3GPP TSG-RAN WG3 #115-e R3-222595

Online, 21st February - 3rd March 2022

Agenda Item: 22.1

Source: ZTE

Title: Summary of NR MBS overall compromise in RAN3#115e

Document for: Approval

# Introduction

This document outlines an overall compromise for NR MBS Rel-17 proposed by companies. A way-forward based on Rel-17 NR MBS progress and companies view is expected to be provided. The discussion will focus only on the issues where companies find it hard to converge, e.g.,

- session management

- F1/E1 bearer management

- mobility support (including non-supporting node)

suggestions are proposed to progress the WI in limited time.

# For the Chairman's Notes

# on session management

**Proposal: For BC, it is proposed for RAN3 to introduce one procedure to include multiple Area Session for location dependent service.**

**Proposal: The following aspects on multicast shall be discussed by RAN3:**

* **MC Session Parameters (QOS & Area Info) included in Multicast Distribution Response but not in Activation Request**
* **no MC Session parameters anywhere in UE associated signalling, apart from joining information and, if included, associated QoS flow info.**
* **LS to SA2 to acknowledge RAN3 support of associated PDU Sessions with deactivated UP connection, join information carried in UE Ctxt signalling & DL NAS Transfer**
* **Stop discussion on SA2 Note 4**

# for F1/E1 bearer management

**Proposal: Support of separate F1-U bearers for ptp-retransmission and ptp-only MRB configurations**

**WA: F1/E1 MC MBS Session resource control in MBS-associated procedures only (revisit if RAN2 prohibit RAN3 to do so).**

# for mobility between supporting node

**Proposal: Support Data Forwarding between supporting nodes.**

**Proposal: Capture the following how to support PDCP SN sync in the spec as one deployment option for reference:**

**"If data loss is to be minimized for an MRB e.g. in order to meet the QoS requirement, the PDCP COUNT of the MRB should be synchronized by adding up every per-QoS-flow N3mb Sequence Number of each QoS flow which is mapped to this MRB, if available, and thus no need to limit the QoS-flow-to-MRB mapping. Other options not excluded."**

**Proposal: It relies on network implementation to achieve PDCP SN sync, and achieve data forwarding start/stop. (no stage 3 spec work)**

**Proposal: On NG transparent HO CN containers carry mapping and forwarding info.**

**Proposal: Provide MBS information from Source to Target outside of PDU Session level IE, include associated QFI inside of PDU Session level IE.**

**Proposal: LS to SA2 on NG impact for shared NG-U termination at NG-RAN (“common CU-UP”)**

**Proposal: The common UP is able to recommend the CUCP about the MRB configuration in the MRB context setup response that is different from MRB configuration in the required MRB Setup request.**

# for mobility between supporting node

**Proposal: RAN3 stops discussing on optimizing HO from supporting node to non supporting node in Rel-17. Specifically, source gNB provides end marker towards non-supporting in implementation.**

# Session management

Currently, the following companies have provided their views on different topics in different files. All open issues can be found below:

**Ericsson:**

* MC Session Parameters (QOS & Area Info) included in Multicast Distribution Response but not in Activation Request
* LS to SA2 to acknowledge RAN3 support of associated PDU Sessions with deactivated UP connection, join information carried in UE Ctxt signalling & DL NAS Transfer
* no MC Session parameters anywhere in UE associated signalling, apart from joining information and, if included, associated QoS flow info.

**HW:**

 - For BC:

* One procedure to include multiple Area Sessions for location dependent service
* Support RAN triggered BC Session Release procedure

- For MC:

* Include Area Information(s) in Distribution Setup Response
* No QoS information and Area Information in Activation Request
* Stop discussion on SA2 Note 4

RAN3 has already sent LS( R3-221468) to SA2 and asked SA2’s feedback on introducing a RAN initiated Broadcast Session Release Required procedure in RAN3#114bis\_e. Because RAN3 has already asked SA2’s view, we think the discussion on this topic can be postponed until SA2 replies. Hence,it is proposed for companies to discuss the rest aspects during online discussion.

**Proposal: For BC, it is proposed for RAN3 to introduce one procedure to include multiple Area Session for location dependent service.**

**Proposal: The following aspects on multicast shall be discussed by RAN3:**

* **MC Session Parameters (QOS & Area Info) included in Multicast Distribution Response but not in Activation Request**
* **no MC Session parameters anywhere in UE associated signalling, apart from joining information and, if included, associated QoS flow info.**
* **LS to SA2 to acknowledge RAN3 support of associated PDU Sessions with deactivated UP connection, join information carried in UE Ctxt signalling & DL NAS Transfer**
* **Stop discussion on SA2 Note 4**

# F1/E1 bearer management

**Ericsson:**

-Support of separate F1-U bearers for ptp-retransmission and ptp-only MRB configurations

-F1/E1 MC MBS Session resource control in MBS-associated procedures only

**HW:**

In case RAN2 agree to introduce common MC CellGroupConfig

- Support PTP retransmission and PTP only F1-U bearers

- MC Session control via common procedures

In case RAN2 do not agree to introduce common MC CellGroupConfig

- Reuse existing F1/E1AP procedures to manage the multicast MRB related context/bearers.

- Introduce non-UE associated F1/E1AP procedures to setup and release the shared F1-U tunnel.

A bit background: on whether RAN3 might follow a per session based F1 signaling to exchange the MBS context/configuration between CU and DU, RAN3 sends out an LS to RAN2 consult the feasibility to define a CellConfigInfo RRC structure which enables the network to use exactly the same Lower Layer (PHY/MAC/RLC) configuration for more than one UE in a cell for Rel-17 NR MBS.

Technically it is possible to arrange the ASN.1 design with an re-organization of IEs in 331. It is indeed RAN2's role to design all the RRC signaling, but the 38.331 signaling design is not only for Uu but F1 which is of RAN3's interests. Such coordination started for NR in Rel-15, on the cell group configuration in RAN2 and DU to CU RRC information in RAN3. If RAN2 fails to define such common IE for MC, RAN3 suffers the unnecessary overhead over F1, e.g., whenever the common PTM config shall be updated, multiple DU initiated per UE cell group config is needed which could be a huge signaling overhead when the UE number is high per DU.

Since the debate is still going on in RAN2, we suggest an proposal/WA in RAN3 that:

**Proposal: Support of separate F1-U bearers for ptp-retransmission and ptp-only MRB configurations**

**WA: F1/E1 MC MBS Session resource control in MBS-associated procedures only (revisit if RAN2 prohibit RAN3 to do so).**

# Mobility (supporting node)

**Ericsson:**

- Data Forwarding between supporting nodes supported

- On NG transparent HO CN containers carry mapping and forwarding info

- On Xn active MC Session parameters carried outside PDU Session Ctxt IEs in HO REQ, HO REQ ACK carries forwarding info

- LS to SA2 on NG impact for shared NG-U termination at NG-RAN (“common CU-UP”)

- No SN STATUS additions, “current COUNT” info in HO information sufficient,

**HW:**

Provide MBS information from Source to Target outside of PDU Session level IE, include associated QFI inside of PDU Session level IE.

Provide the MBS Progress (PDCP COUNT, QFI SN) from Source to Target, in Handover Preparation and Status Transfer.

Support Data Forwarding between supporting nodes.

•Provide the MBS Progress from Target to Source to stop data forwarding.

Exchange the Shared NG-U Termination Information over interfaces (NG, Xn, E1).

Capture how to support PDCP SN sync in the spec.

For the sake of progress, ZTE is willing to compromise to support data forwarding. Therefore there is a common group for all:

**Proposal: Support Data Forwarding between supporting nodes.**

However no PDCP SN sync (which was RAN3'a agreements) was suggested in the above compromise proposals. Further data forwarding and QoS to MRB mapping relies on how the PDCP SN is sync or directly affects the PDCP SN sync.

Current solution suggesting adding QFI to generate the per MRB PDCP SN has its limitation as discussed in MBS CB5.

- a general use case with different QoS will possibly result in blank QoS data flow, and further data loss.

To achieve the best commonality between companies view and being realistic on the progress, we made following suggestions on the mobility support:

**Proposal: Capture the following how to support PDCP SN sync in the spec as one deployment option for reference:**

**"If data loss is to be minimized for an MRB e.g. in order to meet the QoS requirement, the PDCP COUNT of the MRB should be synchronized by adding up every per-QoS-flow N3mb Sequence Number of each QoS flow which is mapped to this MRB, if available, and thus no need to limit the QoS-flow-to-MRB mapping. Other options not excluded."**

**Proposal: It relies on network implementation to achieve PDCP SN sync, and achieve data forwarding start/stop. (no stage 3 spec work)**

For other essential HO signaling we capture based on company input:

**Proposal: On NG transparent HO CN containers carry mapping and forwarding info.**

**Proposal: Provide MBS information from Source to Target outside of PDU Session level IE, include associated QFI inside of PDU Session level IE.**

For the case of shared CU-UP scenario, the real benefit is more than just shared NG-U tunnel. but for shared RAN protocol entity. therefore the buffer size and processing resource will be just half or one tenth depending on how many gNB the CU-UP is serving. Therefore, it is proposed:

**Proposal: LS to SA2 on NG impact for shared NG-U termination at NG-RAN (“common CU-UP”)**

**Proposal: The common UP is able to recommend the CUCP about the MRB configuration in the MRB context setup response that is different from MRB configuration in the required MRB Setup request.**

# Mobility (non supporting node)

**Ericsson:**

* stop discussions on optimising HO with non-supporting RAN nodes (source gNB provides end marker towards non-supporting in implementation specific way - duplication removal @ HO from non-supporting, if any, by UE only)

Considering RAN3 has already made agreements on how to support MBS involved HO from non-supporting node to supporting node in RAN3#114bis\_e. We suggest companies respect the agreements made on this part so far. Hence, it is proposed that:

**Proposal: RAN3 stops discussing on optimizing HO from supporting node to non supporting node in Rel-17. Specifically, source gNB provides end marker towards non-supporting in implementation.**

# Conclusion, Recommendations [if needed]

If needed

# References

1. draft R3-22xxxx MBS Compromise proposal v00 Ericsson
2. Way Forward on Rel-17 NR MBS WI, Huawei