**3GPP TSG-RAN WG3#111-e *R3-21xxxx***

**E-meeting, 25 January – 04th February**

|  |
| --- |
| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **38.463** | **CR** | **0570** | **rev** | **1** | **Current version:** | **16.4.0** |  |
|  |
| *For* [***HELP***](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 | **X** | Core Network |  |

|  |
| --- |
|  |
| ***Title:***  | Support for 4g-5g Direct Data Forwarding over E1  |
|  |  |
| ***Source to WG:*** | Nokia, Nokia Shanghai Bell |
| ***Source to TSG:*** | R3 |
|  |  |
| ***Work item code:*** | Direct\_data\_fw\_NR-Core |  | ***Date:*** | 2021-01-25 |
|  |  |  |  |  |
| ***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-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
|  |  |
| ***Reason for change:*** | For inter-system HO,direct data forwarding is not supported in case the source node or target node is CP/UP separation.  |
|  |  |
| ***Summary of change:*** | Add *Data Forwarding from E-UTRAN Request List* IE in *PDU Session Resource To Setup List.*Add *Data Forwarding from E-UTRAN Response List* IE in *PDU Session Resource Setup List.*Impact assessment towards the previous version of the specification (same release):This CR has an isolated impact towards the previous version of the specification (same release).This CR only has an impact on the Inter-system handover function. |
|  |  |
| ***Consequences if not approved:*** | Direct data forwarding could not be supported in case the source node or target node is CP/UP separation.  |
|  |  |
| ***Clauses affected:*** | 8.3.1, 9.3.3.2, 9.3.3.5, 9.4.5, 9.4.7  |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** | **X** |  |  Other core specifications  | TS 36.413 CR 1738 |
| ***affected:*** |  |  |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  |  |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

8.3.1 Bearer Context Setup

8.3.1.1 General

The purpose of the Bearer Context Setup procedure is to allow the gNB-CU-CP to establish a bearer context in the gNB-CU-UP. The procedure uses UE-associated signalling.

8.3.1.2 Successful Operation

**Figure 8.3.1.2-1: Bearer Context Setup procedure: Successful Operation.**

The gNB-CU-CP initiates the procedure by sending the BEARER CONTEXT SETUP REQUEST message to the gNB-CU-UP. If the gNB-CU-UP succeeds to establish the requested resources, it replies to the gNB-CU-CP with the BEARER CONTEXT SETUP RESPONSE message.

The gNB-CU-UP shall report to the gNB-CU-CP, in the BEARER CONTEXT SETUP RESPONSE message, the result for all the requested resources in the following way:

For E-UTRAN:

- A list of DRBs which are successfully established shall be included in the *DRB Setup List* IE;

- A list of DRBs which failed to be established shall be included in the *DRB Failed List* IE;

For NG-RAN:

- A list of PDU Session Resources which are successfully established shall be included in the *PDU Session Resource Setup List* IE;

- A list of PDU Session Resources which failed to be established shall be included in the *PDU Session Resource Failed List* IE;

- For each established PDU Session Resource, a list of DRBs which are successfully established shall be included in the *DRB Setup List* IE;

- For each established PDU Session Resource, a list of DRBs which failed to be established shall be included in the *DRB Failed List* IE;

- For each established DRB, a list of QoS Flows which are successfully established shall be included in the *Flow Setup List* IE;

- For each established DRB, a list of QoS Flows which failed to be established shall be included in the *Flow Failed List* IE;

When the gNB-CU-UP reports the unsuccessful establishment of a PDU Session Resource, DRB or QoS Flow the cause value should be precise enough to enable the gNB-CU-CP to know the reason for the unsuccessful establishment.

If the *Existing Allocated NG DL UP Transport Layer Information* IE is contained in the BEARER CONTEXT SETUP REQUEST message, the gNB-CU-UP may re-use the indicated resources already allocated for this bearer context. If the gNB-CU-UP decides to re-use the indicated resources, it shall include the *NG DL UP Unchanged* IE in the BEARER CONTEXT SETUP RESPONSE message.

If the *PDU Session Resource DL Aggregate Maximum Bit Rate* IE is contained in the *PDU Session Resource To Setup List* IE in the BEARER CONTEXT SETUP REQUEST message, the gNB-CU-UP shall store and use the information for the down link traffic policing for the Non-GBR QoS flows for the concerned UE as specified in TS 23.501 [20].

If the *Data Forwarding Information Request* IE, *PDU Session Data Forwarding Information Request* IE, *Data Forwarding from E-UTRAN Request List* IE or the *DRB Data Forwarding Information Request* IE are included in the BEARER CONTEXT SETUP REQUEST message, the gNB-CU-UP shall include the requested forwarding information respectively in the *Data Forwarding Information Response* IE, *PDU Session Data Forwarding Information Response* IE *Data Forwarding from E-UTRAN Response List* IEor the *DRB Data Forwarding Information Response* IE in the BEARER CONTEXT SETUP RESPONSE message.

If the *DL UP Parameters* IE is contained in the *DRB To Setup List* IE in the BEARER CONTEXT SETUP REQUEST message, the gNB-CU-UP shall configure the corresponding information.

For each PDU session for which the *Security Indication* IE is included in the *PDU Session Resource To Setup List* IE of the BEARER CONTEXT SETUP REQUEST message, and the *Integrity Protection Indication* IE or *Confidentiality Protection Indication* IE is set to "preferred", then the gNB-CU-UP should, if supported, perform user plane integrity protection or ciphering, respectively, for the concerned PDU session and shall notify whether it performed the user plane integrity protection or ciphering by including the *Integrity Protection Result* IE or *Confidentiality Protection Result* IE, respectively, in the *PDU Session Resource Setup List* IE of the BEARER CONTEXT SETUP RESPONSE message.

Not modified

9.3.3.2 PDU Session Resource To Setup List

This IE contains PDU session resource related information used at Bearer Context Setup Request

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** | **Criticality** | **Assigned Criticality** |
| **PDU Session Resource To Setup Item** |  | *1..<maxnoofPDUSessionResource>* |  |  | - | - |
| >PDU Session ID  | M |  | 9.3.1.21 |  | - | - |
| >PDU Session Type  | M |  | 9.3.1.22 |  | - | - |
| >S-NSSAI  | M |  | 9.3.1.9 |  | - | - |
| >Security Indication  | M |  | 9.3.1.23 |  | - | - |
| >PDU Session Resource DL Aggregate Maximum Bit Rate | O |  | Bit Rate9.3.1.20 | This IE shall be present when at least one Non-GBR QoS Flows is being setup. | - | - |
| >NG UL UP Transport Layer Information | M |  | UP Transport Layer Information9.3.2.1 |  | - | - |
| >PDU Session Data Forwarding Information Request | O |  | Data Forwarding Information Request 9.3.2.5 |  | - | - |
| >PDU Session Inactivity Timer | O |  | Inactivity Timer 9.3.1.54 | Included if the Activity Notification Level is set to PDU Session. | - | - |
| >Existing Allocated NG DL UP Transport Layer Information | O |  | UP Transport Layer Information9.3.2.1 |  | - | - |
| >Network Instance | O |  | 9.3.1.62 | This IE is ignored if the *Common Network Instance* IE is included. | YES | ignore |
| >Common Network Instance | O |  | 9.3.1.66 |  | YES | ignore |
| **>DRB To Setup List** |  | *1* |  |  | - | - |
| **>>DRB To Setup Item**  |  | *1..<maxnoofDRBs>* |  |  | - | - |
| >>>DRB ID | M |  | 9.3.1.16 |  | - | - |
| >>>SDAP Configuration | M  |  | 9.3.1.39 |  | - | - |
| >>>PDCP Configuration | M |  | 9.3.1.38 |  | - | - |
| >>>Cell Group Information | M |  | 9.3.1.11 |  | - | - |
| >>>QoS Flows Information To Be Setup | M |  | QoS Flow QoS Parameters List9.3.1.25 |  | - | - |
| >>>DRB Data forwarding information Request | O |  | Data Forwarding Information Request 9.3.2.5 | Requesting forwarding info from the target gNB-CU-UP. | - | - |
| >>>DRB Inactivity Timer | O |  | Inactivity Timer 9.3.1.54 | Included if the Activity Notification Level is set to DRB. | - | - |
| >>>PDCP SN Status Information | O |  | 9.3.1.58 | Contains the PDCP SN Status at setup after Resume. | - | - |
| >>>DRB QoS | O |  | 9.3.1.26 | Indicates the DRB QoS when more than one QoS Flow is mapped to the DRB. | YES | ignore |
| >>>DAPS Request Information | O |  | 9.3.1.91 |  | YES | ignore |
| >Redundant NG UL UP Transport Layer Information | O |  | UP Transport Layer Information9.3.2.1 |  | YES | ignore |
| >Redundant Common Network Instance | O |  | Common Network Instance9.3.1.66 |  | YES | ignore |
| >Redundant PDU Session Information | O |  | 9.3.1.80 |  | YES | ignore |
| >Data Forwarding from E-UTRAN Request List |  | *0..1* |  |  |  |  |
| >> Data Forwarding from E-UTRAN Request Item |  | *1..< maxnoofDRBs >* |  | Request for data forwarding address per DRB ID when handover from E-UTRAN  |  |  |
| >>>DRB ID | M |  | 9.3.1.16 |  |  |  |
| >>>Data forwarding Request information | M |  | Data Forwarding Information 9.3.2.5 |  |  |  |

|  |  |
| --- | --- |
| **Range bound** | **Explanation** |
| maxnoofDRBs | Maximum no. of DRBs for a UE. Value is 32. |
| maxnoofPDUSessionResource  | Maximum no. of PDU Sessions for a UE. Value is 256. |

Not modified

9.3.3.5 PDU Session Resource Setup List

This IE contains setup PDU session resource related information used at Bearer Context Setup Response

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** | **Criticality** | **Assigned Criticality** |
| **PDU Session Resource Setup Item** |  | *1..<maxnoofPDUSessionResource>* |  |  | - | - |
| >PDU Session ID  | M |  | 9.3.1.21 |  | - | - |
| >Security Result | O |  | 9.3.1.52 |  | - | - |
| >NG DL UP Transport Layer Information | M |  | UP Transport Layer Information 9.3.2.1 |  | - | - |
| >PDU Session Data Forwarding Information Response | O |  | Data Forwarding Information9.3.2.6 | Providing forwarding info from the target gNB-CU-UP. | - | - |
| >NG DL UP Unchanged | O |  | ENUMERATED (True, …) |  | - | - |
| **>DRB Setup List** |  | *1* |  |  | - | - |
| **>>DRB Setup Item**  |  | *1..<maxnoofDRBs>* |  |  | - | - |
| >>>DRB ID  | M |  | 9.3.1.16 |  | - | - |
| >>>DRB Data forwarding information Response | O |  | Data Forwarding Information 9.3.2.6 | Providing forwarding info from the target gNB-CU-UP. | - | - |
| >>>UL UP Parameters | M |  | UP Parameters 9.3.1.13 |  | - | - |
| >>>Flow Setup List | M |  | QoS Flow List9.3.1.12 |  | - | - |
| >>>Flow Failed List  | O |  | Flow Failed List 9.3.1.45 |  | - | - |
| **>DRB Failed List** |  | *0.. 1* |  |  | - | - |
| **>>DRB Failed Item**  |  | *1..<maxnoofDRBs>* |  |  | - | - |
| >>>DRB ID  | M |  | 9.3.1.16 |  | - | - |
| >>>Cause  | M |  | 9.3.1.2 |  | - | - |
| >Redundant NG DL UP Transport Layer Information | O |  | UP Transport Layer Information9.3.2.1 |  | YES | ignore |
| >Used Redundant PDU Session Information | O |  | 9.3.1.80 |  | YES | ignore |
| >Data Forwarding from E-UTRAN Response List |  | 0..1 |  |  |  |  |
| >> Data Forwarding from E-UTRAN Response Item |  | *1..< maxnoofDRBs >* |  | Provided data forwarding address per DRB ID when handover from E-UTRAN. |  |  |
| >>>DRB ID | M |   | 9.3.1.16 |   | - | - |
| >>>Data forwarding Response information | M |   | Data Forwarding Information 9.3.2.6 |  |  |  |
| **Range bound** | **Explanation** |
| maxnoofDRBs | Maximum no. of DRBs for a UE. Value is 32. |
| maxnoofPDUSessionResource  | Maximum no. of PDU Sessions for a UE. Value is 256. |

9.3.3.6 PDU Session Resource Failed List

Not modified

9.4.5 Information Element Definitions

-- ASN1START

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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-- Information Element Definitions

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

E1AP-IEs {

itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)

ngran-access (22) modules (3) e1ap (5) version1 (1) e1ap-IEs (2) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

IMPORTS

 id-CommonNetworkInstance,

 id-SNSSAI,

 id-OldQoSFlowMap-ULendmarkerexpected,

 id-DRB-QoS,

 id-endpoint-IP-Address-and-Port,

 id-NetworkInstance,

 id-QoSFlowMappingIndication,

 id-TNLAssociationTransportLayerAddressgNBCUUP,

 id-Cause,

 id-QoSMonitoringRequest,

 id-QosMonitoringReportingFrequency,

 id-PDCP-StatusReportIndication,

 id-RedundantCommonNetworkInstance,

 id-redundant-nG-UL-UP-TNL-Information,

 id-redundant-nG-DL-UP-TNL-Information,

 id-RedundantQosFlowIndicator,

 id-TSCTrafficCharacteristics,

 id-ExtendedPacketDelayBudget,

 id-CNPacketDelayBudgetDownlink,

 id-CNPacketDelayBudgetUplink,

 id-AdditionalPDCPduplicationInformation,

 id-RedundantPDUSessionInformation,

 id-RedundantPDUSessionInformation-used,

 id-QoS-Mapping-Information,

 id-MDTConfiguration,

 id-TraceCollectionEntityURI,

 id-EHC-Parameters,

 id-DAPSRequestInfo,

 id-EarlyForwardingCOUNTReq,

 id-EarlyForwardingCOUNTInfo,

 id-AlternativeQoSParaSetList,

 id-MCG-OfferedGBRQoSFlowInfo,

 id-Number-of-tunnels,

 id-DataForwardingtoE-UTRANInformationList,

 id-DataForwardingfromE-UTRANRequestList,

 id-DataForwardingfromE-UTRANResponseList,

 maxnoofQoSParaSets,

 maxnoofErrors,

 maxnoofSliceItems,

 maxnoofEUTRANQOSParameters,

 maxnoofNGRANQOSParameters,

not modified

PDU-Session-Resource-To-Setup-List ::= SEQUENCE (SIZE(1.. maxnoofPDUSessionResource)) OF PDU-Session-Resource-To-Setup-Item

PDU-Session-Resource-To-Setup-Item ::= SEQUENCE {

 pDU-Session-ID PDU-Session-ID,

 pDU-Session-Type PDU-Session-Type,

 sNSSAI SNSSAI,

 securityIndication SecurityIndication,

 pDU-Session-Resource-DL-AMBR BitRate OPTIONAL,

 nG-UL-UP-TNL-Information UP-TNL-Information,

 pDU-Session-Data-Forwarding-Information-Request Data-Forwarding-Information-Request OPTIONAL,

 pDU-Session-Inactivity-Timer Inactivity-Timer OPTIONAL,

 existing-Allocated-NG-DL-UP-TNL-Info UP-TNL-Information OPTIONAL,

 networkInstance NetworkInstance OPTIONAL,

 dRB-To-Setup-List-NG-RAN DRB-To-Setup-List-NG-RAN,

 iE-Extensions ProtocolExtensionContainer { { PDU-Session-Resource-To-Setup-Item-ExtIEs } } OPTIONAL,

 ...

}

PDU-Session-Resource-To-Setup-Item-ExtIEs E1AP-PROTOCOL-EXTENSION ::= {

 { ID id-CommonNetworkInstance CRITICALITY ignore EXTENSION CommonNetworkInstance PRESENCE optional }|

 { ID id-redundant-nG-UL-UP-TNL-Information CRITICALITY ignore EXTENSION UP-TNL-Information PRESENCE optional }|

 { ID id-RedundantCommonNetworkInstance CRITICALITY ignore EXTENSION CommonNetworkInstance PRESENCE optional }|

 { ID id-RedundantPDUSessionInformation CRITICALITY ignore EXTENSION RedundantPDUSessionInformation PRESENCE optional }|

 {ID id- DataForwardingfromE-UTRANRequestList CRITICALITY ignore EXTENSION DataForwardingfromE-UTRANRequest-List PRESENCE optional },

 ...

}

Not modified

PDU-Session-Resource-Setup-List ::= SEQUENCE (SIZE(1.. maxnoofPDUSessionResource)) OF PDU-Session-Resource-Setup-Item

PDU-Session-Resource-Setup-Item ::= SEQUENCE {

 pDU-Session-ID PDU-Session-ID,

 securityResult SecurityResult OPTIONAL,

 nG-DL-UP-TNL-Information UP-TNL-Information,

 pDU-Session-Data-Forwarding-Information-Response Data-Forwarding-Information OPTIONAL,

 nG-DL-UP-Unchanged ENUMERATED {true, ...} OPTIONAL,

 dRB-Setup-List-NG-RAN DRB-Setup-List-NG-RAN,

 dRB-Failed-List-NG-RAN DRB-Failed-List-NG-RAN OPTIONAL,

 iE-Extensions ProtocolExtensionContainer { { PDU-Session-Resource-Setup-Item-ExtIEs } } OPTIONAL,

 ...

}

PDU-Session-Resource-Setup-Item-ExtIEs E1AP-PROTOCOL-EXTENSION ::= {

 { ID id-redundant-nG-DL-UP-TNL-Information CRITICALITY ignore EXTENSION UP-TNL-Information PRESENCE optional }|

 { ID id-RedundantPDUSessionInformation-used CRITICALITY ignore EXTENSION RedundantPDUSessionInformation PRESENCE optional }|

 {ID id-DataForwardingfromE-UTRANResponseList CRITICALITY ignore EXTENSION DataForwardingfromE-UTRANResponse-List PRESENCE optional },

 ...

}

Not modified

DataForwardingfromE-UTRANRequest-List ::= SEQUENCE (SIZE(1.. maxnoofDRBs)) OF DataForwardingfromE-UTRANRequest-Item

DataForwardingfromE-UTRANRequest-Item ::= SEQUENCE {

 dRB-ID DRB-ID,

 data-forwarding-Request-information Data-Forwarding-Information-Request,

 iE-Extensions ProtocolExtensionContainer { { DataForwardingfromE-UTRANRequest-Item-ExtIEs} } OPTIONAL,

 ...

}

DataForwardingfromE-UTRANRequest-Item-ExtIEs E1AP-PROTOCOL-EXTENSION ::= {

 ...

}

DataForwardingfromE-UTRANResponse-List ::= SEQUENCE (SIZE(1.. maxnoofDRBs)) OF DataForwardingfromE-UTRANResponse-Item

DataForwardingfromE-UTRANResponse-Item ::= SEQUENCE {

 dRB-ID DRB-ID,

 Data-forwarding-Response-information Data-Forwarding-Information,

 iE-Extensions ProtocolExtensionContainer { { DataForwardingfromE-UTRANResponse-Item-ExtIEs} } OPTIONAL,

 ...

}

DataForwardingfromE-UTRANResponse-Item-ExtIEs E1AP-PROTOCOL-EXTENSION ::= {

 ...

}

Not modified

###

### 9.4.7 Constant Definitions

-- ASN1START

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- Constant definitions

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

E1AP-Constants {

itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)

ngran-access (22) modules (3) e1ap (5) version1 (1) e1ap-Constants (4) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

Not modified

id-Number-of-tunnels ProtocolIE-ID ::= 127

id-DRB-Measurement-Results-Information-List ProtocolIE-ID ::= 128

id-Extended-GNB-CU-CP-Name ProtocolIE-ID ::= 129

id-Extended-GNB-CU-UP-Name ProtocolIE-ID ::= 130

id-DataForwardingtoE-UTRANInformationList ProtocolIE-ID ::= 131

id-QosMonitoringReportingFrequency ProtocolIE-ID ::= 132

id-DataForwardingfromE-UTRANRequestList ProtocolIE-ID ::= xxx

id-DataForwardingfromE-UTRANResponseList ProtocolIE-ID ::= xxx

END

-- ASN1STOP