**3GPP TSG-CT WG4 Meeting #111-eC4-224xxx**

**E-Meeting, 18th – 26th August 2022 *Resivion of C4-224299***

|  |
| --- |
| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
|  |
|  | **29.502** | **CR** | **0581** | **rev** | **1** | **Current version:** | **16.12.0** |  |
|  |
| *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:***  | QoS Flows Failed to Resume |
|  |  |
| ***Source to WG:*** | Huawei |
| ***Source to TSG:*** | CT4 |
|  |  |
| ***Work item code:*** | TEI16 |  | ***Date:*** | 2022-07-12 |
|  |  |  |  |  |
| ***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 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-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19)* |
|  |  |
| ***Reason for change:*** | Based on the definition in clause 8.3.12.2 of 3GPP TS 38.413, the UE Context Resume Request Transfer and UE Context Resume Respose Transfer IEs are transparent to AMF and transferred between NG-RAN and SMF to indicate the QoS Flow Failed to Resume:*If the NG-RAN node is not able to admit certain QoS flows for a PDU session, the NG-RAN node shall indicate this in the QoS Flow Failed to Resume List IE included in the UE Context Resume Request Transfer IE for that PDU session.**…**If the SMF is not able to admit certain QoS flows for a PDU session, the SMF shall indicate this in the QoS Flow Failed to Resume List IE included in the UE Context Resume Response Transfer IE for that PDU session.*UE Context Resume Request Transfer and UE Context Resume Response Transfer are mandatory IEs even the NG-RAN or SMF admit all of the QoS Flows of a PDU session.In clause 9.2.2.16 of 3GPP TS 38.413, the UE Context Suspend Request Transfer is included in UE CONTEXT SUSPEND REQUEST from NG-RAN to AMF. |
|  |  |
| ***Summary of change:*** | 1. Update the service operation description to support the resume procedure from same NG-RAN on receiving UE CONTEXT RESUME REQUEST, and resume procedure from new NG-RAN on receiving PATH SWITCH REQUEST.
2. Support UE Context Resume Request Transfer and UE Context Resume Response Transfer in UE CONTEXT RESUME REQUEST and UE CONTEXT RESUME RESPONSE.
3. Update the service operation description to support the UE Context Suspend Request Transfer IE during connection suspend procedure;
4. Support UE Context Suspend Request Transfer in UE CONTEXT SUSPEND REQUEST.
5. Update the N2SmInfoType data type.
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|  |  |
| ***Consequences if not approved:*** | QoS Flows failed to resume cannot be supported during resume procedure which may waste network resource and cause more signalling to remove the related QoS Flows. |
|  |  |
| ***Clauses affected:*** | 5.2.2.3.15, 5.2.2.3.16, 6.1.6.3.12, 6.1.6.4.3, 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 contribution introduces backward compatible corrections to the OpenAPI file of Nsmf\_PDUSession API. |
|  |  |
| ***This CR's revision history:*** |  |

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

##### 5.2.2.3.15 Connection Suspend procedure

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



Figure 5.2.2.3.15-1: Connection Suspend

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

- upCnxState attribute set to SUSPENDED;

- user location and user location timestamp;

- N2 SM information received from the 5G-AN, including UE Context Suspend Request Transfer IE, if available;

- other information, if necessary.

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

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

##### 5.2.2.3.16 Connection Resume in CM-IDLE with Suspend procedure

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



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

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

- the upCnxState attribute set to ACTIVATING;

- user location and user location timestamp;

- cause attribute set to "PDU\_SESSION\_RESUMED";

- N2 SM information received from the 5G-AN, i.e. Path Switch Request Transfer including the new transport layer address and tunnel endpoint of the downlink termination point for the user data for this PDU session (i.e. 5G-AN's GTP-U F-TEID for downlink traffic); or UE Context Resume Request Transfer;

- additional N2 SM information received from the 5G-AN, if any;

- the "MO Exception Data Counter" if the UE has accessed the network by using "MO exception data" RRC establishment cause;

- other information, if necessary.

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

- the upCnxState attribute set to ACTIVATED;

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

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

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

- the upCnxState attribute representing the final state of the user plane connection (e.g. SUSPENDED);

- N2 SM information, including the cause of the failure.

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

##### 6.1.6.3.12 Enumeration: N2SmInfoType

Table 6.1.6.3.12-1: Enumeration N2SmInfoType

|  |  |
| --- | --- |
| Enumeration value | Description |
| "PDU\_RES\_SETUP\_REQ" | PDU Session Resource Setup Request Transfer  |
| "PDU\_RES\_SETUP\_RSP" | PDU Session Resource Setup Response Transfer |
| "PDU\_RES\_SETUP\_FAIL" | PDU Session Resource Setup Unsuccessful Transfer |
| "PDU\_RES\_REL\_CMD" | PDU Session Resource Release Command Transfer |
| "PDU\_RES\_REL\_RSP" | PDU Session Resource Release Response Transfer |
| "PDU\_RES\_MOD\_REQ" | PDU Session Resource Modify Request Transfer |
| "PDU\_RES\_MOD\_RSP" | PDU Session Resource Modify Response Transfer |
| "PDU\_RES\_MOD\_FAIL" | PDU Session Resource Modify Unsuccessful Transfer |
| "PDU\_RES\_NTY" | PDU Session Resource Notify Transfer |
| "PDU\_RES\_NTY\_REL" | PDU Session Resource Notify Released Transfer |
| "PDU\_RES\_MOD\_IND" | PDU Session Resource Modify Indication Transfer |
| "PDU\_RES\_MOD\_CFM" | PDU Session Resource Modify Confirm Transfer |
| "PATH\_SWITCH\_REQ" | Path Switch Request Transfer |
| "PATH\_SWITCH\_SETUP\_FAIL" | Path Switch Request Setup Failed Transfer |
| "PATH\_SWITCH\_REQ\_ACK" | Path Switch Request Acknowledge Transfer |
| "PATH\_SWITCH\_REQ\_FAIL" | Path Switch Request Unsuccessful Transfer |
| "HANDOVER\_REQUIRED" | Handover Required Transfer |
| "HANDOVER\_CMD" | Handover Command Transfer |
| "HANDOVER\_PREP\_FAIL" | Handover Preparation Unsuccessful Transfer |
| "HANDOVER\_REQ\_ACK" | Handover Request Acknowledge Transfer |
| "HANDOVER\_RES\_ALLOC\_FAIL" | Handover Resource Allocation Unsuccessful Transfer |
| "SECONDARY\_RAT\_USAGE" | Secondary RAT Data Usage Report Transfer |
| "PDU\_RES\_MOD\_IND\_FAIL" | PDU Session Resource Modify Indication Unsuccessful Transfer |
| "UE\_CONTEXT\_RESUME\_REQ" | UE Context Resume Request Transfer |
| "UE\_CONTEXT\_RESUME\_RSP" | UE Context Resume Response Transfer |
| "UE\_CONTEXT\_SUSPEND\_REQ" | UE Context Suspend Request Transfer |

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

##### 6.1.6.4.3 N2 SM Information

N2 SM Information shall encode NG Application Protocol (NGAP) IEs, as specified in clause 9.3 of 3GPP TS 38.413 [9] (ASN.1 encoded), using the vnd.3gpp.ngap content-type.

N2 SM Information may encode any NGAP SMF related IE specified in 3GPP TS 38.413 [9], as summarized in Table 6.1.6.4.3-1.

Table 6.1.6.4.3-1: N2 SM Information content

|  |  |  |
| --- | --- | --- |
| N2 SM IE | Reference(3GPP TS 38.413 [9]) | Related NGAP message |
| PDU Session Resource Setup Request Transfer  | 9.3.4.1 | PDU SESSION RESOURCE SETUP REQUESTINITIAL CONTEXT SETUP REQUESTHANDOVER REQUEST |
| PDU Session Resource Setup Response Transfer | 9.3.4.2 | PDU SESSION RESOURCE SETUP RESPONSEINITIAL CONTEXT SETUP RESPONSE |
| PDU Session Resource Setup Unsuccessful Transfer | 9.3.4.16 | PDU SESSION RESOURCE SETUP RESPONSEINITIAL CONTEXT SETUP RESPONSE |
| PDU Session Resource Release Command Transfer | 9.3.4.12 | PDU SESSION RESOURCE RELEASE COMMAND |
| PDU Session Resource Release Response Transfer | 9.3.4.21 | PDU SESSION RESOURCE RELEASE RESPONSE |
| PDU Session Resource Modify Request Transfer | 9.3.4.3 | PDU SESSION RESOURCE MODIFY REQUEST |
| PDU Session Resource Modify Response Transfer | 9.3.4.4 | PDU SESSION RESOURCE MODIFY RESPONSE |
| PDU Session Resource Modify Unsuccessful Transfer | 9.3.4.17 | PDU SESSION RESOURCE MODIFY RESPONSE |
| PDU Session Resource Notify Transfer | 9.3.4.5 | PDU SESSION RESOURCE NOTIFY |
| PDU Session Resource Notify Released Transfer | 9.3.4.13 | PDU SESSION RESOURCE NOTIFY |
| PDU Session Resource Modify Indication Transfer | 9.3.4.6 | PDU SESSION RESOURCE MODIFY INDICATION |
| PDU Session Resource Modify Confirm Transfer | 9.3.4.7 | PDU SESSION RESOURCE MODIFY CONFIRM |
| PDU Session Resource Modify Indication Unsuccessful Transfer | 9.3.4.22 | PDU SESSION RESOURCE MODIFY CONFIRM |
| Path Switch Request Transfer | 9.3.4.8 | PATH SWITCH REQUEST |
| Path Switch Request Setup Failed Transfer | 9.3.4.15 | PATH SWITCH REQUEST |
| Path Switch Request Acknowledge Transfer | 9.3.4.9 | PATH SWITCH REQUEST ACKNOWLEDGE |
| Path Switch Request Unsuccessful Transfer | 9.3.4.20 | PATH SWITCH REQUEST ACKNOWLEDGEPATH SWITCH REQUEST FAILURE |
| Handover Required Transfer | 9.3.4.14 | HANDOVER REQUIRED |
| Handover Request Acknowledge Transfer | 9.3.4.11 | HANDOVER REQUEST ACKNOWLEDGE |
| Handover Resource Allocation Unsuccessful Transfer | 9.3.4.19 | HANDOVER REQUEST ACKNOWLEDGE |
| Handover Command Transfer | 9.3.4.10 | HANDOVER COMMAND |
| Handover Preparation Unsuccessful Transfer | 9.3.4.18 | HANDOVER COMMAND |
| Secondary RAT Data Usage Report Transfer | 9.3.4.23 | SECONDARY RAT DATA USAGE REPORT  |
| UE Context Resume Request Transfer | 9.3.4.24 | UE CONTEXT RESUME REQUEST |
| UE Context Resume Response Transfer | 9.3.4.25 | UE CONTEXT RESUME RESPONSE |
| UE Context Suspend Request Transfer | 9.3.4.26 | UE CONTEXT SUSPEND REQUEST |

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

# A.2 Nsmf\_PDUSession API

openapi: 3.0.0

info:

 version: '1.1.8'

 title: 'Nsmf\_PDUSession'

 description: |

 SMF PDU Session Service.

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[…]

 N2SmInfoType:

 anyOf:

 - type: string

 enum:

 - PDU\_RES\_SETUP\_REQ

 - PDU\_RES\_SETUP\_RSP

 - PDU\_RES\_SETUP\_FAIL

 - PDU\_RES\_REL\_CMD

 - PDU\_RES\_REL\_RSP

 - PDU\_RES\_MOD\_REQ

 - PDU\_RES\_MOD\_RSP

 - PDU\_RES\_MOD\_FAIL

 - PDU\_RES\_NTY

 - PDU\_RES\_NTY\_REL

 - PDU\_RES\_MOD\_IND

 - PDU\_RES\_MOD\_CFM

 - PATH\_SWITCH\_REQ

 - PATH\_SWITCH\_SETUP\_FAIL

 - PATH\_SWITCH\_REQ\_ACK

 - PATH\_SWITCH\_REQ\_FAIL

 - HANDOVER\_REQUIRED

 - HANDOVER\_CMD

 - HANDOVER\_PREP\_FAIL

 - HANDOVER\_REQ\_ACK

 - HANDOVER\_RES\_ALLOC\_FAIL

 - SECONDARY\_RAT\_USAGE

 - PDU\_RES\_MOD\_IND\_FAIL

 - UE\_CONTEXT\_RESUME\_REQ

 - UE\_CONTEXT\_RESUME\_RSP

 - UE\_CONTEXT\_SUSPEND\_REQ

 - type: string

 description: >

 This string provides forward-compatibility with future

 extensions to the enumeration but is not used to encode

 content defined in the present version of this API.

 description: >

 Possible values are

 - PDU\_RES\_SETUP\_REQ

 - PDU\_RES\_SETUP\_RSP

 - PDU\_RES\_SETUP\_FAIL

 - PDU\_RES\_REL\_CMD

 - PDU\_RES\_REL\_RSP

 - PDU\_RES\_MOD\_REQ

 - PDU\_RES\_MOD\_RSP

 - PDU\_RES\_MOD\_FAIL

 - PDU\_RES\_NTY

 - PDU\_RES\_NTY\_REL

 - PDU\_RES\_MOD\_IND

 - PDU\_RES\_MOD\_CFM

 - PATH\_SWITCH\_REQ

 - PATH\_SWITCH\_SETUP\_FAIL

 - PATH\_SWITCH\_REQ\_ACK

 - PATH\_SWITCH\_REQ\_FAIL

 - HANDOVER\_REQUIRED

 - HANDOVER\_CMD

 - HANDOVER\_PREP\_FAIL

 - HANDOVER\_REQ\_ACK

 - HANDOVER\_RES\_ALLOC\_FAIL

 - SECONDARY\_RAT\_USAGE

 - PDU\_RES\_MOD\_IND\_FAIL

 - UE\_CONTEXT\_RESUME\_REQ

 - UE\_CONTEXT\_RESUME\_RSP

 - UE\_CONTEXT\_SUSPEND\_REQ

[…]

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