3GPP TSG-RAN WG3 Meeting #115-e R3-222454

Online, 21th Feb – 3rd Mar 2022

**Agenda item: 21.3**

**Source: Huawei (moderator)**

**Title: Summary of offline: Enhancements Based on New QoS Related Parameters**

**Document for: Discussion and Decision**

# 1 Introduction

**CB: # NRIIOT3\_NewQoS**

**- For non-HO scenarios, the gNB-DU need deliver a survival time state indicator to the gNB-CU? If agree, which message is used to include the above indicator?**

**- During handover, the downlink Survival Time assistance information is defined as Option 1 (i.e., an available survival time) and Option 4 (i.e., a survival time state indicator (activated or not))?**

**- The downlink Survival Time assistance information IE is introduced over Xn and F1 interfaces? If agree, which message is used to include the above information?**

**- Capture agreements and provide TPs if agreeable**

(HW - moderator)

Summary of offline disc

# 2 For the Chair’s Notes

**Propose to agree:**

**Proposal 1: TBD.**

# 3 Discussion (Phase 1)

Please provide your Round 1 views by **11:00 UTC Wednesday February 23rd**, so that comments may be taken into account during the online discussion.

At the beginning of the discussion, the moderator copies the agreements of the previous meeting for reference.

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| **For downlink transmission, the issue on survival state is not triggered on the source NG-RAN node should be discussed and solved. On top of it, Option 1 (i.e., an available survival time) and Option 4 (i.e., a survival time state indicator (activated or not)) can be further discussed.**  **There is no need to deliver uplink Survival Time assistance information during handover in R17 based on agreements in RAN2 and RAN3.** |

Also in R3-221876, some background information is provided with three observations. Since last meeting already agreed that no need to consider the UL survival time assistance information during handover, the discussion is focusing on the **DL only**.

## 3.1 XnAP on DL survival time assistance information

Contributions to this meeting seems all agree to introduce the DL survival time assistance information, but the details may be different.

Overview of RAN3 papers.

* *Nokia [R3-221876]:* 
  + *Introduce the Available Survival Time IE within the TSC Assistance Information IE transferred over Xn, to convey the survival time that remains following handover.*
* *ZTE [R3-221879]:* 
  + *It’s suggest that SN STATUS TRANSFER message is used to include downlink Survival Time assistance information over XnAP. For downlink transmission, Option 4 (i.e., a survival time state indicator (activated or not)) can be selected as the downlink Survival Time assistance information*
* *Huawei [R3-221969]:*
  + *During handover, the Source NG-RAN indicates the downlink survival time indicator to the target NG-RAN as an assistance information. For Xn based handover, the source gNB can include the DL survival time state in the SN STATUS TRANSFER message and the EARLY STATUS TRANSFER message. A single codepoint “activated” can be designed for the DL survival time state.*
* *Ericsson [R3-222039]:* 
  + *consider that when the service with “Survival Time” IE included in the TSC Assistance information, the target NG-RAN node shall, if support, consider that the “Survival State” is triggered/started already and it should be handled with higher priority than the handovers without any “Survival Time” IE.*
* *CATT [R3-222214]*
  + *Source node provides the available survival time to target node for downlink during* ***DAPS*** *handover*

In addition, about the survival time state (“deactivated” state at the source node) signalled to the target RAN node, two companies in R3-221876/ R3-222039 have concerns to indicate the “deactivated” state. And one company is fine to have only a single codepoint “activated” state. Then the moderator limit the option 4 to the “activated” state only.

The moderator’s summary: two options are on the table over Xn.

* **Option 1 (i.e., an available survival time) over the XnAP Handover Request message.**
* **Option 4 (i.e., a survival time state indicator (single codepoint- “activated” only)) over the SN STATUS TRANSFER message and the EARLY STATUS TRANSFER message.**

Before the down-selection of the two options, the moderator first collects views about the following question.

In R3-222039, the following texts are suggested to be specified.

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| If the “Survival Time” is presented in the TSC Assistance Information in HANDOVER REQUEST message, the target NG-RAN node shall, if supported, consider that the “Survival State” has been activated. |

**Question 1: Do you agree with the above added procedure texts?**

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| **Company** | **Comments** |
| Huawei | No strong need.  Now only a single codepoint “activated” is signalled to the target NG-RAN node (also the available ST can be designed without the “deactivate” case). Then there is no issue at the target NG-RAN node, i.e., it will not happen that the target NG-RAN node receives the “deactivated” state for a DRB, but turning into the “activated” during data forwarding.  Then the target NG-RAN node can first prioritize the DRBs with “activated” state, then secondly prioritize the DRBs with mapped QoS flows with survival time in TSC assistance information, finally with normal DRBs. |
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**Question 2: Which option is your preferred option, or any other possible views e.g. applicable for all handover cases or limited to DAPS handover only?**

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| **Company** | **Comments** |
| Huawei | Option 4.  For option 1, first to signal the ST available time in the XnAP Handover Request message is a bit early due to the fact that the data transmission is ongoing (for normal handover and DAPS handover). Then this leads to the error cases of the ST available time. Second, the ST available time is not fully accurate considering the ST is typical at the a few milliseconds and handover interruption time, as well as the signalling delay etc.  And we think this can be applicable for all handover cases. |
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## 3.2 F1AP/User-plane on DL survival time assistance information

Overview of RAN3 papers.

* ZTE [R3-221879]:
  + *For non-HO scenarios and HO scenario: the MAC layer of gNB needs to notify the PDCP layer of gNB to activate PDCP duplication through a survival time state indicator.*
  + *For the gNB-CU/gNB-DU split case, the gNB-DU should deliver a survival time state indicator to the gNB-CU by* ***NOTIFY*** *message.*
* Huawei [R3-221969]:
  + *in order to allow the source gNB-CU to be aware of the survival time state, the source gNB-DU needs to notify such information to the source gNB-CU, when it receives the* ***Step 5 (UE context modification request)*** *in the figure wherein.*
  + *Over F1, the source DU sends the downlink survival time state to the source CU via DL DATA DELIVERY STATUS Frame.*
  + *Over F1, the target CU can send the downlink survival time state to the target DU via DL USER DATA.*

Though both companies are proposing the survival time state, the terminology Survival Time Assistance Information is used below.

The moderator’s summary: two options are on the table:

* **Option 1**: F1AP Notify
* **Option 2**: User plane frame via DL DATA DELIVERY STATUS Frame from source DU to source CU, and DL USER DATA from target CU to target DU.

**Question 3: Which option is your preferred option, and your views whether this is applicable to the non-handover, and/or handover scenario?**

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| **Company** | **Comments** |
| Huawei | Option 2 is preferred.  As discussed in the R3-221969, for handover case, the DDDS can be triggered when the source DU receives the UE CONTEXT MODIFICATION REQUEST message indicating to **stop** the data transmission to the UE so as to inform the gNB-CU about the unsuccessfully transmitted downlink data to the UE. Then the DDDS can be used to include the ST state naturally.  For non-handover case, we are open to indicate ST state to the CU. But it seems that the UP frame “ASSISTANCE INFORMATION DATA” can indicate the assistance information for DL duplication, which seems sufficient.  For option 1, this should be clarified under which conditions the F1AP notify is triggered, even for non-handover case. And it is a little strange to indicate the UP packet transmission state over application protocol message. |
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## 3.3 NGAP on DL survival time assistance information

In R3-221969, it is proposed that:

* *For NG based handover, the source gNB can include the survival time state in the Uplink RAN Status Transfer message and the Downlink RAN Status Transfer message.*

**Question 4: Your view to introduce the DL survival time assistance information for NG based handover?**

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| **Company** | **Comments** |
| Huawei | Yes to introduce it for NG, to align with Xn. |
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## 3.4 Potential way forward for the 2nd round or other aspects

**Question: Your suggestions of the way forward on the 2nd round, or any issues that are not covered by above**

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| **Company** | **Comments** |
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# 4 Discussion (Phase 2)

TBD

# 5 Conclusions, Recommendations

TBD

# References

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| [R3-221876](file:///C:\Users\h00364927\Documents\Docs\R3-221876.zip) | (TP for NR\_IIOT\_URLLC\_enh BL CR for TS 38.423) Resolution of open issues for Survival Time (Nokia, Nokia Shanghai Bell) | other |
| [R3-221879](file:///C:\Users\h00364927\Documents\Docs\R3-221879.zip) | (TP for Introduction of Enhanced IIoT support over Xn and F1) Remaining issues on New QoS Related parameters (ZTE) | other |
| [R3-221969](file:///C:\Users\h00364927\Documents\Docs\R3-221969.zip) | (TP for eIIOT BLCR for TS 38.423 and TS 38.425) Survival time remaining issues (Huawei) | other |
| [R3-222039](file:///C:\Users\h00364927\Documents\Docs\R3-222039.zip) | On survival time (Ericsson) | other |
| [R3-222214](file:///C:\Users\h00364927\Documents\Docs\R3-222214.zip) | Discussion on new QoS related parameters (CATT) | discussion |