**3GPP TSG-CT WG4 Meeting #99eC4-204258**

**E-Meeting, 18th – 28th August 2020**

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| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **29.502** | **CR** | **0377** | **rev** | **1** | **Current version:** | **16.4.0** |  |
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| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network |  | Core Network | **X** |

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| ***Title:*** | Service Access Authorization between SMFs | | | | | | | | | |
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| ***Source to WG:*** | Ericsson | | | | | | | | | |
| ***Source to TSG:*** | CT4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | TEI16 | | | | |  | ***Date:*** | | | 2020-08-24 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **F** |  | | | | | ***Release:*** | | | Rel-16 |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) Rel-12 (Release 12)* *Rel-13 (Release 13) Rel-14 (Release 14) Rel-15 (Release 15) Rel-16 (Release 16)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | In 3GPP 5GC, Oauth is introduced to enforce the access control NF service consumer consuming services on NF service producer, i.e. the NF consumer needs to acquire an access token from authorization server (i.e. NRF) and attached the token in service request towards the NF producer. In order to acquire the access to certain NF producer, the NF consumer provide the NF instance Id of the NF producer to the authorization server, thus the authorization server check the NF profile of the producer and authorize the access accordingly.  Usually NF consumer explicitly discover and select NF producer via NRF discovery thus it aware of the NF instance ID from the search result. But in some scenario, the NF producer is not selected by by the NF consumer itself, e.g. AMF discover and select H-SMF/SMF for the V-/I-SMF during PDU Session establishment, or new I-SMF retrieve SM Context from old I-SMF or SMF.  In order to successfully access the service on the H-SMF/SMF/old I-SMF, the new I-/V-SMF needs to get access token thus needs the NF instance ID of the peer SMF (as service producer). But currently AMF doesn't have a way to provide the corresponding SMF ID to the new V-/I-SMF during SM Context Creation procedure. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | 1/ Add SMF IDs corresponding to SMF Service Uris and SM context Uri in SmContextCreateData data type.  2/ specify new application Error for Service Authorization failure when V-SMF/I-SMF not authorized to access service on H-SMF/SMF/old V-/I-SMF.  3/ Update service procedure for AMF to provide corresponding SMF ID(s)  4/ Update OpenAPI accordingly. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | PDU Session establishment or relocation with V-SMF/I-SMF will failure, if Oauth is enabled. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 5.2.2.2.1, 5.2.2.2.4, 5.2.2.2.5, 5.2.2.2.6, 5.2.2.2.7, 6.1.3.2.3.1, 6.1.6.2.2, 6.1.3.7, A.2 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  | **X** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | | This CR introduces backward compatible corrections to OpenAPI file of Nsmf\_PduSession API. | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | | Rev1:  1/ Add indication of SMF aware of Oauth enabled on next hop SMF, e.g. with 401 response code;  2/ Editorial corrections. | | | | | | | | |

\* \* \* First Change \* \* \* \*

##### 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]);

- 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]);

- 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]);

- 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]);

- Handover from EPC/ePDG to 5GS with I-SMF insertion (see clause 4.23 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]);

- 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]).

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 payload body of the POST request shall contain:

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

- the Request Type IE, if it 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 Request Type 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 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 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.

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.

For a PDU session establishment with an I-SMF (see clause 4.23.5.1 of of 3GPP TS 23.502 [3]), 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.

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 payload body 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.

2a. On success, "201 Created" shall be returned, the payload body 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 Request Type was received in the request and set to EXISTING\_PDU\_SESSION or EXISTING\_EMERGENCY\_PDU\_SESSION (i.e. indicating that this is a 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:

- it includes the same SUPI, or PEI for an emergency registered UE without a UICC or without an authenticated SUPI, and the same PDU Session ID as for an existing SM context; and

- 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.

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 and PCF. 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 Request Type 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.

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).

\* \* \* Next Change \* \* \* \*

##### 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.

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).

\* \* \* Next Change \* \* \* \*

##### 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.

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.

\* \* \* Next Change \* \* \* \*

##### 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;

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 are skipped in this case.

\* \* \* Next Change \* \* \* \*

##### 5.2.2.2.7 Registration procedure for a UE with a PDU session with I-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 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 insertion or the SM Context resource in the I-SMF during I-SMF removal or the SM Context resource in the old I-SMF during I-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.

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 (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).

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.

\* \* \* Next Change \* \* \* \*

###### 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 |
| SmContextCreateData | 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 |
| SmContextCreatedData | M | 1 | 201 Created | Successful creation of an SM context. |
|  |  |  | 307 Temporary Redirect | Temporary redirection, during a UE requested PDU Session Establishment. The response shall include a Location header field containing a different URI. The URI shall be an alternative URI of the resource located on an alternative service instance within the SMF that was selected by the AMF. |
|  |  |  | 308 Permanent Redirect | Permanent redirection, during a UE requested PDU Session Establishment. The response shall include a Location header field containing a different URI. The URI shall be an alternative URI of the resource located on an alternative service instance within the SMF that was selected by the AMF. |
| 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]. |
| SmContextCreateError | M | 1 | 403 Forbidden | The "cause" attribute shall be set to one of the following application error:  - 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  - SERVICE\_NOT\_AUTHORIZED\_BY\_NEXT\_HOP  See table 6.1.7.3-1 for the description of these errors. |
| 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. |
| 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. |
| 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. |
| SmContextCreateError | M | 1 | 504 Gateway Timeout | The "cause" attribute shall be set to one of the following application error:  - PEER\_NOT\_RESPONDING  - NETWORK\_FAILURE  See table 6.1.7.3-1 for the description of these errors. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] 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]). | | | | |

\* \* \* Next Change \* \* \* \*

##### 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. |  |
| pei | Pei | C | 0..1 | This IE shall be present if the UE is emergency registered and it is either UIClless 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. |  |
| 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 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. |  |
| hplmnSnssai | Snssai | C | 0..1 | This IE shall be present for a roaming PDU session, 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. |  |
| 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. |  |
| requestType | RequestType | C | 0..1 | This IE shall be present if the request relates to an existing PDU session or an existing emergency PDU session, except during an EPS to 5GS idle mode mobility or handover using the N26 interface. 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. |  |
| 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. |  |
| ueLocation | UserLocation | C | 0..1 | This IE shall contain the UE location information, if it is available. See NOTE. |  |
| 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; and  - the timestamp, if available, indicating the UTC time when the addUeLocation information was acquired.  (NOTE) |  |
| 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. 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. |  |
| 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 x) |  |
| smfUri | Uri | C | 0..1 | This IE shall be present for a PDU session with an I-SMF, including Indirect Communication with Delegated Discovery. 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. | 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 x) | DTSSA |
| 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, to request the preparation of a handover of the PDU session.  When present, it shall be set as specified in clause 5.2.2.2.3. |  |
| 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 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 x) |  |
| 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 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 x) | DTSSA |
| pcfId | NfInstanceId | O | 0..1 | When present, this IE shall contain the identifier of the PCF selected by the AMF for the UE (for Access and Mobility Policy and/or UE Policy); it shall be the V-PCF in LBO roaming and the H-PCF in HR roaming. |  |
| 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, this IE shall contain the NF Set ID of the PCF serving the UE for Access and Mobility Policy and/or UE Policy. It shall be the V-PCF Set ID in LBO roaming and the H-PCF Set ID in HR roaming. |  |
| 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 optional feature defined in clause 6.1.8 is supported. |  |
| selMode | DnnSelectionMode | C | 0..1 | This IE shall be present if it is available. When present, it shall indicate whether the requested DNN corresponds to an explicitly subscribed DNN or to the usage of a wildcard subscription. |  |
| 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. |  |
| epsInterworkingInd | EpsInterworkingIndication | O | 0..1 | The AMF may provide the indication when a PGW-C+SMF is selected to serve the PDU Session.  When present, this IE shall indicate whether the PDU session may possibly be moved to EPS 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 radio 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. |  |
| 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 |
| 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). | 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 x) | DTSSA |
| upCnxState | UpCnxState | C | 0..1 | This IE shall be present to request the activation of the user plane connection of the PDU session, during a Service Request with an I-SMF insertion / change / removal, or with a V-SMF change (see clause 5.2.2.2.6). | 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 |
| extendedNasSmTimerInd | 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 identifier of the SM Context resource in the old SMF. | CTXTR |
| 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. |  |
| 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.  NOTE x: If the SMF is aware that Oauth is enabled for the indicated next hop SMF, e.g. 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. | | | | | |

\* \* \* Next Change \* \* \* \*

#### 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. |
| 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. |
| 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. |
| 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. |
| 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 | 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. |
| PEER\_NOT\_RESPONDING | 504 Gateway Timeout | No response is received from a remote peer, e.g. from the H-SMF for a HR PDU session. |
| 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. |

\* \* \* Next Change \* \* \* \*

## A.2 Nsmf\_PDUSession API

openapi: 3.0.0

info:

version: '1.1.0'

title: 'Nsmf\_PDUSession'

description: |

SMF PDU Session Service.

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externalDocs:

description: 3GPP TS 29.502 V16.4.0; 5G System; Session Management Services; Stage 3

url: http://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.

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Text Skipped for Clarify \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

#

# STRUCTURED DATA TYPES

#

SmContextCreateData:

type: object

properties:

supi:

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

unauthenticatedSupi:

type: boolean

default: false

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'

hplmnSnssai:

$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'

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'

smfUri:

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

smfId:

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

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

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

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'

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

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

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'

smContextSmfId:

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

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'

required:

- servingNfId

- servingNetwork

- anType

- smContextStatusUri

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Text Skipped for Clarify \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

\* \* \* End of Changes \* \* \* \*