3GPP TSG-RAN WG3 #117-e R3-225053

Online, 15. – 24.08 2022

Agenda Item: 14.3

Source: Nokia (moderator)

Title: Summary of Offline Discussion on CHO with NR-DC   
(CB # 51\_F1TNLAddress)

Document for: Approval

# Introduction

**CB: # 51\_F1TNLAddress**

**- Check the scenarios and whether the current the spec describes which addresses are used for the direct data forwarding between the hosting node and DU in the assistant node?**

# For the Chairman’s Notes

Propose the following:

R3-20xxxa, R3-20xxxc merged

R3-20xxxc rev [in xxxg] – agreed

R3-20xxxd rev [in xxxh] – agreed

R3-20xxxe rev [in xxxi] – agreed

R3-20xxxf rev [in xxxj] – endorsed

Propose to capture the following:

**Agreement text…**

**Agreement text…**

**WA: carefully crafted text…**

Issue 1: no consensus

**Issue 2: issue is acknowledged; need to further check the impact on xxx. May be possible to address with a pure st2 change. To be continued…**

# Discussion (1st round)

## Scenario

The problem presented in R3-224246 concerns data exchange in DC operation, directly between the hosting node and the DU in the assisting node. The authors assume it is allowed (not prohibited) on the standards since Rel.15. In particular, TS 38.425 instructs as follows:

*If configured, NR user plane protocol instances exist at the Master node and the Secondary node in the context of DC or at nodes hosting F1-U protocol terminations or at eNB-CP and eNB-UP. The NR user plane protocol supports direct communication between NR user plane protocol entities, regardless of whether they terminate the same or different user plane interfaces.*

**Question 1: Please, comment if you consider that direct data exchange between the hosting node and the DU of the assisting node is not allowed (starting from Rel.15).**

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| --- | --- |
| Company | Why not? |
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|  |  |

## Addresses

If the companies agreed that direct data exchange between the hosting node and the DU of the assisting node is allowed, then the problem of the addressing arises: which addresses shall be used at either of the ends?

Practically, often each interface uses own addressing pool. This was acknowledged in some earlier discussions in RAN3, e.g. one that resulted in agreeing R3-223761 at RAN3 #116 (there, the SN was informed about using either X2 pool or S1 pool for TEIDs related to an inter-RAT HO).

In the online discussion, it was observed though, that in case of DC operation, there is no standardised method to let the DU of the assisting node know if the data exchange will be direct or indirect. Neither the hosting node can know it based on the communication with the CU of the assisting node. On the other hand, signalling is not the only option and a node may be configured to allocate certain address in response to address received.

**Question 2: If you agree that direct data exchange has been allowed, please, comment if you agree that the same address pool must be used at the hosting node and the DU of the assisting node, even if separate addressing pools are configured in Xn-U (MN-SN) and F1-U (CU-DU)?**

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| --- | --- | --- |
| Company | Yes / No | Possible further comments |
| Nokia | Yes, it is needed | The principle of implementing separate addressing pools is that communication with a different pool is prevented (this has been discussed and explained in the context of R3-223761). |
| Huawei | Yes | In order to ensure the split bearer or RLC bearer data delivery, we understand the TNL of the hosting node and TNL of the DU of the assisting node should in the same address pool.  But we want to emphasize that the issue discussed here is different from R3-223761 where it is focusing on the data forwarding so that the data forwarding can be allowed via the CN for the SN-terminated bearers.  I copy the reason of change as follows.   * *It can be observed that these semantic descriptions highly restrict that the data forwarding has to be relayed by the target MeNB for the SN-terminated bearers.* |
| E/// | No | This should not be part of the standards work. It is depending on the network deployment. |
| CATT | Yes |  |

If it is confirmed, the next point to consider is which addressing pool is to be used in case of such direct data exchange? One may note following requirements in TS 37.340:

*In case of bearer options that require Xn-U resources between the MN and the SN, the SN provides Xn-U TNL address information for the respective DRB, Xn-U UL TNL address information for SN terminated bearers, Xn-U DL TNL address information for MN terminated bearers.*

Since the CU and DU of the assisting node form together a node (the MN or the SN), the authors of the proposal in R3-224246 assume the assisting node as whole should provide addresses from the X2-U or Xn-U pool. This means, that if the assisting node is split into CU and DU, the DU of the assisting node shall provide X2-U or Xn-U addresses, if the data is to be exchanged directly with the hosting node.

**Question 3: Please, comment if you agree with the above interpretation of the TS 37.340, i.e. that for the direct data exchange in DC operation, the DU of the assisting node shall provide addresses from X2-U or Xn-U pool for the direct data exchange.**

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| Company | Yes / No | Possible further comments |
| Nokia | Yes, we agree | The issue how the DU knows which address to use, can be left FFS, discussed further and enhanced in future releases.  In the closed releases, we assume, it must be implemented based on some configuration (e.g. the DU recognises the address provided from the CU when the bearer is set up and then it responds with an address from the same pool). |
| Huawei | No | For SN terminated bearers, the DU of the assisting node does not know the bearer type, and it can only allocate the F1-U TNL addresses.  For MN terminated bearers, the DU of the assisting node can allocate DL TNL address based on the received UL TNL address.  So our understanding is that from DU perspective, the F1AP always specifies the F1 TNL addresses. And we prefer the “F1” is kept if the CR is needed. |
| E/// | No | This is also network implementation dependent. We don’t have to reuse the same addresses from X2-U and Xn-U pool. |
| CATT | Partly agree | To be honest, for the case described in 37.340 copied by the moderator, we are not sure whether we should call it X2-U or Xn-U. But we agree that the DU of assisting node shall provide address from the corresponding pool.  At the same time, we think Huawei raise a valid point. If the DU of the corresponding node does not know the bearer type, how could DU provide the address from the corresponding pool? |

## Possible conflict of the standards

As already cited above, the Xn-U specification clearly indicates that Xn-U frame protocol may span across Xn-U and F1-U. However, the addresses that can be exchanged over F1AP are declared to be addresses used between the CU and DU, i.e. from the F1-U pool:

*The UP Transport Layer Information IE identifies an F1 transport bearer associated to a DRB. It contains a Transport Layer Address and a GTP Tunnel Endpoint Identifier. The Transport Layer Address is an IP address to be used for the F1 user plane transport. The GTP Tunnel Endpoint Identifier is to be used for the user plane transport between Gnb-CU and Gnb-DU.*

**Question 4: Please, comment if you agree that the marked text conflicts with the declaration in the TS 38.425, where direct data exchange for a DRB is allowed between the Gnb-DU and the hosting node?.**

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| --- | --- | --- |
| Company | Yes / No | If you don’t see the conflict, please, explain how the above should be interpreted for the direct data exchange.  If you do agree, please, suggest how this conflict could be resolved. |
| Nokia | Yes, we agree | We propose to extend the text in TS 38.473, chapter 9.3.2.1, as proposed in R3-224246:  *The GTP Tunnel Endpoint Identifier is to be used for the user plane transport between Gnb-CU and Gnb-DU within the same Gnb, or between the hosting node and the Gnb-DU in the assisting node (in MR-DC scenarios).* |
| Huawei |  | We are not sure if there is any conflict with TS 38.425. Note that 38.425 is to convey control information for the data flow (copy below), not much related to the TNL addresses.   * The NR user plane protocol is used to convey control information related to the user data flow management of data radio bearers.   More clarification is needed about the descriptions in TS 38.425 on the “regardless of whether they terminate the same or different user plane interfaces” |
| E/// | No | In TS 38.425, section 4.1, it states the following.  If configured, NR user plane protocol instances exist at the Master node and the Secondary node in the context of DC or at nodes hosting F1-U protocol terminations or at eNB-CP and eNB-UP. The NR user plane protocol supports direct communication between NR user plane protocol entities, regardless of whether they terminate the same or different user plane interfaces.  We don’t think this is conflicting with current F1AP spec definition. There is no limitation on whether communication terminates the same or different user plane interfaces. |
| CATT | Yes | The proposal from Nokia is OK to us. |

# Conclusion, Recommendations [if needed]

If needed

# References

[4251] R3-224251, Continuation of the work on CHO with DC and optimisation of the data forwarding (Nokia, Nokia Shanghai Bell)

[4252] R3-224252, CHO with multiple candidate SCGs (Nokia, Nokia Shanghai Bell)

[4269] R3-224269, Discussion on CHO with CPA (ZTE)

[4270] R3-224270, New procedure for support of CHO with CPA feature to TS37.340 (ZTE)

[4322] R3-224322, Consideration on CHO related aspects (Huawei)

[4343] R3-224343, Support of CHO with CPAC (vivo)

[4394] R3-224394, Consideration on support of CHO including target MCG and SCGs (China Telecommunication)

[4436] R3-224436, Discussion on CHO in NR-DC (Lenovo)

[4509] R3-224509, CHO including target MCG and candidate SCGs (Qualcomm Incorporated)

[4510] R3-224510, CHO with SCG configuration (Qualcomm Incorporated)

[4519] R3-224519, Outstanding issues for CHO + MR-DC (Ericsson)

[4520] R3-224520, Introduction of signaling flows for CHO+MR-DC (Ericsson)

[4793] R3-224793, Discussion on the scenarios of CHO with multiple candidate SCGs (CATT)

[4794] R3-224794, Discussion on the procedure of CHO with multiple candidate SCGs (CATT)

[4834] R3-224834, (TP to TS37.340 on Mobility Enhancements)Considerations on CHO+CPAC procedure (Samsung)

[4835] R3-224835, (TP to TS38.423 on Mobility Enhancements) Considerations on CHO+CPAC configuration (Samsung)