3GPP TSG-RAN WG3 Meeting #127bis R3-252332

**Wuhan, China, 7th – 11th April, 2025**

**Agenda item:** 16.2

**Source:** Lenovo

**Title:** (TP to TS 38.401 BL CR) Device Association aspects

**Document for:** Discussion and Approval

# Introduction

This paper provides the TP to TS 38.401 BL CR for Device Association aspects:

* **Introduce per-session per-device Device Association (“RAN NGAP Device ID”, and “(FFS) CN NGAP Device ID” pair) between gNB and AIOTF, in case of Command after inventory.**
* **In case of command after inventory, the gNB allocates and provides a “RAN NGAP Device ID” in the *Inventory Report Transfer* IE for each device.**
* **The Device Association is included in the *Command Request Transfer* IE and *Command Response Transfer* IE.**

# Discussion

6.2.1 Principle of handling Application Protocol Identities

An Application Protocol Identity (AP ID) is allocated when a new UE-associated logical connection is created in either an NG-RAN node or an AMF. An AP ID shall uniquely identify a logical connection associated to a UE over the NG interface or Xn interface within a node (NG-RAN node or AMF) or over the F1 interface or over the E1 interface or over the W1 interface. Upon receipt of a message that has a new AP ID from the sending node, the receiving node shall store the AP ID of the sending node for the duration of the logical connection. The receiving node shall assign the AP ID to be used to identify the logical connection associated to the UE and include it as well as the previously received new AP ID from the sending node, in the first returned message to the sending node. In all subsequent messages to and from sending node, both AP IDs of sending node and receiving node shall be included. For MBS-associated logical connections of the E1 interface and the F1 interface the same principles for AP IDs apply as for UE-associated logical connections. For A-IOT device-associated logical NG-connection the same principles for AP IDs apply as for UE-associated logical connections.

The definitions of AP IDs as used on NG interface or Xn interface or F1 interface or E1 interface are shown below:

**RAN UE NGAP ID:**

 A RAN UE NGAP ID shall be allocated so as to uniquely identify the UE over the NG interface within an gNB. When an AMF receives an RAN UE NGAP ID it shall store it for the duration of the UE-associated logical NG-connection for this UE. Once known to an AMF this is included in all UE associated NGAP signalling.

 The RAN UE NGAP ID shall be unique within the logical NG-RAN node.

**AMF UE NGAP ID:**

 An AMF UE NGAP ID shall be allocated so as to uniquely identify the UE over the NG interface within the AMF. When a NG-RAN node receives an AMF UE NGAP ID it shall store it for the duration of the UE-associated logical NG-connection for this UE. Once known to a NG-RAN node this ID is included in all UE associated NGAP signalling.

 The AMF UE NGAP ID shall be unique within an AMF Set as specified in TS 23.501 [3].

**Old NG-RAN node UE XnAP ID:**

 An Old NG-RAN node UE XnAP ID shall be allocated so as to uniquely identify the UE over the Xn interface within an old NG-RAN node. When a new NG-RAN node receives an Old NG-RAN node UE XnAP ID it shall store it for the duration of the UE-associated logical Xn-connection for this UE. Once known to a new NG-RAN node this ID is included in all UE associated XnAP signalling. The Old NG-RAN node UE XnAP ID shall be unique within the logical NG-RAN node.

**New NG-RAN node UE XnAP ID:**

 A New NG-RAN node UE XnAP ID shall be allocated so as to uniquely identify the UE over the Xn interface within a new NG-RAN node. When an old NG-RAN node receives a New NG-RAN node UE XnAP ID it shall store it for the duration of the UE-associated logical Xn-connection for this UE. Once known to an old NG-RAN node this ID is included in all UE associated XnAP signalling. The New NG-RAN node UE XnAP ID shall be unique within the logical NG-RAN node.

**Source NG-RAN node UE XnAP ID:**

 A Source NG-RAN node UE XnAP ID shall be allocated so as to uniquely identify the UE over the Xn interface within a source NG-RAN node. When a target NG-RAN node receives a Source NG-RAN node UE XnAP ID it shall store it for the duration of the UE-associated logical Xn-connection for this UE. Once known to a target NG-RAN node this ID is included in all UE associated XnAP signalling. The Source NG-RAN node UE XnAP ID shall be unique within the logical NG-RAN node.

**Target NG-RAN node UE XnAP ID:**

 A Target NG-RAN node UE XnAP ID shall be allocated so as to uniquely identify the UE over the Xn interface within a target NG-RAN node. When a source NG-RAN node receives a Target NG-RAN node UE XnAP ID it shall store it for the duration of the UE-associated logical Xn-connection for this UE. Once known to a source NG-RAN node this ID is included in all UE associated XnAP signalling. The Target NG-RAN node UE XnAP ID shall be unique within the logical NG-RAN node.

**M-NG-RAN node UE XnAP ID:**

 An M-NG-RAN node UE XnAP ID shall be allocated so as to uniquely identify the UE over the Xn interface within an M-NG-RAN node for dual connectivity. When an S-NG-RAN node receives an M-NG-RAN node UE XnAP ID it shall store it for the duration of the UE-associated logical Xn-connection for this UE. Once known to an S-NG-RAN node this ID is included in all UE associated XnAP signalling. The M-NG-RAN node UE XnAP ID shall be unique within the logical NG-RAN node.

**S-NG-RAN node UE XnAP ID:**

 A S-NG-RAN node UE XnAP ID shall be allocated so as to uniquely identify the UE over the Xn interface within an S-NG-RAN node for dual connectivity. When an M-NG-RAN node receives a S-NG-RAN node UE XnAP ID it shall store it for the duration of the UE-associated logical Xn-connection for this UE. Once known to an M-NG-RAN node this ID is included in all UE associated XnAP signalling. The S-NG-RAN node UE XnAP ID shall be unique within the logical NG-RAN node.

**gNB-CU UE F1AP ID:**

 A gNB-CU UE F1AP ID shall be allocated so as to uniquely identify the UE over the F1 interface within a gNB-CU. When a gNB-DU receives a gNB-CU UE F1AP ID it shall store it for the duration of the UE-associated logical F1-connection for this UE. The gNB-CU UE F1AP ID shall be unique within the gNB-CU logical node.

**gNB-DU UE F1AP ID:**

 A gNB-DU UE F1AP ID shall be allocated so as to uniquely identify the UE over the F1 interface within a gNB-DU. When a gNB-CU receives a gNB-DU UE F1AP ID it shall store it for the duration of the UE-associated logical F1-connection for this UE. The gNB-DU UE F1AP ID shall be unique within the gNB-DU logical node.

**gNB-CU-CP UE E1AP ID:**

 A gNB-CU-CP UE E1AP ID shall be allocated so as to uniquely identify the UE over the E1 interface within a gNB-CU-CP (respectively an ng-eNB-CU-CP, or an eNB-CP as defined in TS 36.401[28]). When a gNB-CU-UP (respectively an ng-eNB-CU-UP, or an eNB-UP as defined in TS 36.401[28]) receives a gNB-CU-CP UE E1AP ID it shall store it for the duration of the UE-associated logical E1-connection for this UE. The gNB-CU-CP UE E1AP ID shall be unique within the gNB-CU-CP (respectively the ng-eNB-CU-CP, or the eNB-CP as defined in TS 36.401[28]) logical node.

**gNB-CU-UP UE E1AP ID:**

 A gNB-CU-UP UE E1AP ID shall be allocated so as to uniquely identify the UE over the E1 interface within a gNB-CU-UP (respectively an ng-eNB-CU-UP, or an eNB-UP as defined in TS 36.401[28]). When a gNB-CU-CP (respectively an ng-eNB-CU-CP, or an eNB-CP as defined in TS 36.401[28]) receives a gNB-CU-UP UE E1AP ID it shall store it for the duration of the UE-associated logical E1-connection for this UE. The gNB-CU-UP UE E1AP ID shall be unique within the gNB-CU-UP (respectively the ng-eNB-CU-UP, or the eNB-UP as defined in TS 36.401[28]) logical node.

**ng-eNB-CU UE W1AP ID:**

 An ng-eNB-CU UE W1AP ID shall be allocated so as to uniquely identify the UE over the W1 interface within an ng-eNB-CU. When an ng-eNB-DU receives an ng-eNB-CU UE W1AP ID it shall store it for the duration of the UE-associated logical W1-connection for this UE. The ng-eNB-CU UE W1AP ID shall be unique within the ng-eNB-CU logical node.

**ng-eNB-DU UE W1AP ID:**

 An ng-eNB-DU UE W1AP ID shall be allocated so as to uniquely identify the UE over the W1 interface within an ng-eNB-DU. When an ng-eNB-CU receives an ng-eNB-DU UE W1AP ID it shall store it for the duration of the UE-associated logical W1-connection for this UE. The ng-eNB-DU UE W1AP ID shall be unique within the ng-eNB-DU logical node.

**gNB-CU MBS F1AP ID:**

 A gNB-CU MBS F1AP ID shall be allocated so as to uniquely identify the MBS Session Context over the F1 interface within a gNB-CU. When a gNB-DU receives a gNB-CU MBS F1AP ID it shall store it for the duration of the MBS-associated logical F1-connection for that MBS Session. The gNB-CU MBS F1AP ID shall be unique within the gNB-CU logical node.

**gNB-DU MBS F1AP ID:**

 A gNB-DU MBS F1AP ID shall be allocated so as to uniquely identify the MBS Session Context over the F1 interface within a gNB-DU. When a gNB-CU receives a gNB-DU MBS F1AP ID it shall store it for the duration of the MBS-associated logical F1-connection for this MBS Session. The gNB-DU MBS F1AP ID shall be unique within the gNB-DU logical node.

**gNB-CU-CP MBS E1AP ID:**

 A gNB-CU-CP MBS E1AP ID shall be allocated so as to uniquely identify the MBS Session Context over the E1 interface within a gNB-CU-CP. When a gNB-CU-UP receives a gNB-CU-CP MBS E1AP ID it shall store it for the duration of the MBS-associated logical E1-connection for that MBS Session. The gNB-CU-CP MBS E1AP ID shall be unique within the gNB-CU-CP logical node.

**gNB-CU-UP MBS E1AP ID:**

 A gNB-CU-UP MBS E1AP ID shall be allocated so as to uniquely identify the MBS Session Context over the E1 interface within a gNB-CU-UP. When a gNB-CU-CP receives a gNB-CU-UP MBS E1AP ID it shall store it for the duration of the MBS-associated logical E1-connection for this MBS Session. The gNB-CU-UP MBS E1AP ID shall be unique within the gNB-CU-UP logical node.

**NG-RAN Node AIOT Device NGAP ID**

 A NG-RAN Node AIOT Device ID shall be allocated so as to uniquely identify the A-IOT device between AIOTF and NG RAN node within the NG-RAN node per A-IOT session. When an AIOTF receives an NG-RAN Node AIOT Device ID it shall store it for the duration of the A-IOT device-associated logical NG-connection between AIOTF and NG-RAN node for this AIOT device of an A-IOT session.

 The NG-RAN Node AIOT Device ID shall be unique per A-IOT session within the logical AIOT RAN node.

**AIOTF AIOT Device NGAP ID (FFS)**

An AIOTF AIOT Device ID shall be allocated so as to uniquely identify the AIOT device between AIOTF and NG-RAN node within the AIOTF per A-IOT session. When a NG-RAN node receives an AIOTF AIOT Device ID it shall store it for the duration of the duration of the A-IOT device-associated logical NG-connection between AIOTF and NG-RAN node for this AIOT device of an A-IOT session.

 The AIOTF AIOT Device ID shall be unique per A-IOT session within the AIOTF.

**-------------------------------------------------------------Next Change--------------------------------------------**

## 6.5 A-IOT device associations in NG-RAN Node

**A-IOT device associated logical NG-connection:**

NGAP provide means to exchange control plane messages associated with an A-IOT device over the respective NG interface.

An A-IOT device-associated logical NG-connection is established between the NG-RAN node and AIOTF for a A-IOT session.

The A-IOT device-associated logical NG-connection uses the identities NG-RAN Node AIOT Device NGAP ID and AIOTF AIOT Device NGAP ID (FFS).

# Reference

[1] TS 38.401