**3GPP TSG-CT WG4 Meeting #111-eC4-224549**

**E-Meeting, 18th – 26th August 2022 was C4-224215**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **29.502** | **CR** | **0577** | **rev** | **1** | **Current version:** | **17.5.0** |  |
|  |
| *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:***  | Populating a fullDnaiList to (new) I-SMF |
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| ***Source to WG:*** | Ericsson |
| ***Source to TSG:*** | CT4 |
|  |  |
| ***Work item code:*** | TEI18 |  | ***Date:*** | 2022-08-25 |
|  |  |  |  |  |
| ***Category:*** | B |  | ***Release:*** | Rel-18 |
|  | *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 canbe 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-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
|  |  |
| ***Reason for change:*** | The anchor SMF stores a list of DNAIs of interest, which are used to instruct User Plane Function to route relevant application data towards a desired Data Network Access point (as identified by DNAI) as part of AF traffic influence function. This list of DNAIs is provisioned by the PCF as part of PCC rule authorization for the PDU session. The PCF determines the list of DNAIs of interest for the PDU session by retrieving the AF traffic influence request information as part of the Application data from a UDR, and/or being provisioned by the trusted AF or the NEF when establishing or updating an Application Session Context (via consuming Npcf\_PolicyAuthoriztion service) upon receiving the traffic influence subscription request from an Application function.Some of DNAIs within the list of DNAIs of interest for the PDU session are forwarded to the I-SMF if it is used, so that the I-SMF can use it to determine to select a UL CL/BP and local PSA. However, there are some issues that we may consider improving: 1. When populating the DNAI list from the Anchor SMF to an I-SMF, e.g., during a PDU session establishment, or subsequent an I-SMF insertion procedure (with or without mobility), or PDU session modification procedure where the list of DNAI of interest for the PDU session is modified (due to the AF(s) has made an update), it is not cristal clear if only DNAIs which are common to the list of the I-SMF supporting DNAIs and the list of DNAI of interest for the PDU session? Or whether the DNAIs provided to the I-SMF should also exclude the DNAIs supported by the Anchor SMF.Functional wise, DNAIs which are included the list of DNAIs of interest for the PDU session excluding the ones which can be supported by the Anchor SMF should be provided to the I-SMF, i.e. there is no benefit to take what DNAIs supported by a specific I-SMF into account, the I-SMF can figure it out by itself. On the contrary, it adds extra processing load in the Anchor SMF to produce the list every time when a new I-SMF is inserted.

*4.23.5.1               PDU Session establishment procedure**The I-SMF provides the DNAI list it supports to SMF and the SMF provides the DNAI(s) of interest for this PDU Session to I-SMF based on the DNAI list information received from I-SMF as defined in Figure 4.23.9.1-1 step 1.*1. During an I-SMF insertion or I-SMF change procedure, the DNAI(s) of interest for this PDU session can only provided to the I-SMF using PduSessionCreatedData or HsmfUpdatedData, where the I-SMF has already selected an I-UPF, this leads either I-SMF cannot or very difficult to select a combined I-UPF/UL CL/BP, potentially resulting extra signaling transaction (to change the selected I-UPF to a combined I-UPF/UL CL/BP or an extra I-UPF in the user plane data path, which increases signaling latency.

So, it is proposed when populating the DNAI list to the I-SMF, the DNAIs should contains the DNAIs in the list of DNAI(s) of interest for PDU session (provisioned) by the PCF excluding the ones supported by the Anchor SMF. It is also proposed to add this DNAI list in the SmContext, so that after retrieving SmContext, the (new) I-SMF can already select a proper I-UPF combined with UL CL/BP functionality when it is required.This optimization has following benefits:1. reduce some signaling transactions between I-SMF and Anchor SMF, at least for one round of Nsmf\_PDUSession\_Update, so signaling latency during a mobility procedure is minimized. 2. avoid having a standalone I-UPF or UL CL/BP in the user plane data path which leads extra latency for payload transferring.3. it simplifies the processing or logic in the anchor SMF, so it can always provide a same list of DNAIs to different I-SMFs without considering what DNAIs that an I-SMF supports. (Note that, the supported DNAI list for a I-SMF might be changed.) |
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| ***Summary of change:*** | In order to make a backwards compatible change, it is proposed to add a new attribute fullDnaiList which contains DNAIs in the list of DNAI(s) of interest for PDU session (provisioned) by the PCF excluding the ones supported by the Anchor SMF in following data types:- PduSessionCreatedData- HsmfUpdatedData (this is needed when the old SMF does not support to receive fullDnaiList)- VsmfUpdateData- SmContext |
|  |  |
| ***Consequences if not approved:*** | The I-SMF is not able to select a proper I-UPF with UL CL/BP function which triggers extra signaling transactions. |
|  |  |
| ***Clauses affected:*** | 6.1.6.2.10, 6.1.6.2.12, 6.1.6.2.15, 6.1.6.2.39, 6.1.8, 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 feature to Nsmf\_PDUSession API. |
|  |  |
| ***This’CR's revision history:*** | Rev1: it is decided to reuse the existing DnaiList, and introduce a new feature, and when receiver supports the feature, the existing DnaiList will be set a full list of DNAI of interest. |

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\* \* \* \* First change \* \* \* \*

##### 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 N9 tunnel 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 N9 tunnel information of the SMF. | 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 N9 tunnel 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. |  |
| 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 optional 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 | C | 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 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 supports the DTSSA-Ext1 feature, when present, this IE shall include DNAIs in the list of DNAI(s) of interest for PDU session excluding the ones supported by the Anchor SMF. | DTSSADTSSA-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) |  |
| 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 | C | 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 | C | 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) |  |
| 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. |

\* \* \* \* Next 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 supports the DTSSA-Ext1 feature, when present, this IE shall include DNAIs in the list of DNAI(s) of interest for PDU session excluding the ones supported by the Anchor SMF. | DTSSADTSSA-Ext1 |
| supportedFeatures | SupportedFeatures | C | 0..1 | This IE shall be present if the supportedFeatures IE was received in the request and at least one optional 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. (NOTE 3) | DTSSA |
| 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 | C | 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 | C | 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. |  |
| 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.  |

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

##### 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 | C | 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 optional 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 supports the DTSSA-Ext1 feature, when present, this IE shall include DNAIs in the list of DNAI(s) of interest for PDU session 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. | DTSSADTSSA-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 | C | 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 |
| 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. |

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

##### 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.  |  |
| hplmnSnssai | Snssai | C | 0..1 | This IE shall be present for a HR PDU session.When present, it shall contain the S-NSSAI for the HPLMN.  |  |
| 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 to the PDU session.  |  |
| ueIpv6Prefix | Ipv6Prefix | C | 0..1 | This IE shall be present if a UE IPv6 prefix 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 | C | 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 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]). |  |
| 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. |  |
| satelliteBackhaulCat | 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. |  |
| fullDnaiList  | array(Dnai) | O | 1..N | This IE may be present to contain DNAIs in the list of DNAI(s) of interest for PDU session excluding the ones supported by the Anchor SMF.  | DTSSA-Ext1 |
| 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. |  |

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

### 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 optional features applicable between the SMF and the NF Service Consumer, for the Nsmf\_PDUSession service, if any.

The NF Service Consumer shall indicate the optional 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 optional 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.

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 IoTSupport 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 SessionAn 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 AreasA 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 QoSAn 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 redirectionAn 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 PathsAn 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 networkA 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 CLThis 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 NetworksSupport 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 EventsThis 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 5.8.2.15 of 3GPP TS 23.501 [2]. |
| 16 | UPIPE | O | User Plane Integrity Protection with EPSAn 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 establishmentThis 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.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 removes 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, 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. |
| X | DTSSA-Ext1 | O | This feature bit indicates that a list of DNAI(s) of interest for PDU session excluding the ones supported by the anchor SMF can be provisioned by the anchor SMF or handled by the I-SMF. |
| 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. |

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

# A.2 Nsmf\_PDUSession API

openapi: 3.0.0

info:

 version: '1.2.0'

 title: 'Nsmf\_PDUSession'

 description: |

 SMF PDU Session Service.

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externalDocs:

 description: 3GPP TS 29.502 V17.5.0; 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.

\*\*\*\*\*\*\*\* Skipped for Clarity \*\*\*\*\*\*\*\*

 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'

 hplmnSnssai:

 $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

 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

 fullDnaiList:

 type: array

 items:

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

 minItems: 1

 required:

 - pduSessionId

 - dnn

 - sNssai

 - pduSessionType

 - sessionAmbr

 - qosFlowsList

\*\*\*\*\*\*\*\* Skipped for Clarity \*\*\*\*\*\*\*\*

\* \* \* \* End of changes \* \* \* \*