**3GPP TSG-RAN WG3 Meeting #123 *R3-240883***

**Athens, Greece, 26th February– 1st March, 2024**

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| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **38.401** | **CR** | **0324** | **rev** | **1** | **Current version:** | **18.0.0** |  |
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| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network | **x** | Core Network |  |

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| ***Title:*** | Rapporteur update for 38.401-CR | | | | | | | | | |
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| ***Source to WG:*** | NEC | | | | | | | | | |
| ***Source to TSG:*** | R3 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_newRAT-Core, TEI18 | | | | |  | ***Date:*** | | | 2024-02-26 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **D** |  | | | | | ***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 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)* | |
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| ***Reason for change:*** | | Rapporteur review of specification and found some editorial correction | | | | | | | | |
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| ***Summary of change:*** | | Rapporteur to give some editorial correction  Impact Analysis:  Impact assessment towards the previous version of the specification (same release):  This CR has no impact to any functionality | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | The spec remains editorial mistake. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 2, 6.2.4, 6.4, 8.7, 8.9.14, 8.16.1,8.18.1, 8.18.2, 8.18.3, 8.18.4, 8.21.1, 8.23.1, | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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's revision history:*** | | Rev1:  -in 8.18.4,to remove a sentense which was forgotten.  -undo the change of figures, keep colourful text inside the figures.  -giving more editorial like indent etc.  Rev0: first version | | | | | | | | |

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| *Start of change part* |

# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non‑specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 38.300: "NR; Overall description; Stage-2".

[3] 3GPP TS 23.501: "System Architecture for the 5G System".

[4] 3GPP TS 38.473: "NG-RAN; F1 application protocol (F1AP)".

[5] 3GPP TS 38.414: "NG-RAN; NG data transport".

[6] 3GPP TS 38.424: "NG-RAN; Xn data transport".

[7] 3GPP TS 38.474: "NG-RAN; F1 data transport".

[8] ITU-T Recommendation G.823 (2000-03): "The control of jitter and wander within digital networks which are based on the 2048 kbit/s hierarchy".

[9] ITU-T Recommendation G.824 (2000-03): "The control of jitter and wander within digital networks which are based on the 1544 kbit/s hierarchy".

[10] ITU-T Recommendation G.825 (2001-08): "The control of jitter and wander within digital networks which are based on the synchronous digital hierarchy (SDH)".

[11] ITU-T Recommendation G.8261/Y.1361 (2008-04): "Timing and Synchronization aspects in Packet networks".

[12] 3GPP TS 37.340: "NR; Multi-connectivity; Overall description; Stage-2".

[13] 3GPP TS 33.501: "Security Architecture and Procedures for 5G System".

[14] 3GPP TS 38.410: "NG-RAN; NG general aspect and principles".

[15] 3GPP TS 38.420: "NG-RAN; Xn general aspects and principles"

[16] 3GPP TS 38.470: "NG-RAN; F1 general aspects and principles".

[17] 3GPP TS 38.460: "NG-RAN; E1 general aspects and principles".

[18] 3GPP TS 33.210: "3G security; Network Domain Security (NDS); IP Network Layer Security".

[19] 3GPP TS 36.300: "Evolved Universal Terrestrial Radio Access (E-UTRA), Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Overall description; Stage 2".

[20] 3GPP TS 32.422: "Trace control and configuration management".

[21] 3GPP TS 37.470: "Evolved Universal Terrestrial Radio Access Network (E-UTRAN) and NG-RAN; W1 general aspects and principles; Stage-2".

[22] 3GPP TS 38.340: "NR; Backhaul Adaptation Protocol (BAP) specification".

[23] 3GPP TS 38.331: "NR; Radio Resource Control (RRC) protocol specification".

[24] 3GPP TS 38.425: "NG-RAN; NR user plane Protocol".

[25] 3GPP TS 38.305: "NG Radio Access Network (NG-RAN); Stage 2 functional specification of User Equipment (UE) positioning in NG-RAN".

[26] 3GPP TS 38.472: "NG-RAN; F1 signalling transport".

[27] 3GPP TS 23.247: " Architectural enhancements for 5G multicast-broadcast services; Stage 2".

[28] 3GPP TS 36.401: "Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Architecture Description".

[29] IETF RFC 4555 (2006-06): "RFC IKEv2 Mobility and Multihoming Protocol (MOBIKE)".

[30] 3GPP TS 38.321 " NR; Medium Access Control (MAC) protocol specification ".

[31] 3GPP TS 37.320: "Radio measurement collection for Minimization of Drive Tests (MDT); Overall description; Stage 2".

[32] 3GPP TS 23.502: "Procedures for the 5G System (5GS); Stage 2".

[33] 3GPP TS 28.532: "Management and orchestration; Generic management services".

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### 6.2.4 gNB-CU-UP ID

The gNB-CU-UP ID is configured at the gNB-CU-UP and used to uniquely identify the gNB-CU-UP at least within a gNB-CU-CP. The gNB-CU-UP provides its gNB-CU-UP ID to the gNB-CU-CP during the E1 Setup procedure. The gNB-CP-UP ID is used only within E1AP procedures.

NOTE 1: This identity is also used to uniquely identify the ng-eNB-CU-UP at least within an ng-eNB-CU-CP in case CP/UP separation is implemented in ng-eNB.

NOTE 2: This identity is also used to uniquely identify the eNB at least within an eNB-CP in case CP/UP separation is implemented in eNB.

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## 6.4 UE associations in NG-RAN Node

There are several types of UE associations needed in the NG-RAN node: the "NG-RAN node UE context" used to store all information needed for a UE and the associations between the UE and the logical NG and Xn connections used for NGAP/XnAP UE associated messages. An "NG-RAN node UE context" exists for a UE in CM\_CONNECTED.

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## 8.7 RRC connection reestablishment

This procedure is used for the case that UE tries to reestablish the RRC connection, as shown in Figure 8.7-1.



Figure 8.7-1: RRC connection reestablishment procedure

1. The UE sends a preamble to the gNB-DU.

2. The gNB-DU allocates new C-RNTI and responds with RAR.

3. The UE sends an *RRCReestablishmentRequest* message to the gNB-DU, which contains old C-RNTI and old PCI.

4. The gNB-DU includes the RRC message and, if the UE is admitted, the corresponding low layer configuration for the UE in the INITIAL UL RRC MESSAGE TRANSFER message and transfers to the gNB-CU. The INITIAL UL RRC MESSAGE TRANSFER message includes the new C-RNTI. If the gNB-DU identifies the UE as a Reduced Capability UE during the random access procedure, a NR RedCap UE Indication is provided in the INITIAL UL RRC MESSAGE TRANSFER message.

5. The gNB-CU includes an *RRCReestablishment* message and transfers to the gNB-DU. If the UE requests to re-establish RRC connection in the last serving gNB-DU, the DL RRC MESSAGE TRANSFER message shall include old gNB-DU UE F1AP ID.

6. The gNB-DU retrieves the UE context based on the old gNB-DU UE F1AP ID, and replaces old C-RNTI/PCI with new C-RNTI/PCI. It sends the *RRCReestablishment* message to UE.

7-8. The UE sends an *RRCReestablishmentComplete* message to the gNB-DU. The gNB-DU encapsulates the RRC message in the UL RRC MESSAGE TRANSFER message and sends to the gNB-CU.

9-10. The gNB-CU triggers an UE Context Modification procedure by sending UE CONTEXT MODIFICATION REQUEST message, which may include DRBs to be modified and released list. The gNB-DU responses with the UE CONTEXT MODIFICATION RESPONSE message.

9'-10'. The gNB-DU triggers an UE Context Modification procedure by sending UE CONTEXT MODIFICATION REQUIRED message, which may include DRBs to be modified and released list. The gNB-CU responses with UE CONTEXT MODIFICATION CONFIRM message.

NOTE 1: Here it is assumed that the UE accessed the original gNB-DU where the UE context is available for that UE, and either steps 9-10 or steps 9’-10’ may be executed or both could be skipped.

NOTE 2: If the UE accessed from a gNB-DU other than the original one, the gNB-CU should trigger the UE Context Setup procedure toward this new gNB-DU.

11-12. The gNB-CU includes an *RRCReconfiguration* message into the DL RRC MESSAGE TRANSFER message and transfers to the gNB-DU. The gNB-DU forwards it to the UE.

13-14. The UE sends an *RRCReconfigurationComplete* message to the gNB-DU, and the gNB-DU forwards it to the gNB-CU.

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### 8.9.14 Mobile IAB-node authorization

During the mobile IAB-node integration procedure, the RRC-terminating IAB-donor-CU receives the authorization status of the mobile IAB-node from the 5GC. If the authorization status is “not authorized”, the RRC-terminating IAB-donor-CU will neither establish any backhaul resources nor allocate any BAP address, TNL address or default BAP configuration for this mobile IAB-node. If the authorization status for the mobile IAB-node changes, the 5GC sends an updated authorization status to the RRC-terminating IAB-donor-CU.

In case the mobile IAB-MT and its co-located mobile IAB-DU connect to same IAB-donor-CU, and the updated authorization status received from the 5GC is “not authorized”, the IAB-donor-CU will perform the following actions in this order: it will attempt to hand over the UEs served by the mobile IAB-node to other cell(s), release the F1 interface towards the mobile IAB-DU, and release all backhaul resources (including the BAP address, TNL address and default BAP reconfiguration) for this mobile IAB-node.

In case the mobile IAB-MT and its co-located mobile IAB-DU connect to different IAB-donor-CUs, the RRC-terminating IAB-donor-CU sends the updated authorization status to the F1-terminating IAB-donor-CU via the IAB TRANSPORT MIGRATION MODIFICATION REQUEST message. The F1-terminating IAB-donor-CU confirms the reception of the updated authorization status via the IAB TRANSPORT MIGRATION MODIFICATION RESPONSE message.

NOTE: In absence of Xn connectivity between the RRC-terminating IAB-donor-CU and the F1-terminating IAB-donor-CU, the passing of the authorization status is left up to implementation.

If the updated authorization status for the mobile IAB-node is “not authorized”, the F1-terminating IAB-donor, attempts to hand over the UEs served by the mobile IAB-node to other cell(s), and then releases the F1 interface towards the mobile IAB-DU. After that, the F1-terminating IAB-donor requests from the RRC-terminating IAB-donor the release of all the offloaded traffic via the IAB TRANSPORT MIGRATION MANAGEMENT REQUEST message. The RRC-terminating IAB-donor releases the offloaded traffic and all backhaul resources (including BAP address, TNL address and default BAP reconfiguration) for this mobile IAB-node. The RRC-terminating IAB-donor may send an indication which indicates that the mobile IAB-MT can be deregistered, to AMF.

If the authorization status is changed back from “not authorized” to “authorized”, the phase 2 and phase 3 of the mobile IAB-node integration procedure as defined in clause 8.12.3 are carried out.

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### 8.16.1 MN initiated Conditional PSCell Addition

The procedure for MN initiated Conditional PSCell Addition (CPA) is shown in Figure 8.16-1-1.



Figure 8.16.1-1 Conditional Secondary Node Addition procedure

1-12. The steps 1-12 are as defined in TS 37.340 [12].

a1-a5. The steps a1-a5 are as defined in clause 8.9.2 and with conditional indications.

a6. After Random Access procedure successfully performed at the candidate gNB-DU which becomes the target SN gNB-DU, the target gNB-DU sends a Downlink Data Delivery Status frame to inform the target gNB-CU-UP. The target gNB-DU also sends an ACCESS SUCCESS message to inform the target gNB-CU-CP of which cell the UE has successfully accessed.

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## 8.18 Overall procedure for Small Data Transmission during RRC Inactive

### 8.18.1 RACH based SDT

The procedure for RACH based small data transmission in RRC Inactive is shown in Figure 8.18.1-1.



Figure 8.18.1-1: RACH based Small Data Transmission in RRC Inactive state.

1. The UE in RRC Inactive sends the *RRCResumeRequest* message together with UL SDT data and/or UL SDT signalling.

2. The gNB-DU buffers the UL SDT data and/or UL SDT signalling.

3. The step 3 is as defined in step 4 in clause 8.6.2, including an indication of SDT access. The gNB-DU may also provide SDT assistance information.

4-5. If UE context is successfully retrieved as specified in TS 38.300 [2], the steps 4-5 are as defined in steps 6-7 in clause 8.9.6.2. The UL SDT data, if any, is forwarded to the gNB-CU-UP, and the UL signalling, if any, is forwarded to the gNB-CU-CP via the UL RRC MESSAGE TRANSFER message, in which any UL NAS PDU is delivered to AMF.

NOTE 1: In case that full UE context is retrieved from another gNB-CU-CP as specified in TS 38.300 [2], the gNB-CU-CP first establishes the UE context in the gNB-CU-UP via the Bearer Context Setup procedure and F1-U UL TEIDs are retrieved before step 4. The BEARER CONTEXT SETUP REQUSET message may include an indication to suspend non-SDT bearers, and in this case, the BEARER CONTEXT MODIFICATION REQUEST message in step 6 does not include resume indication for SDT DRBs.

NOTE 2: In case that only partial UE context for SDT including F1-U UL TEIDs is retrieved from another gNB-CU-CP as specified in TS 38.300 [2], the gNB-CU-CP uses those F1-U UL TEIDs for steps 4-5, and the subsequent steps 6-7 are not executed. The F1-U DL TEIDs received from the gNB-DU in step 5 should be forwarded to the other gNB-CU-CP, to be used for transferring of the DL SDT data. In addition, the UL SDT data, if any, is forwarded from the gNB-DU to the gNB-CU-UP of the other gNB-CU-CP for which the partial context is retrieved, and the UL signalling, if any, is forwarded from the gNB-CU-CP to the other gNB-CU-CP (the last serving gNB-CU-CP) via the XnAP RRC TRANSFER message.

NOTE 3: The other gNB-CU-UP may need to buffer the UL SDT data if received before the SDT bearer(s) are resumed.

6. The gNB-CU-CP sends the BEARER CONTEXT MODIFICATION REQUEST message including an resume indication for SDT DRBs. The gNB-CU-CP also includes the F1-U DL TEIDs received from the gNB-DU in step 5.

7. The gNB-CU-UP responds with the BEARER CONTEXT MODIFICATION RESPONSE message.

NOTE 4: void.

Upon receiving the UE INACTIVITY NOTIFICATION message without SDT volume threshold crossed indication from the gNB-DU, the gNB-CU, if serving the UE and deciding to terminate the ongoing SDT procedure, shall transmit the UE CONTEXT RELEASE COMMAND message to the gNB-DU.

If CG-SDT is (re-)configured, the gNB-CU may request the gNB-DU to keep CG-SDT configuration and resources in the UE CONTEXT RELEASE COMMAND message.

NOTE 5: Upon receiving BSR from the UE, in case that UL SDT data size in the BSR is larger than the threshold configured from the gNB-CU-CP, the gNB-DU sends the UE INACTIVITY NOTIFICATION message with the SDT volume threshold crossed indication to the gNB-CU-CP. Upon receiving such indication, the gNB-CU-CP may terminate the ongoing SDT procedure, by sending the *RRCResume* message to move the UE to RRC\_CONNECTED, or by sending the *RRCRelease* message to move the UE to RRC\_INACTIVE.

Upon receiving non-SDT data, the gNB-CU-UP shall send the DL DATA NOTIFICATION message to the gNB-CU-CP. The gNB-CU-CP shall terminate the ongoing SDT procedure as specified in TS 38.300 [2].

If the amount of the received DL SDT data is above the data size threshold configured by the gNB-CU-CP, the gNB-CU-UP shall send the DL DATA NOTIFICATION message with the SDT data size threshold crossed indication. The gNB-CU-CP may terminate the ongoing SDT procedure.

### 8.18.2 CG based SDT

The procedure for CG based small data transmission in RRC Inactive is shown in Figure 8.18.2-1.



Figure 8.18.2-1: CG based Small Data Transmission in RRC Inactive state.

1. The gNB-CU decides to move UE into RRC\_INACTIVE state.

2. The gNB-CU-CP decides to configure CG-SDT, it sends UE CONTEXT MODIFICATION REQUEST message including a query indication for CG-SDT related resource configuration associated with the information of SDT Radio Bearer(s).

3. The gNB-DU sends the UE CONTEXT MODIFICATION RESPONSE message including the CG-SDT related resource configurations for the requested SDT Radio Bearer(s) within the *DU to CU RRC Information* IE.

4. The gNB-CU-CP sends the BEARER CONTEXT MODIFICATION REQUEST towards the gNB-CU-UP, with the suspend indication.

5. The gNB-CU-UP sends the BEARER CONTEXT MODIFICATION RESPONSE towards the gNB-CU-CP.

6. The gNB-CU-CP sends the UE CONTEXT RELEASE COMMAND message to the gNB-DU including an *RRCRelease* message to the UE with the CG-SDT information within suspend configuration. The gNB-CU notifies the gNB-DU to keep the SDT RLC config, F1-U tunnels, F1AP UE association, and store the CG resource for SDT when the UE is entering RRC\_INACTIVE state with an explicit CG-SDT kept indicator.

7. The gNB-DU sends the *RRCRelease* message to UE.

8. The gNB-DU sends UE CONTEXT RELEASE COMPLETE message. The gNB-DU keeps the SDT RLC config, F1-U tunnels, F1AP UE association, and stores the CG resource for SDT when the UE entering RRC\_INACTIVE. The gNB-DU also stores the C-RNTI, CS-RNTI, and which bearers are CG-SDT bearers.

After a period of time of the UE being in RRC\_INACTIVE state.

9. The UE decides to perform CG based SDT procedure, it sends the *RRCResumeRequest* message together with UL SDT data/UL NAS PDU.

10.The gNB-DU sends the UL RRC MESSAGE TRANSFER message including the *RRCResumeRequest* message to indicate the access due to CG-SDT.

11/12. If UE context is successfully retrieved as specified in TS 38.300 [2], the gNB-CU-CP initiates the BEARER CONTEXT MODIFICATION procedure to resume SDT DRBs.

13 – 13a. The gNB-DU sends the UL SDT data, if any, to the gNB-CU-UP, and/or sends the UL signalling, if any, to the gNB-CU-CP via the UL RRC MESSAGE TRANSFER message, in which any UL NAS PDU is delivered to AMF.

NOTE 1: void.

Upon receiving the UE INACTIVITY NOTIFICATION message without SDT volume threshold crossed indication from the gNB-DU and deciding to terminate the ongoing SDT procedure, the gNB-CU shall transmit the UE CONTEXT RELEASE COMMAND message to the gNB-DU.

NOTE 2: Upon receiving BSR from the UE, in case that UL SDT data size in the BSR is larger than the threshold configured from the gNB-CU-CP, the gNB-DU sends the UE INACTIVITY NOTIFICATION message with the SDT volume threshold crossed indication to the gNB-CU-CP. Upon receiving such indication, the gNB-CU-CP may terminate the ongoing SDT procedure, by sending the *RRCResume* message to move the UE to RRC\_CONNECTED, or by sending the *RRCRelease* message to move the UE to RRC\_INACTIVE.

If CG-SDT is re-configured, the gNB-CU may request the gNB-DU to keep CG-SDT configuration and resources in the UE CONTEXT RELEASE COMMAND message.

Upon receiving non-SDT data, the gNB-CU-UP shall send the DL DATA NOTIFICATION message to the gNB-CU-CP. The gNB-CU-CP shall terminate the ongoing SDT procedure as specified in TS 38.300 [2].

If the amount of the received DL SDT data is above the data size threshold configured by the gNB-CU-CP, the gNB-CU-UP shall send the DL DATA NOTIFICATION message with the SDT data size threshold crossed indication. The gNB-CU-CP may terminate the ongoing SDT procedure.

### 8.18.3 RA-SDT or non-SDT with CG-SDT configuration

The procedure for the case where the UE has CG-SDT resource configurations but decides to perform RACH based small data transmission in RRC Inactive or to perform RACH procedure to transit to RRC Connected (see TS 38.321 [30] clause 5.27) is shown in Figure 8.18.3-1.



Figure 8.18.3-1: RA-SDT or non-SDT with CG-SDT configuration.

1. The UE in RRC Inactive sends *RRCResumeRequest* message. If the UE decides to perform RACH based SDT procedure, it also sends UL SDT data and/or UL SDT signalling.

2. The gNB-DU buffers the UL SDT data and/or UL SDT signalling.

3. The gNB-DU sends the INITIAL UL RRC MESSAGE TRANSFER message to the gNB-CU-CP, including a new gNB-DU UE F1AP ID, and in case of RACH based SDT access, the gNB-DU provides an indication of SDT access and may also the SDT assistance information.

4. If UE context is successfully retrieved as specified in TS 38.300 [2], the gNB-CU-CP sends the UE CONTEXT SETUP REQUEST message with the stored (or retrieved from the last serving gNB) F1 UL TEIDs and the new gNB-DU UE F1AP ID received in step 3.

In case that the gNB-DU is the one that sent the RRCRelease message with CG-SDT resource configurations to the UE, the gNB-CU-CP also includes the old gNB-DU UE F1AP ID and the old gNB-CU F1AP UE ID within the Old CG-SDT Session Info IE of the UE CONTEXT SETUP REQUEST message.

In case that the gNB-CU-CP is the one that generated the RRCRelease message with CG-SDT resource configurations but the gNB-DU is not the old gNB-DU that sent the RRCRelease message to the UE, the gNB-CU-CP initiates the UE Context Release procedure by sending the UE CONTEXT RELEASE COMMAND message to the old gNB-DU.

In case that the UE accesses a gNB other than the last serving gNB, upon receiving the RETRIEVE UE CONTEXT REQUEST message from the receiving gNB-CU-CP, the last serving gNB-CU-CP initiates the UE Context Release procedure by sending the UE CONTEXT RELEASE COMMAND message to the last serving gNB-DU.

5. The gNB-DU sends the UE CONTEXT SETUP RESPONSE message with the new gNB-DU UE F1AP ID. In case the old gNB-DU UE F1AP ID is received within the *Old CG-SDT Session Info* IE in step 4, the gNB-DU retrieves the stored CG-SDT resource configurations and UE context based on the *Old CG-SDT Session Info* IE, if any, and associates them with the new gNB-DU F1AP UE ID.

### 8.18.4 MT-SDT

The procedure for mobile terminated small data transmission in RRC Inactive is shown in Figure 8.18.4-1.



Figure 8.18.4-1: Mobile Terminated Small Data Transmission in RRC Inactive state.

1. During the setup or modification of the bearer context as specified in 8.9.2, the gNB-CU-CP requests the gNB-CU-UP to provide MT-SDT information.

2a-0. The gNB-CU-UP receives DL data for the UE in RRC Inactive on NG-U interface.

2a-1. The gNB-CU-UP sends DL DATA NOTIFICATION message to the gNB-CU-CP. If determining that DL data packets are only mapped to SDT bearers, as requested in step 1, the gNB-CU-UP includes the MT-SDT information in the DL DATA NOTIFICATION message.

2b. The gNB-CU-CP receives DL NAS signalling over NGAP.

3. After 2a or 2b, the gNB-CU-CP sends PAGING message to the gNB-DU. The MT-SDT indication may be included in the PAGING message.

4. The gNB-DU sends the *Paging* message to the UE. In case the MT-SDT indication is received in step 3, the gNB-DU includes the MT-SDT indicator in the *Paging* message.

5. If the UE has been successfully reached, it initiates the RRC connection resume procedure as described in 8.6.2 or 8.9.6.2, or initiates the SDT procedure as described from step 1 in 8.18.1 or from step 9 in 8.18.2 or from step 1 in 8.18.3 with the following difference:

- In case SDT procedure is initiated, the UE may indicate MT-SDT in the RRCResumeRequest, which may be without UL data.

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### 8.21.1 NCR Integration Procedure

A high-level flow chart for NCR integration is shown in Figure 8.21.1-1:



Figure 8.21.1-1: The integration procedure for NCR

Phase 1: NCR-MT setup. In this phase, the NCR-MT of the NCR (re-)selects a cell that broadcasts the NCR support indicator in SIB1. It then connects to the network as a UE, by performing the RRC connection setup procedure with the gNB-CU, and authentication with the 5GC. The NCR-MT includes the NCR indication in the RRCSetupComplete message. The gNB selects an appropriate AMF for the NCR. Upon receiving the NCR authorization information from 5GC, the gNB-CU provides the authorization information to the gNB-DU.

NOTE: The signalling flow for UE initial access procedure as shown in Figure 8.1-1/Figure 8.9.1-1 is used for the setup of the NCR-MT.

Phase 2: NCR configuration. The gNB-CU may configure the NCR via RRC.

Phase 3: NCR Start Operation. After the NCR is configured, it may start serving the UE(s).

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### 8.23.1 Migration of mobile IAB-MT via Xn handover

The mobile IAB-MT can be migrated from a source RRC-terminating IAB-donor-CU to a target RRC-terminating IAB-donor-CU using the Xn handover procedure. During this migration, the mobile IAB-DU co-located with the mobile IAB-MT is connected to an F1-terminating IAB-donor-CU, which may be the same as the source RRC-terminating IAB-donor-CU or the target RRC-terminating IAB-donor-CU, or it can be different from both the source and the target RRC-terminating IAB-donor-CU.

Figure 8.23.1-1 shows an example of mobile IAB-MT migration via Xn handover. In this example, the mobile IAB-MT is connected to the source RRC-terminating IAB-donor-CU via a source path of an IAB topology before the migration, and it is connected to the target RRC-terminating IAB-donor-CU via a target path of a different IAB topology after the migration.



Figure 8.23.1-1: Procedure for Xn-based migration of mobile IAB-MT

1. Steps 1-14 of the topology adaptation procedure in clause 8.17.3.1 are performed to conduct Xn handover of the mobile IAB-MT from the source parent IAB-node connected to the source RRC-terminating IAB-donor-CU to the target parent IAB-node connected to the target RRC-terminating IAB-donor-CU. In these steps, the mobile IAB-node corresponds to the migrating IAB-node in clause8.17.3.1, and the mobile IAB-MT’s source and target RRC-terminating IAB-donor-CUs correspond to the respective source and target IAB-donor-CUs of clause8.17.3.1. The source RRC-terminating IAB-donor-CU should retain the UE XnAP IDs allocated for the mobile IAB-MT as long as the mobile IAB-MT is connected.

2. Same as step 15 of the topology adaptation procedure in clause8.17.3.1, where the F1-C connection between the co-located mobile IAB-DU and its F1-terminating IAB-donor-CU is switched to the target path using the new TNL address information of the IAB-MT. In this step, the mobile IAB-node corresponds to the migrating IAB-node, and the F1-terminating IAB-donor-CU corresponds to the source IAB-donor-CU.

3. The mobile IAB-DU passes to the F1-terminating IAB-donor-CU via F1AP the gNB ID of the target RRC-terminating IAB-donor-CU and the mobile IAB-node’s BAP address allocated by the target RRC-terminating IAB-donor-CU. In case the migration of the mobile IAB-MT occurs during DU migration, each logical mobile IAB-DU passes this information to its respective F1-terminating IAB-donor-CU. The F1-terminating IAB-donor-CU retains the UE XnAP ID that it allocated to the mobile IAB-MT as long as the co-located mobile IAB-DU connects to this CU, and retains the UE XnAP ID allocated for the mobile IAB-MT by the source RRC-terminating IAB-donor-CU until the present step (step 3).

4. Same as steps 16-20 of the topology adaptation procedure in clause 8.17.3.1, where the F1-terminating IAB-donor-CU initiates the IAB Transport Migration Management procedure towards the target RRC-terminating IAB-donor-CU to provide the context of the offloaded traffic. The target RRC-terminating IAB-donor-CU reconfigures the BAP sublayer and/or BH RLC channels on the target path accordingly, and provides the UL BH information for UL BH reconfigurations to be conducted by the F1-terminating IAB-donor-CU on the mobile IAB-node. Then, the F1-U connections of the mobile IAB-node are migrated to the target path.