Integrity Protection Max Data Rate	15.1.0
2018-09	CT#81	CP-182055	0008	1	F	EBI Assignment for Home Routed PDU sessions	15.1.0
2018-09	CT#81	CP-182055	0010	1	F	Returning the H-SMF URI to the AMF	15.1.0
2018-09	CT#81	CP-182055	0014	1	F	N2 SM signalling	15.1.0
2018-09	CT#81	CP-182055	0017	1	F	Supporting AMF changes	15.1.0
2018-09	CT#81	CP-182055	0018	1	F	VPLMN S-NSSAI during mobility from EPS to 5GC with N26	15.1.0
2018-09	CT#81	CP-182055	0009	2	F	HTTP message retransmissions and requests colliding with existing contexts	15.1.0
2018-09	CT#81	CP-182055	0029		F	Rejected PDU session during Xn handover	15.1.0
2018-09	CT#81	CP-182055	0033		F	Description of Structured data types	15.1.0
2018-09	CT#81	CP-182055	0034		F	Handling of LADN service area during handovers	15.1.0
2018-09	CT#81	CP-182055	0036		F	Mapping to stage 2 service operation names	15.1.0
2018-09	CT#81	CP-182055	0039		F	Stateless AMF support updates	15.1.0
2018-09	CT#81	CP-182055	0040		F	QoS rule structure improvement	15.1.0
2018-09	CT#81	CP-182055	0020	1	F	NRF URI for PCF Selection	15.1.0
2018-09	CT#81	CP-182055	0022	1	F	BackUp AMF Info	15.1.0
2018-09	CT#81	CP-182055	0031	1	F	NGAP causes	15.1.0
2018-09	CT#81	CP-182055	0024	1	F	EPS Interworking Ind	15.1.0
2018-09	CT#81	CP-182050	0021	2	F	References to common NonDynamic5Qi and Dynamic5Qi data types	15.1.0
2018-09	CT#81	CP-182055	0025	1	F	Not Allowed Slice	15.1.0
2018-09	CT#81	CP-182055	0005	3	F	N2 SM Information Type Definition	15.1.0
2018-09	CT#81	CP-182055	0028	1	F	OpenAPI corrections	15.1.0
2018-09	CT#81	CP-182055	0032	1	F	Age of User Location	15.1.0
2018-09	CT#81	CP-182055	0037	1	F	Detecting SMF Failure and Restart	15.1.0
2018-09	CT#81	CP-182055	0041		F	PresenceState reference	15.1.0
2018-09	CT#81	CP-182055	0030	2	F	URIs of created SM context and PDU session resources	15.1.0
2018-09	CT#81	CP-182055	0023	2	F	5G MM Cause	15.1.0
2018-09	CT#81	CP-182055	0042		F	API version number update	15.1.0
2018-12	CT#82	CP-183013	0044	2	F	IndDirect Forwarding Flag	15.2.0
2018-12	CT#82	CP-183013	0045	1	F	Data Forwarding IE	15.2.0
2018-12	CT#82	CP-183013	0047		F	Alignments with NAS 5GS Session Management	15.2.0
2018-12	CT#82	CP-183013	0048	1	F	Alignments with NGAP	15.2.0
2018-12	CT#82	CP-183013	0049		F	Corrections to N2 Handover and Inter-AMF change or mobility procedures	15.2.0
2018-12	CT#82	CP-183013	0050	2	F	Indication of Access Type can be changed	15.2.0
2018-12	CT#82	CP-183013	0051		F	Roaming Charging Profile negotiation for Home Routed PDU sessions	15.2.0
2018-12	CT#82	CP-183013	0052		F	Service restart detection by direct signalling between NFs	15.2.0
2018-12	CT#82	CP-183013	0053		F	Use of the serviceName attribute by the Notify SM Context Status service operation	15.2.0
2018-12	CT#82	CP-183013	0054		F	Cardinality of arrays	15.2.0
2018-12	CT#82	CP-183013	0055		F	Data type of serviceName attribute	15.2.0
2018-12	CT#82	CP-183013	0056		F	HTTP status code "501 Not Implemented"	15.2.0
2018-12	CT#82	CP-183013	0057		F	Case conventions	15.2.0
2018-12	CT#82	CP-183013	0058		F	Resource URI structure of Nsmf_PDUSession service	15.2.0
2018-12	CT#82	CP-183013	0059		F	EPS bearer identity and data type definitions	15.2.0
2018-12	CT#82	CP-183013	0060	3	F	EPC Interworking in Home Routed Roaming	15.2.0
2018-12	CT#82	CP-183013	0061	1	F	Correction to EPS Interworking Indication	15.2.0
2018-12	CT#82	CP-183013	0063		F	Presence condition of targetServingNfId	15.2.0
2018-12	CT#82	CP-183013	0064	2	F	PDU session removal during interworking with N26	15.2.0
2018-12	CT#82	CP-183013	0067	1	F	Complete the SSC mode 3 in the home routed roaming scenario	15.2.0
2018-12	CT#82	CP-183013	0068	2	F	Clarification on EBI allocation	15.2.0

2018-12	CT#82	CP-183013	0069	1	F	Correct description of Request type	15.2.0
2018-12	CT#82	CP-183190	0071	3	F	PDU Session Id Duplication	15.2.0
2018-12	CT#82	CP-183013	0072	1	F	Service Instance	15.2.0
2018-12	CT#82	CP-183013	0075	2	F	A new cause value 'PDU_Session_Status_Mismatch' for Cause Data Type	15.2.0
2018-12	CT#82	CP-183013	0076	2	F	UDM group Id	15.2.0
2018-12	CT#82	CP-183013	0077	2	F	Always-on PDU sessions	15.2.0
2018-12	CT#82	CP-183013	0078	2	F	Handover Failure scenarios	15.2.0
2018-12	CT#82	CP-183013	0079		F	Release of PDU session during 5GS to EPS mobility	15.2.0
2018-12	CT#82	CP-183013	0080	1	F	Mandatory HTTP status codes	15.2.0
2018-12	CT#82	CP-183013	0081	1	F	Clarification of API URI definition	15.2.0
2018-12	CT#82	CP-183013	0082		F	API version	15.2.0
2018-12	CT#82	CP-183013	0083		F	externalDocs field in OpenAPI document	15.2.0
2018-12	CT#82	CP-183013	0084		F	Location Header	15.2.0
2018-12	CT#82	CP-183169	0085	1	F	Regular Expression Patterns	15.2.0
2018-12	CT#82	CP-183013	0086		F	Correct reference of EPS to 5GS handover	15.2.0
2018-12	CT#82	CP-183013	0087		F	Secondary RAT usage data reporting	15.2.0
2018-12	CT#82	CP-183013	0088	1	F	OAuth2 requirements	15.2.0
2018-12	CT#82	CP-183081	0089		F	SMF Network Function Instance	15.2.0
2018-12						MaxIntegrityProtectedDataRate spare quote fixed in yaml-file	15.2.1
2019-03	CT#83	CP-190018	0090		F	OpenAPI correction	15.3.0
2019-03	CT#83	CP-190018	0091	1	F	Secondary RAT usage reporting	15.3.0
2019-03	CT#83	CP-190018	0092	1	F	Target ID during inter NG-RAN node N2 based handover and EPS to 5GS Handover	15.3.0
2019-03	CT#83	CP-190018	0093		F	Indirect data forwarding timer	15.3.0
2019-03	CT#83	CP-190018	0095		F	API version update	15.3.0
2019-03	CT#83	CP-190018	0096	2	F	Clarification on the use of pduSessionsActivateList during EPS to 5GS Idle Mode Mobility Procedure.	15.3.0
2019-03	CT#83	CP-190018	0097		F	Cause information	15.3.0
2019-03	CT#83	CP-190018	0098	2	F	Update ReleaseSMContext Service Operation Description for PDU Session Release due to Change of Set of Network Slices	15.3.0
2019-03	CT#83	CP-190018	0099	1	F	Trigger Conditions for SMContext Update	15.3.0
2019-03	CT#83	CP-190018	0100	1	F	Trigger Conditions for SMContext Release	15.3.0
2019-03	CT#83	CP-190018	0102	1	F	Status Notify for HO	15.3.0
2019-03	CT#83	CP-190018	0103	1	F	Provide Resource URI before PDU Session Creation Response	15.3.0
2019-03	CT#83	CP-190018	0104	1	F	Allocated EBIs during EPS to 5GS Preparation with N26	15.3.0
2019-06	CT#84	CP-191029	0106	1	F	Change of access type in home routed roaming scenario	15.4.0
2019-06	CT#84	CP-191029	0107	1	F	EPS bearer synchronization upon EPS to 5GS idle mode mobility using N26	15.4.0
2019-06	CT#84	CP-191029	0109		F	Removing multiple redundant appearances of major version number	15.4.0
2019-06	CT#84	CP-191029	0112	1	F	Application Error "S-NSSAI_CONGESTION"	15.4.0
2019-06	CT#84	CP-191029	0113	3	F	Clarification on Sending SMContextStatusNotify	15.4.0
2019-06	CT#84	CP-191029	0117	1	F	Essential Correction of HPLMN SNSSAI during SM Context Creation	15.4.0
2019-06	CT#84	CP-191029	0118	2	F	Handover Preparation Failure	15.4.0
2019-06	CT#84	CP-191029	0129	2	F	Storage of OpenAPI specification files	15.4.0
2019-06	CT#84	CP-191029	0133	2	F	Location header in redirect response	15.4.0
2019-06	CT#84	CP-191029	0135	2	F	Correct Nsmf_PDUSession_Create to support Mobility Restriction	15.4.0
2019-06	CT#84	CP-191029	0139	1	F	Correction of Procedure of Handover using UpdateSmContext	15.4.0
2019-06	CT#84	CP-191029	0141	1	F	Secondary RAT Usage reporting at PDU session level	15.4.0
2019-06	CT#84	CP-191029	0142		F	Mapped EPS bearer contexts in n1SmInfoFromUe	15.4.0
2019-06	CT#84	CP-191029	0143	1	F	Target ID sent to the SMF	15.4.0
2019-06	CT#84	CP-191029	0144		F	Copyright Note in YAML file	15.4.0
2019-06	CT#84	CP-191029	0145	1	F	Correction on GPSI for PDU session	15.4.0
2019-06	CT#84	CP-191029	0148		F	3GPP TS 29.502 API version update	15.4.0
2019-06	CT#84	CP-191048	0147		B	3GPP TS 29.502 API version update	16.0.0
2019-06	CT#84	CP-191049	0116	4	F	Updates to CreateSMContext for eNS Support	16.0.0
2019-06	CT#84	CP-191050	0130	4	B	PDU Session Establishment support Control Plane CIoT Optimization	16.0.0
2019-06	CT#84	CP-191051	0115	2	B	ATSSS: MA-PDU Session Establishment	16.0.0
2019-06	CT#84	CP-191051	0136	2	B	MA PDU Session Update	16.0.0
2019-06	CT#84	CP-191051	0137	5	B	MA PDU Session Release over a Single Access	16.0.0
2019-06	CT#84	CP-191054	0108	1	B	Updates to reference model for ETSUN	16.0.0
2019-06	CT#84	CP-191054	0124	1	B	Update SM context service operation for additional PDU Session Anchor and Branching Point or UL CL controlled by I-SMF	16.0.0
2019-06	CT#84	CP-191054	0123	2	B	Update Retrieve SM Context service operation from Source I-SMF or SMF	16.0.0
2019-06	CT#84	CP-191054	0110	2	B	SM context transfer between I-SMFs or V-SMFs	16.0.0
2019-06	CT#84	CP-191054	0122	2	B	Update Release SM Context service operation for I-SMF change and removal	16.0.0
2019-06	CT#84	CP-191054	0121	6	B	Update Create SM context service operation for the I-SMF insertion and change	16.0.0

2019-06	CT#84	CP-191054	0134	3	B	Update Create SM context service operation for the I-SMF insertion and change	16.0.0
2019-06	CT#84	CP-191059	0140	1	F	EPS Interworking Indication for N3GPP	16.0.0
2019-06	CT#84	CP-191059	0131	3	F	Exemption Indication	16.0.0
2019-09	CT#85	CP-192193	0149	3	B	I-SMF insertion implications on Nsmf_PDUSession_Update across N16a	16.1.0
2019-09	CT#85	CP-192193	0151	3	B	Implications of Policy Update Procedures with I-SMF on Nsmf_PDUSession_Update across N16a	16.1.0
2019-09	CT#85	CP-192193	0153	1	B	Implications of I-SMF insertion on Create service operation	16.1.0
2019-09	CT#85	CP-192193	0154		B	PDU session establishment with I-SMF insertion - Create SM Context service operation	16.1.0
2019-09	CT#85	CP-192193	0155	1	B	Transfer of NAS SM Information between I-SMF and SMF	16.1.0
2019-09	CT#85	CP-192193	0156		B	Updates to resources model and operations for PDU sessions with an I-SMF	16.1.0
2019-09	CT#85	CP-192193	0157		B	Release of a PDU session with an I-SMF	16.1.0
2019-09	CT#85	CP-192193	0158		B	Notify status of a PDU session with an I-SMF	16.1.0
2019-09	CT#85	CP-192193	0159		B	Update of a PDU session with an I-SMF	16.1.0
2019-09	CT#85	CP-192029	0160	1	B	Insertion of a PSA and UL CL/BP into the data path of a PDU session with an I-SMF	16.1.0
2019-09	CT#85	CP-192193	0161	1	B	Removal of a PSA and UL CL/BP from the data path of a PDU session with an I-SMF	16.1.0
2019-09	CT#85	CP-192193	0162	1	B	Change of a PSA for IPv6 multi-homing or UL CL controlled by I-SMF	16.1.0
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