3GPP TSG-RAN WG3 #113-e R3-214157

Online, 16-26 August 2021

Agenda Item: 9.3.4.1

Source: Qualcomm (moderator)

Title: Summary of Offline Discussion on inter-MN resume without SN change

Document for: Approval

# Introduction

**CB: # 23\_InterMNResume\_withoutSNChange**

**- Support inter-MN resume without SN change for both inactive resume and RRC reestablishment in RAN3 specifications in TEI17?**

**- Introduce the source SN UE XnAP ID, SN ID and the UE context in the source SN in the Retrieve UE Context Response message? Define a new message SN Keep Notification to indicate the source MN that the UE context in the SN is kept? Qualcomm Incorporated, China Telecom, T-Mobile USA, HW, CMCC,**

**- Provide CRs if agreeable**

(Qualcomm - moderator)

Summary of offline disc in [R3-214157](C:\\Users\\z00274494\\Downloads\\Inbox\\R3-214157.zip)

# For the Chairman’s Notes

Summary: 9 companies participated the discussion. Among them, 7 companies agree with supporting inter-MN RRC resume/reestablishment as TEI-17; 2 companies requested to confirm the scenario with RAN2.

**Proposal: send LS (R3-214360) to RAN2 to confirm RAN2 spec supporting status.**

It is proposed to technically endorse below items, which can be converted into agreement once RAN2 confirmed the scenario.

**Introduce “UE Context Reference at the S-NG-RAN node” (with SN node ID and SN XnAP UE ID, as defined in Handover Request) into Retrieve UE Context Response message**

**Target MN needs to indicate the source MN that the UE context in the SN is kept.**

# Discussion

MN and SN have different coverage. When MN changes, it is possible to keep SN unchanged. MN change without SN change has been supported for handover but not supported for RRC resume and RRC reestablishment.

Last meeting discussion was summarized in R3-212747 [1]. The RAN2 impacts have been supported in R16 DC/CA enhancement work item and RAN3 impacts seem to be small. To be safe, the decision was deferred to this meeting so that companies can further check offline.

**Question 1: Do you agree to support inter-MN resume without SN change for both inactive resume and RRC reestablishment in RAN3 specifications in TEI17?**

|  |  |  |
| --- | --- | --- |
| Company | Yes/no | Comments |
| Qualcomm | Yes | This is low hang fruit. The required changes for UE have been supported in R16. We can get the benefit of keeping SN by small enhancement in RAN. |
| Intel | No | We think that this should be first discussed in scenario-wise, although there may be no impacts on RAN2 to support this.  Our understanding is that we first had "inter-MN HO with SN change" procedure and then had "inter-MN HO without SN change" as a sub case of that.  Currently, we don't have "inter-MN resume/re-establishment with SN change" scenario. We think we should first discuss whether there is a need for such a feature.  And we are not sure how "early measurement" in Msg5 helps the target MN decide to keep the same SN. |
| Verizon | Yes | Agree with Qualcomm that this is low hanging fruit which can be achieved with small enhancement. |
| Huawei | Yes | We agree to have this feature in TEI-17.  We cannot compare with the inter-MN HO with/without SN change function. They are totally different functions used in different cases, one is for handover, the other is for RRC inactive.  There is no big efforts for RAN3 to support this. And we do see some benefical. |
| China Telecom | yes | Agree with Huawei and Qualcomm  Since this feature only need only small enhancement and has obvious beneficial, we agree to support this feature… |
| Nokia | Yes | We think that 3GPP shall review the scenario and if it is confirmed it was supposed to be supported in Rel.16, RAN3 shall proceed to enable it yet in Rel.16. Otherwise, we support working on the solution as an enhancement for Rel.17.  To clarify if the scenario was assumed to be supported in Rel.16, an LS to RAN2 may be considered. |
| E/// | No until the scenario is clearly clarified | We have some doubts on the scenarios and would ask for clarification. During inter-MN resume without SN change, the probability that the UE stays under the same SN coverage actually is lower for the resume case compared to the handover case, considering there is an inactivity period between suspend and resume. Whether such scenario will occur often or not is questionable. Then in case of RRC reestablishment, the SN should be released, so the proposed enhancement does not work. |
| ZTE | Yes | We have similar view to Nokia. Firstly, it is useful and needed, secondly, we can send LS to RAN2 to confirm either R16 or R17. |
| T-Mobile USA | Yes | This scenario is very common in the NR deployment due to the coverage imparity of different frequency band. For example, MN is on mid band and SN is on low band. The fact that this is supported for HO has been very helpful. Adding this support for RRC re-establishment is highly desirable based on field operation experience. |

To support inter-MN resume with SN, the new MN needs to know the SN information from old MN, e.g. by Retrieved UE context procedure as proposed in [2][3][4][5].

**Question 2: Do you agree to** **introduce “UE Context Reference at the S-NG-RAN node” (with SN node ID and SN XnAP UE ID, as defined in Handover Request) into Retrieve UE Context Response message?**

|  |  |  |
| --- | --- | --- |
| Company | Yes/no | Comments |
| Qualcomm | Yes |  |
| Intel | Could be | But should be first agreed whether there is a need for this scenario. |
| Verizon | Yes |  |
| Huawei | yes |  |
| China Telecom | yes |  |
| Nokia | Yes | Once clarified there are no RAN2 impacts. |
| E/// |  | Agree with Intel. |
| ZTE | Yes |  |
| T-Mobile USA | Yes |  |

If we take inter-MN handover without SN change procedure as example, target MN tells source MN to keep SN UE context and the accepted DRBs, PDU sessions.

**Question 3: Do you agree to define a new XnAP message to indicate the source MN that the UE context in the SN is kept?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes/no** | **Comment** |
| Qualcomm | Yes | Take inter-MN handover without SN change procedure as reference. |
| Intel | Could be | But should be first agreed whether there is a need for this scenario. |
| Verizon | Yes |  |
| Huawei | yes |  |
| China Telecom | yes |  |
| Nokia |  | We prefer to postpone stage-3 details until the next meeting. |
| E/// |  | Wait for clarification to Q1 |
| ZTE | FFS | Agree with Nokia, the detail solution in Stage 3 shall be postpone to the next meeting. We suggest to provide LS to RAN2. |
| T-Mobile USA | Yes |  |

On the parameter details, [2][3] and [4][5] proposed different IEs and message names.

**Option A [2][3], Proposal 3: Define new XnAP message “****Retrieve UE Context Confirm” to carry following IEs equivalent to Handover Request Acknowledge**

* **SN UE Context Kept Indicator**
* **DRBs transferred to MN**
* **PDU Session Resources Admitted List.**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M |  | 9.2.3.1 |  | YES | reject |
| Old NG-RAN node UE XnAP ID reference | M |  | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the old NG-RAN node | YES | ignore |
| New NG-RAN node UE XnAP ID reference | M |  | NG-RAN node UE XnAP ID 9.2.3.16 | Allocated at the new NG-RAN node | YES | ignore |
| PDU Session Resources Admitted List | M |  | 9.2.1.2 |  | YES | ignore |
| UE Context Kept Indicator | M |  | 9.2.3.68 |  | YES | ignore |
| DRBs transferred to MN | O |  | DRB List  9.2.1.29 | In case of DC, indicates that SN Status is needed for the listed DRBs from the S-NG-RAN node. | YES | ignore |

**Option B [4][5], Proposal 3: To define a new message “SN Keep Notification” to indicate the source MN that the UE context in the SN is kept.**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** | **Criticality** | **Assigned Criticality** |
| Message Type | M |  | 9.2.3.1 |  | YES | reject |
| New NG-RAN node UE XnAP ID reference | M |  | NG-RAN node UE XnAP ID  9.2.3.16 | Allocated at the new NG-RAN node. | YES | ignore |
| Old NG-RAN node UE XnAP ID reference | M |  | NG-RAN node UE XnAP ID  9.2.3.16 | Allocated at the old NG-RAN node. | YES | ignore |
| SN Node Status | M |  | ENUMERATED (kept, Released…) |  | YES | reject |

**Question 3a: If answer to question 3 is yes, which parameters shall be included in the new message?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Option** | **Comment** |
| Qualcomm | A | Take inter-MN handover without SN change procedure as reference.  Target MN may transfer some DRBs from SN to MN, after UE context retrieval. Some PDU session resource may not be accepted by the target. It would be useful to tell this information to source. |
| Intel |  | Should be first agreed whether there is a need for this scenario. |
| Verizon | A |  |
| Huawei | B | Either way is OK, but option b may have no impact on legacy function and will not introduce new procedures which may be overlapped with existing ones from function pov. |
| China Telecom | A |  |
| Nokia | A | If the new signalling is indeed necessary, option A seems better. But it shall be rediscussed once the scenario is clarified. |
| ZTE | FFS | It can also be postponed. |
| T-Mobile USA | A |  |

**Question 3b: If answer to question 3 is yes, which parameters name do you prefer?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Option** | **Comment** |
| Qualcomm | A | Retrieve UE Context Confirm |
| Verizon | A |  |
| Huawei |  | Either way is OK. |
| China Telecom | A |  |
| Nokia |  | We prefer to postpone stage-3 details until the next meeting. |
| ZTE | FFS | Agree with Nokia |

# Conclusion, Recommendations [if needed]

If needed

# References

1. R3-212747 Summary of offline discussion on inter-MN resume without SN change
2. R3-213371 Inter MN Resume without SN Change (Qualcomm Incorporated, China Telecom, T-Mobile USA) discussion
3. R3-213372 Inter MN Resume without SN Change (CR to 38.423) (Qualcomm Incorporated, China Telecom, T-Mobile USA) CR0596r1, TS 38.423 v16.6.0, Rel-16, Cat. B
4. R3-213962 Inter MN Resume without SN Change (Huawei, CMCC) discussion
5. R3-213963 Inter MN Resume without SN Change (Huawei, CMCC) CR0662r, TS 38.423 v16.6.0, Rel-16, Cat. F