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

**E-Meeting, 18th – 26th August 2022 *was C4-224271***

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| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **29.518** | **CR** | **0776** | **rev** | **1** | **Current version:** | **17.6.0** |  |
|  | | | | | | | | |
| *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:*** | 409 Response for Xn HO and Intra-AMF N2 HO | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Ericsson | | | | | | | | | |
| ***Source to TSG:*** | CT4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | TEI16, 5GS\_Ph1-CT | | | | |  | ***Date:*** | | | 2022-08-22 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **A** |  | | | | | ***Release:*** | | | Rel-17 |
|  | *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-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | When the SMF invoke Assign EBI during Xn Handover and intra-AMF N2 handover, e.g. a terminating IMS call (which triggers a new QoS flow for voice data) arrived when Xn handover, the AMF received PATH SWITCH and invoked UpdateSmContext to SMF, at the same time, the SMF invoked AssignEbi on AMF.    Then for AMF, it may:  • Reject with 409 Handover ongoing; or  • Successfully assign the EBI to the SMF; or  • Buffer the EBI assignment and wait for SMF response first    For SMF, it may possibly  • Abort the EBI assignment and start handling the PATCH SWITCH; or  • Wait for AMF response then process PATCH SWITCH    For interworking perspective, the AMF rejecting with 409 (indicting request is temporarily not handled due to HO is ongoing) should be the safest way, thus the SMF could redo the EBI assignment after PATH SWITCH is finished.  The AMF may also successfully assign the EBI, thus the SMF shall not abort the EBI assignment and should take the assigned EBI into account in subsequent handling. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | 1/ Update the custom operation description for EBI assignment response table to add the Xn HO scenario for 409 response.  2/ Table NOTE added to clarify that AMF may either reject the request or proceed with assigning EBI during Xn/N2 HO. The SMF shall take the assigned EBIs into account.  3/ Update Application Error to cover the Xn HO for EBI assignment. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Deadlock between AMF/SMF or Inconsistent EBIs in AMF/SMF, when EBI assignment is invoked during ongoing Xn Handover procedure. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 6.1.3.2.4.3.2, 6.1.7.3 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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 does not require version Update on OpenAPI files. | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | | Rev1:  Clarify that the AMF may reject with 409 or successfully respond with assigned EBI, for EBI assignment during Xn/N2 HO. | | | | | | | | |

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

6.1.3.2.4.3.2 Operation Definition

This operation shall support the request data structures specified in table 6.1.3.2.4.3.2-1 and the response data structure and response codes specified in table 6.1.3.2.4.3.2-2.

Table 6.1.3.2.4.3.2-1: Data structures supported by the (POST) assign-ebi Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| AssignEbiData | M | 1 | The information required for AMF to allocate EPS bearer ID(s) or to update the mapping of EBI and ARP for a QoS flow to which an EBI is already allocated. |

Table 6.1.3.2.4.3.2-2: Data structures supported by the (POST) assign-ebi Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| AssignedEbiData | M | 1 | 200 OK | Represent successful assignment of EPS bearer ID service operation, with the assigned EBIs included, or represent successful update of the mapping of EBI and ARP for a QoS flow to which an EBI is already allocated.  AMF may allocate only a subset of the requested EBIs, when not enough available EBI(s) can be allocated, e.g. when other PDU sessions with higher ARP have occupied too many EBIs. If the POST request body contained "releasedEbiList" the AMF shall release those EBI(s) and shall include the "releaseEbiList" IE in the POST response body.  (NOTE x) |
| RedirectResponse | O | 0..1 | 307 Temporary Redirect | Temporary redirection. The response shall include a Location header field containing a different URI, or the same URI if a request is redirected to the same target resource via a different SCP. In the former case, the URI shall be an alternative URI of the resource located on an alternative service instance within the same AMF or AMF (service) set. |
| RedirectResponse | O | 0..1 | 308 Permanent Redirect | Permanent redirection. The response shall include a Location header field containing a different URI, or the same URI if a request is redirected to the same target resource via a different SCP. In the former case, the URI shall be an alternative URI of the resource located on an alternative service instance within the same AMF or AMF (service) set. |
| AssignEbiError | O | 0..1 | 403 Forbidden | This represents the case when none of the requested EBI(s) can be assigned by the AMF. The "cause" attribute of the ProblemDetails shall be set to:  - EBI\_EXHAUSTED, if the number of EBIs allocated for the UE has already reached the maximum limit.  - EBI\_REJECTED\_LOCAL\_POLICY, if the EBI allocation is rejected due to local policies at the AMF as specified in clause 4.11.1.4.1 of 3GPP TS 23.502 [3].  - EBI\_REJECTED\_NO\_N26, if the EBI allocation was rejected when the AMF is in a serving PLMN that does not support 5GS-EPS interworking procedures with N26 interface as specified in clause 5.17.2.3.1 of 3GPP TS 23.501 [2]. |
| ProblemDetails | O | 0..1 | 403 Forbidden | This error shall only be returned by an SCP for errors it originates. |
| AssignEbiError | O | 0..1 | 409 Conflict | This represents the case when none of the requested EBI(s) can be assigned by the AMF. The "cause" attribute of the ProblemDetails shall be set to:  - TEMPORARY\_REJECT\_REGISTRATION\_ONGOING, if there is an ongoing registration procedure.  - TEMPORARY\_REJECT\_HANDOVER\_ONGOING, if there is an ongoing N2 handover procedure or an ongoing Xn handover procedure.  (NOTE x) |
| NOTE 1: The mandatory HTTP error status code for the POST method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] also apply, with response body containing an object of ProblemDetails data type (see clause 5.2.7 of 3GPP TS 29.500 [4]).  NOTE x: When receiving EBI assignment request during Xn Handover or N2 Handover, the AMF may either reject the request with the TEMPORARY\_REJECT\_HANDOVER\_ONGOING application error in a 409 Conflict response or proceed with assigning EBIs with a 200 OK response. When the 200 OK response is received, the SMF shall take the assigned EBIs into account in subsequent processing. | | | | |

Table 6.1.3.2.4.3.2-3: Headers supported by the 307 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | An alternative URI of the resource located on an alternative service instance within the same AMF or AMF (service) set.  Or the same URI, if a request is redirected to the same target resource via a different SCP. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance ID towards which the request is redirected |

Table 6.1.3.2.4.3.2-4: Headers supported by the 308 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | An alternative URI of the resource located on an alternative service instance within the same AMF or AMF (service) set.  Or the same URI, if a request is redirected to the same target resource via a different SCP. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance ID towards which the request is redirected |

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

#### 6.1.7.3 Application Errors

The common application errors defined in the Table 5.2.7.2-1 in 3GPP TS 29.500 [4] may also be used for the Namf\_Communication service. The following application errors listed in Table 6.1.7.3-1 are specific for the Namf\_Communication service.

Table 6.1.7.3-1: Application errors

|  |  |  |
| --- | --- | --- |
| Application Error | HTTP status code | Description |
| NF\_CONSUMER\_REDIRECT\_ONE\_TXN | 307 Temporary Redirect | The request has been asked to be redirected to a specified target. |
| HANDOVER\_FAILURE | 403 Forbidden | Creation of UE context in the target AMF failed during Handover procedure causing a failure of handover. |
| INTEGRITY\_CHECK\_FAIL | 403 Forbidden | Integrity check of the complete registration message included in the UE context transfer request failed. |
| EBI\_EXHAUSTED | 403 Forbidden | 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 | Allocation of EPS Bearer ID failed due to local policy at the AMF as specified in clause 4.11.1.4.1 of 3GPP TS 23.502 [3]. |
| 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. |
| SUPI\_OR\_PEI\_UNKNOWN | 403 Forbidden | The SUPI or PEI included in the message is unknown. |
| UE\_IN\_NON\_ALLOWED\_AREA | 403 Forbidden | UE is currently in a non-allowed area hence the N1/N2 message transfer cannot be completed because the request is not associated with a regulatory prioritized service. |
| UNSPECIFIED | 403 Forbidden | The request is rejected due to unspecified reasons. |
| SM\_CONTEXT\_RELOCATION\_REQUIRED | 403 Forbidden | The request is rejected because the SM Context should be relocated to another SMF, e.g. when AMF detects that an I-SMF or V-SMF insertion, change or removal is needed, as specified in clause 4.23 of 3GPP TS 23.502 [3]. |
| UE\_WITHOUT\_N1\_LPP\_SUPPORT | 403 Forbidden | UE does not support LPP in N1 mode hence the N1 LPP message cannot be sent to the UE. |
| INVALID\_SM\_CONTEXT | 403 Forbidden | The request is rejected because the SM Context is invalid for the PDU session, i.e. active SM Context for the PDU session (with same PDU Session ID) has been created on another SMF.  (NOTE) |
| CONTEXT\_NOT\_FOUND | 404 Not Found | The requested UE Context does not exist on the AMF |
| HIGHER\_PRIORITY\_REQUEST\_ONGOING | 409 Conflict | Paging triggered N1/N2 transfer cannot be initiated since already there is a paging due to a higher priority session ongoing. |
| TEMPORARY\_REJECT\_REGISTRATION\_ONGOING | 409 Conflict | N1/N2 message transfer towards UE / AN cannot be initiated or the EBI assignment fails due to an ongoing registration procedure. |
| TEMPORARY\_REJECT\_HANDOVER\_ONGOING | 409 Conflict | N1/N2 message transfer towards UE / AN cannot be initiated due to an ongoing Xn or N2 handover procedure, or the EBI assignment fails due to an ongoing N2 handover procedure or an ongoing Xn handover procedure. |
| UE\_IN\_CM\_IDLE\_STATE | 409 Conflict | N2 message transfer towards 5G-AN cannot be initiated due to the UE being in CM-IDLE state for the Access Network Type associated to the PDU session. |
| MAX\_ACTIVE\_SESSIONS\_EXCEEDED | 409 Conflict | If the RAT type is NB-IoT, and the UE already has 2 PDU Sessions with active user plane resources. |
| REJECTION\_DUE\_TO\_PAGING\_RESTRICTION | 409 Conflict | If Paging Restrictions information restricts the N1N2MessageTransfer request from causing paging as defined in 3GPP TS 23.501 [2] clause 5.38.5. |
| UE\_NOT\_REACHABLE | 504 Gateway Timeout | The UE is not reachable for paging. |
| NOTE: More than one SM Contexts may be present in the network for the same PDU Session ID, e.g. when the UE established a new PDU session with the same PDU Session ID and the AMF failed to release the old SM Context in the old SMF. In such a scenario, if the old SMF tries to send N1 and/or N2 Message to the RAN/UE, the AMF shall respond with this application error if the AMF identified that service operation is invoked by the SMF holding the old SM Context. | | |

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