3GPP TSG-RAN WG3 #122 R3-238021

13th – 17th November 2023

Chicago, USA

**Agenda item: 13.2**

**Source: Nokia, Nokia Shanghai Bell, Ericsson**

**Title: (TP for TS 38.413 BL CR) IAB-node De-registration Handling**

**Document for: Discussion and Decision**

# 1 Introduction

This contribution includes TP to support following:

***Proposal 4a: MT’s CU sends an NGAP indication to AMF in a new class-2 NGAP procedure to indicate that the IAB MT can be deregistered. This proposal overwrites the WA: “MT’s CU sends an NGAP indication to AMF as part of an existing procedure, to indicate that the IAB MT can be deregistered.”***

# Annex A – TP for TS 38.413 BL CR

<<<<<<<<<<<<<<<<<<<< Start of Changes >>>>>>>>>>>>>>>>>>>>

#### 9.3.1.2 Cause

The purpose of the *Cause* IE is to indicate the reason for a particular event for the NGAP protocol.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| CHOICE *Cause Group* | M |  |  |  |
| >*Radio Network Layer* |  |  |  |  |
| >>Radio Network Layer Cause | M |  | ENUMERATED (Unspecified,  TXnRELOCOverall expiry,  Successful handover,  Release due to NG-RAN generated reason,  Release due to 5GC generated reason,  Handover cancelled,  Partial handover,  Handover failure in target 5GC/NG-RAN node or target system,  Handover target not allowed,  TNGRELOCoverall expiry,  TNGRELOCprep expiry,  Cell not available,  Unknown target ID,  No radio resources available in target cell,  Unknown local UE NGAP ID,  Inconsistent remote UE NGAP ID,  Handover desirable for radio reasons,  Time critical handover,  Resource optimisation handover,  Reduce load in serving cell,  User inactivity,  Radio connection with UE lost,  Radio resources not available,  Invalid QoS combination,  Failure in the radio interface procedure,  Interaction with other procedure,  Unknown PDU Session ID,  Unknown QoS Flow ID,  Multiple PDU Session ID Instances,  Multiple QoS Flow ID Instances,  Encryption and/or integrity protection algorithms not supported,  NG intra-system handover triggered,  NG inter-system handover triggered,  Xn handover triggered,  Not supported 5QI value,  UE context transfer,  IMS voice EPS fallback or RAT fallback triggered,  UP integrity protection not possible,  UP confidentiality protection not possible,  Slice(s) not supported,  UE in RRC\_INACTIVE state not reachable,  Redirection,  Resources not available for the slice(s),  UE maximum integrity protected data rate reason,  Release due to CN-detected mobility,  …, N26 interface not available, Release due to pre-emption,Multiple Location Reporting Reference ID Instances,  RSN not available for the UP,  NPN access denied,  CAG only access denied, Insufficient UE Capabilities, RedCap UE not supported,  Unknown MBS Session ID,  Indicated MBS Session Area Information not served by the gNB,  Inconsistent slice info for the session,  Misaligned association for the multicast and unicast sessions or flows) |  |
| *>Transport Layer* |  |  |  |  |
| >>Transport Layer Cause | M |  | ENUMERATED (Transport resource unavailable,  Unspecified, …) |  |
| *>NAS* |  |  |  |  |
| >>NAS Cause | M |  | ENUMERATED  (Normal release,  Authentication failure,  Deregister,  Unspecified,  …, UE not in PLMN serving area,  Mobile IAB not authorized) |  |
| *>Protocol* |  |  |  |  |
| >>Protocol Cause | M |  | ENUMERATED (Transfer syntax error, Abstract syntax error (reject), Abstract syntax error (ignore and notify), Message not compatible with receiver state,  Semantic error,  Abstract syntax error (falsely constructed message),  Unspecified,  …) |  |
| *>Miscellaneous* |  |  |  |  |
| >>Miscellaneous Cause | M |  | ENUMERATED (Control processing overload,  Not enough user plane processing resources, Hardware failure, O&M intervention, Unknown PLMN or SNPN,  Unspecified,  …) |  |

The meaning of the different cause values is described in the following tables. In general, "not supported" cause values indicate that the related capability is missing. On the other hand, "not available" cause values indicate that the related capability is present, but insufficient resources were available to perform the requested action.

|  |  |
| --- | --- |
| Radio Network Layer cause | Meaning |
| Unspecified | Sent for radio network layer cause when none of the specified cause values applies. |
| TXnRELOCOverall expiry | The timer guarding the handover that takes place over Xn has abnormally expired. |
| Successful handover | Successful handover. |
| Release due to NG-RAN generated reason | Release is initiated due to NG-RAN generated reason. |
| Release due to 5GC generated reason | Release is initiated due to 5GC generated reason. |
| Handover cancelled | The reason for the action is cancellation of Handover. |
| Partial handover | Provides a reason for the handover cancellation. The HANDOVER COMMAND message from AMF contained *PDU Session Resource to Release List* IEor *QoS flow to Release List* and the source NG-RAN node estimated service continuity for the UE would be better by not proceeding with handover towards this particular target NG-RAN node. |
| Handover failure in target 5GC/ NG-RAN node or target system | The handover failed due to a failure in target 5GC/NG-RAN node or target system. |
| Handover target not allowed | Handover to the indicated target cell is not allowed for the UE in question. |
| TNGRELOCoverall expiry | The reason for the action is expiry of timer TNGRELOCoverall. |
| TNGRELOCprep expiry | Handover Preparation procedure is cancelled when timer TNGRELOCprep expires. |
| Cell not available | The concerned cell is not available. |
| Unknown target ID | Handover rejected because the target ID is not known to the AMF. |
| No radio resources available in target cell | Load on target cell is too high. |
| Unknown local UE NGAP ID | The action failed because the receiving node does not recognise the local UE NGAP ID. |
| Inconsistent remote UE NGAP ID | The action failed because the receiving node considers that the received remote UE NGAP ID is inconsistent. |
| Handover desirable for radio reasons | The reason for requesting handover is radio related. |
| Time critical handover | Handover is requested for time critical reason i.e., this cause value is reserved to represent all critical cases where the connection is likely to be dropped if handover is not performed. |
| Resource optimisation handover | The reason for requesting handover is to improve the load distribution with the neighbour cells. |
| Reduce load in serving cell | Load on serving cell needs to be reduced. When applied to handover preparation, it indicates the handover is triggered due to load balancing. |
| User inactivity | The action is requested due to inactivity on all user data radio bearers (i.e., DRBs and, if applicable, MRBs as per section 16.10.5.2 in TS 38.300 [8]), e.g., NG is requested to be released in order to optimise the radio resources. For L2 U2N Relay UE, this action is requested due to user inactivity on all PDU sessions of L2 U2N Relay UE and its served remote UE(s). |
| Radio connection with UE lost | The action is requested due to losing the radio connection to the UE. |
| Radio resources not available | No requested radio resources are available. |
| Invalid QoS combination | The action was failed because of invalid QoS combination. |
| Failure in the radio interface procedure | Radio interface procedure has failed. |
| Interaction with other procedure | The action is due to an ongoing interaction with another procedure. |
| Unknown PDU Session ID | The action failed because the PDU Session ID is unknown in the NG-RAN node. |
| Unknown QoS Flow ID | The action failed because the QoS Flow ID is unknown in the NG-RAN node. |
| Multiple PDU Session ID instances | The action failed because multiple instance of the same PDU Session had been provided to/from the NG-RAN node. |
| Multiple QoS Flow ID instances | The action failed because multiple instances of the same QoS flow had been provided to the NG-RAN node. |
| Encryption and/or integrity protection algorithms not supported | The NG-RAN node is unable to support any of the encryption and/or integrity protection algorithms supported by the UE. |
| NG intra-system handover triggered | The action is due to a NG intra-system handover that has been triggered. |
| NG inter-system handover triggered | The action is due to a NG inter-system handover that has been triggered. |
| Xn handover triggered | The action is due to an Xn handover that has been triggered. |
| Not supported 5QI value | The QoS flow setup failed because the requested 5QI is not supported. |
| UE context transfer | The action is due to a UE resumes from the NG-RAN node different from the one which sent the UE into RRC\_INACTIVE state. |
| IMS voice EPS fallback or RAT fallback triggered | The setup of QoS flow is failed due to EPS fallback or RAT fallback for IMS voice using handover or redirection. |
| UP integrity protection not possible | The PDU session cannot be accepted according to the required user plane integrity protection policy. |
| UP confidentiality protection not possible | The PDU session cannot be accepted according to the required user plane confidentiality protection policy. |
| Slice(s) not supported | Slice(s) not supported. |
| UE in RRC\_INACTIVE state not reachable | The action is requested due to RAN paging failure. |
| Redirection | The release is requested due to inter-system redirection or intra-system redirection. |
| Resources not available for the slice(s) | The requested resources are not available for the slice(s). |
| UE maximum integrity protected data rate reason | The request is not accepted in order to comply with the maximum data rate for integrity protection supported by the UE. |
| Release due to CN-detected mobility | The context release is requested by the AMF because the UE is already served by another CN node (same or different system), or another NG interface of the same CN node. |
| N26 interface not available | The action failed due to a temporary failure of the N26 interface. |
| Release due to pre-emption | Release is initiated due to pre-emption. |
| Multiple Location Reporting Reference ID Instances | The action failed because multiple areas of interest are set with the same Location Reporting Reference ID. |
| RSN not available for the UP | The redundant user plane resources indicated by RSN are not available. |
| NPN access denied | Access was denied, or release is requested, for NPN reasons. |
| CAG only access denied | Access was denied because the cell is a non-CAG cell and UE is only allowed to access CAG cells. |
| Insufficient UE Capabilities | The procedure can’t proceed due to insufficient UE capabilities. |
| RedCap UE not supported | The action failed because target NG-RAN node does not support RedCap UE. |
| Unknown MBS Session ID | The action failed because the MBS Session ID is unknown. |
| Indicated MBS Session Area Information not served by the gNB | The action failed because the none of the cells in indicacted MBS Session Area Infomration served by the NG-RAN node. |
| Inconsistent slice info for the session | The action failed because the slice info of the multicast session is inconsistent. |
| Misaligned association for the multicast and unicast sessions or flows | The action failed because the Associated Unicast QoS Flow ID has already been used, or the Associated Unicast QoS Flow ID is not defined, or the Associated Unicast QoS Flow ID is not released, or multiple MBS QoS flows associated to the same unicast QoS flow, or same multicast session associated to multiple PDU Sessions. |

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| Transport Layer cause | Meaning |
| Transport resource unavailable | The required transport resources are not available. |
| Unspecified | Sent when none of the above cause values applies but still the cause is Transport Network Layer related. |

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| --- | --- |
| NAS cause | Meaning |
| Normal release | The release is normal. |
| Authentication failure | The action is due to authentication failure. |
| Deregister | The action is due to deregister. |
| Unspecified | Sent when none of the above other cause values applies but still the cause is NAS related. |
| UE not in PLMN serving area | The release is due to the UE not being within the serving area of its current PLMN (for NTN). |
| Mobile IAB not authorized | The release is due to the NG-RAN node having completed the operation for a non- authorized mobile IAB node. |

<<<<<<<<<<<<<<<<<<<< Next Change >>>>>>>>>>>>>>>>>>>>

### 9.4.5 Information Element Definitions

-- ASN1START

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-- Information Element Definitions

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NGAP-IEs {

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

ngran-Access (22) modules (3) ngap (1) version1 (1) ngap-IEs (2) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

IMPORTS

id-AdditionalDLForwardingUPTNLInformation,

id-AdditionalULForwardingUPTNLInformation,

id-AdditionalDLQosFlowPerTNLInformation,

<<<<<<<<<<<<<<<<<<<< Unaffected part is skipped >>>>>>>>>>>>>>>>>>>>

CauseMisc ::= ENUMERATED {

control-processing-overload,

not-enough-user-plane-processing-resources,

hardware-failure,

om-intervention,

unknown-PLMN-or-SNPN,

unspecified,

...

}

CauseNas ::= ENUMERATED {

normal-release,

authentication-failure,

deregister,

unspecified,

...,

uE-not-in-PLMN-serving-area,

mobile-IAB-not-authorized

}

CauseProtocol ::= ENUMERATED {

transfer-syntax-error,

abstract-syntax-error-reject,

abstract-syntax-error-ignore-and-notify,

message-not-compatible-with-receiver-state,

semantic-error,

abstract-syntax-error-falsely-constructed-message,

unspecified,

...

}

<<<<<<<<<<<<<<<<<<<< End of Changes >>>>>>>>>>>>>>>>>>>>