**3GPP TSG-RAN WG3 Meeting #121 R3-234592**

**Toulouse, France, August 21 – 25, 2023**

**Agenda item:** 13.2

**Source:** Qualcomm Incorporated

**Title:** (TPs to TS 38.401) Mobile IAB-MT migration via Xn handover

**Document for:** Discussion

# 1 Introduction

This TP includes ST2 on mobile IAB-MT migration via Xn handover.

# TP to TS 38.401 on mobile IAB-MT migration via Xn handover

*START OF CHANGES*

## 3.1 Definitions

For the purposes of the present document, the terms and definitions given in TR 21.905 [1] and the following apply.
A term defined in the present document takes precedence over the definition of the same term, if any, in TR 21.905 [1].

**Associated QoS Flow:** as defined in TS 23.247 [27].

**Associated QoS flow information:** Information encompassing: QoS flow QoS parameters for associated QoS flows and mapping information between mapped (unicast) QoS flows and associated QoS flows. The respective information is included in a way that non-supporting RAN nodes would not establish respective RAN resources irrespective the multicast session state.

**Boundary IAB-node:** anIAB-node with one RRC interface terminating at a different IAB-donor-CU than the F1 interface. This definition applies to partial migration, inter-donor redundancy and inter-donor RLF recovery.

**Conditional Handover:** as defined in TS 38.300 [2].

**Conditional PSCell Addition:** as defined in TS 37.340 [12].

**Conditional PSCell Change:** as defined in TS 37.340 [12].

**DAPS Handover:** as defined in TS 38.300 [2].

**eNB-CP**: as defined in TS 36.401 [28].

**eNB-UP**: as defined in TS 36.401 [28].

**en-gNB**: as defined in TS 37.340 [12].

**Early Data Forwarding**: as defined in TS 38.300 [2].

**F1-terminating IAB-donor of boundary IAB-node**: Refers to the IAB-donor that terminates F1 for the boundary IAB-node.

**gNB:** as defined in TS 38.300 [2].

**gNB Central Unit (gNB-CU):** a logical node hosting RRC, SDAP and PDCP protocols of the gNB or RRC and PDCP protocols of the en-gNB that controls the operation of one or more gNB-DUs. The gNB-CU terminates the F1 interface connected with the gNB-DU.

**gNB Distributed Unit (gNB-DU):** a logical node hosting RLC, MAC and PHY layers of the gNB or en-gNB, and its operation is partly controlled by gNB-CU. One gNB-DU supports one or multiple cells. One cell is supported by only one gNB-DU. The gNB-DU terminates the F1 interface connected with the gNB-CU. For DC operation, the MgNB-DU designates the gNB-DU of an en-gNB or a gNB acting as master node, and the SgNB-DU designates the gNB-DU of an en-gNB or a gNB acting as secondary node.

**gNB-CU-Control Plane (gNB-CU-CP):** a logical node hosting the RRC and the control plane part of the PDCP protocol of the gNB-CU for an en-gNB or a gNB. The gNB-CU-CP terminates the E1 interface connected with the gNB-CU-UP and the F1-C interface connected with the gNB-DU. For DC operation, the MgNB-CU-CP designates the gNB-CU-CP of the gNB-CU for an en-gNB or a gNB acting as master node, and the SgNB-CU-CP designates the gNB-CU-CP of the gNB-CU for an en-gNB or a gNB acting as secondary node.

**gNB-CU-User Plane (gNB-CU-UP):** a logical node hosting the user plane part of the PDCP protocol of the gNB-CU for an en-gNB, and the user plane part of the PDCP protocol and the SDAP protocol of the gNB-CU for a gNB. The gNB-CU-UP terminates the E1 interface connected with the gNB-CU-CP and the F1-U interface connected with the gNB-DU. For DC operation, the MgNB-CU-UP designates the gNB-CU-UP of the gNB-CU for an en-gNB or a gNB acting as master node, and the the SgNB-CU-UP designates the gNB-CU-UP of the gNB-CU for an en-gNB or a gNB acting as secondary node.

**IAB-node**: as defined in TS 38.300 [2].

**IAB-donor**:as defined in TS 38.300 [2].

**IAB-donor-CU**: the gNB-CU of an IAB-donor, terminating the F1 interface towards IAB-nodes and IAB-donor-DU.

**IAB-donor-DU**: the gNB-DU of an IAB-donor, hosting the IAB BAP sublayer (as defined in TS 38.340 [22]), providing wireless backhaul to IAB-nodes.

**IAB-DU**: as defined in TS 38.300 [2].

**IAB-MT**: as defined in TS 38.300 [2].

**IAB Topology**: as defined in TS 38.300 [2].

**Mapped QoS flows:** Unicast QoS flows requested to be established, i.e. included in the legacy QoS flow lists in a way, that non-support RAN nodes would attempt to establish unicast QoS flows and supporting RAN nodes can identify them as mapped QoS flows based on the associated QoS information.

**Master node:** as defined in TS 37.340 [12].

**Master gNB:** see TS 37.340 [12].

**MBS session resource**: This term is used for specification of NG, Xn, F1 and E1 interfaces. It denotes NG-RAN interface and radio resources provided to support an MBS Session.

**ng-eNB:** as defined in TS 38.300 [2].

**ng-eNB Central Unit (ng-eNB-CU):** as defined in TS 37.470 [21].

**ng-eNB Distributed Unit (ng-eNB-DU):** as defined in TS 37.470 [21].

**ng-eNB-CU-Control Plane (ng-eNB-CU-CP):** a logical node hosting the RRC and the control plane part of the PDCP protocol of the ng-eNB-CU for an ng-eNB. The ng-eNB-CU-CP terminates the E1 interface connected with the ng-eNB-CU-UP and the W1-C interface connected with the ng-eNB-DU.

**ng-eNB-CU-User Plane (ng-eNB-CU-UP):** a logical node hosting the user plane part of the PDCP protocol and the SDAP protocol of the ng-eNB-CU for an ng-eNB. The ng-eNB-CU-UP terminates the E1 interface connected with the ng-eNB-CU-CP and the W1-U interface connected with the ng-eNB-DU.

**NG-RAN node:** as defined in TS 38.300 [2].

**Non-F1-terminating IAB-donor of boundary IAB-node**: Refers to the IAB-donor that has an RRC connection with the boundary node but does not terminate F1 with this boundary node.

**PDU Session Resource**: This term is used for specification of NG, Xn, and E1 interfaces. It denotes NG-RAN interface and radio resources provided to support a PDU Session.

**Public Network Integrated NPN:** as defined in TS 23.501 [3].

**RRC-terminating IAB-donor:** Refers to the IAB-donor that terminates RRC for the IAB-node.

**Secondary gNB:** see TS 37.340 [12].

**Stand-alone Non-Public Network:** as defined in TS 23.501 [3].

**U2N Relay UE:** as defined in TS 38.300 [2].

**U2N Remote UE:** as defined in TS 38.300 [2].

*NEXT CHANGE*

## 3.2 Abbreviations

For the purposes of the present document, the terms and definitions given in TR 21.905 [1] and the following apply.
A term defined in the present document takes precedence over the definition of the same term, if any, in TR 21.905 [1].

5GC 5G Core Network

AMF Access and Mobility Management Function

AP Application Protocol

AS Access Stratum

BH Backhaul

CAG Closed Access Group

CHO Conditional Handover

CLI Cross-Link Interference

CM Connection Management

CMAS Commercial Mobile Alert Service

CPA Conditional PSCell Addition

CPC Conditional PSCell Change

DAPS Dual Active Protocol Stack

EM Element Manager

EN-DC E-UTRA-NR Dual Connectivity

ETWS Earthquake and Tsunami Warning System

F1-U F1 User plane interface

F1-C F1 Control plane interface

F1AP F1 Application Protocol

FDD Frequency Division Duplex

FTEID Fully Qualified TEID

GTP-U GPRS Tunnelling Protocol

IAB Integrated Access and Backhaul

IP Internet Protocol

L2 Layer-2

MBS Multicast Broadcast Service

MCG Master Cell Group

MDT Minimization of Drive Tests

MN Master Node

MgNB Master Gnb

mIAB Mobile IAB

MRB MBS Radio Bearer

MRDC Multi-Radio Dual Connectivity

NAS Non-Access Stratum

NID Network identifier

NPN Non-Public Network

NSA Non Standalone

OAM Operation, Administration and Maintenance

PNI-NPN Public Network Integrated Non-Public Network

PTP Point to Point

PTM Point to Multipoint

PWS Public Warning System

QoE Quality of Experience

QoS Quality of Service

RET Remote Electrical Tilting

RIM Remote Interference Management

RIM-RS Remote Interference Management Reference Signal

RNL Radio Network Layer

RRC Radio Resource Control

SA Standalone

SAP Service Access Point

SCG Secondary Cell Group

SCTP Stream Control Transmission Protocol

SFN System Frame Number

SgNB Secondary gNB

SM Session Management

SMF Session Management Function

SN Secondary Node

SNPN Stand-alone Non-Public Network

SRAP Sidelink Relay Adaptation Protocol

TCE Trace Collection Entity

TDD Time Division Duplex

TDM Time Division Multiplexing

TEID Tunnel Endpoint Identifier

TMA Tower Mounted Amplifier

TNL Transport Network Layer

U2N UE-to-Network

*NEXT CHANGE*

## 8.YY Mobile IAB migration procedures

### 8.YY.1 – Migration of mobile IAB-MT via Xn handover

The mIAB-MT of a mobile IAB-node 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, a mIAB-DU collocated with the mIAB-MT may be connected to an F1-terminating IAB-donor-CU, which may be different from the source RRC-terminating IAB-donor-CU and/or the target RRC-terminating IAB-donor-CU.

Figure 8.YY.1.1-1 shows an example of the mIAB-MT migration via Xn handover. In this example, the mIAB-MT is connected to the source RRC-terminating IAB-donor-CU via a source path of an IAB topology before the handover and via a target path of a different IAB-topology after the handover.



**Figure 8.YY.1.1-1: Procedure for Xn-based migration of mobile IAB-MT**

1. Steps 1-14 of the topology adaptation procedure of Section 8.17.3.1 are performed to conduct Xn handover of the mIAB-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 mIAB-node corresponds to the migrating IAB-node of Section 8.17.3.1, and the mIAB-MT’s source and target RRC-terminating IAB-donor-CUs correspond to the respective source and target IAB-donor-CUs of Section 8.17.3.1.

2. Same as step 15 of the topology adaptation procedure of Section 8.17.3.1, where the mIAB-node corresponds to the migrating IAB-node, and the mIAB-DU’s F1-terminating IAB-donor corresponds to the source IAB-donor.3. The F1-U connections of the mIAB-DU of the mobile IAB-node with the mIAB-DU’s F1-terminating IAB-donor-CU are switched to use the mIAB-node’s new TNL address(es) allocated in Step 1. The redirection of the F1-U connections and exchange of F1-U traffic may use the default BAP routing ID and default BH RLC channel allocated in Step 1 for upstream communication, and they may use the DL mapping configured by the mobile IAB-MT’s target RRC-terminating IAB-donor-CU on the IAB-donor-DU of the mIAB-MT’s target RRC-terminating IAB-donor for downstream communication in equivalent manner as for F1-C.

4. The source RRC-terminating IAB-donor-CU sends the gNB-ID of the target RRC-terminating IAB-donor-CU and the mIAB-MT’s XnAP UE ID generated by the target RRC-terminating IAB-donor-CU to the F1-terminating IAB-donor-CU.

Editor’s NOTE: FFS if this mIAB-MT’s XnAP UE ID is different than that used by the target RRC-terminating-IAB-donor-CU with the source RRC-terminating IAB-donor-CU, and, in this case, how the source RRC-terminating IAB-donor-CU obtains this XnAP UE ID.

Editor’s NOTE: FFS the procedure used for sending this information.

5. Steps 16-18 of the topology adaptation procedure of Section 8.17.3.1, where the target RRC-terminating IAB-donor-CU performs the IAB Transport Management Migration procedure with the F1-terminating IAB-donor-CU to provide the context of the traffic offloaded. The target RRC-terminating IAB-donor-CU reconfigures the BAP sublayer and/or BH RRC channels accordingly and provides the L2 info for reconfigurations to be conducted by the F1-terminating IAB-donor-CU.

*END OF CHANGES*