94e-53-R17-Flex-gNB-ID - Version 0.0.3
RAN

3GPP TSG RAN#94e RP-21xxxx

e-Meeting, Dec 6th – 17th, 2021

Agenda item: 9.7

Source: 3GPP TSG RAN3 Chair (ZTE)

Title: Email Summary on [94e-53-R17-Flex-gNB-ID] Flexible gNB-ID solutions

Document for: Discussion and Decision

1 Initial Round

The following conclusions were proposed in RP-213245:

Conclusion 1: Unconstrained use of Flexible gNB-IDs eases the process of network expansions. The lack of such feature makes network expansions either very costly or even impossible in some use cases.

Conclusion 2: The agreements in RAN3 allowed for the endorsement of network based solutions as a complement to solutions based on broadcast of gNB-ID length

Conclusion 3: Endorsement of a network based solution for gNB-ID disambiguation shall not imply rejection of solutions based on broadcasting of gNB-ID length.

Conclusion 4: The solutions in R3-214403 and R3-214404 cannot be agreed because they have not been validated by the WG of competence for AMF and CN functionalities

Conclusion 5: the solution in R3-214403 and R3-214404 alone cannot address all the use cases RAN3 has agreed to be in need of a solution, which are "ANR, RAN sharing, gNB-ID exhaustion". This solution should be revised and endorsed together with a broadcast-based solution.

Feedback Form 1: Q1) Do you agree the above conclusions in RP-213245?

1 – Ericsson LM Yes, we agree the conclusions.
2 – Samsung R&D Institute UK UE based solution and network based solution have been discussed in RAN3. The compromised way forward is to agree the UE based solution, while network based solutions as a complement to support the scenarios in case of no Rel-17 UEs in the network. With this in mind, we agree the conclusions.

3 – Bell Mobility

Yes we agree with the conclusions. Discussions in RAN3 and LS sent to RAN2 already confirmed UE based solution is technically feasible and extremely important for the operators. Network based solution can work in some scenarios but it requires additional workarounds and special rules. In certain scenarios like EN-DC ANR and PCI confusion UE based solution is better than network solution. Also for some use cases like drive test post-processing UE based solution is the only solution that can work. This is why both solutions can be be specified and will be a complement to each other.

4 – MediaTek Inc.

R2 Chair: Comment on the whole, also repeated below.

Note that the TEI17 proposal for a Uu solution was indeed not agreed in RAN2, similar to almost all other TEI17 new NR proposals in RAN2 (Last meeting TEI17 new proposals: 16 were rejected, 6 undecided, none agreed). The acceptance threshold for TEI17 has been very high in RAN2. Note that RAN2 never assumed that the existence of a network solution precludes the existence of a Uu solution which seems insinuated. In RAN2, there were some comments that in the light of the existence of a network solution there is no need = not sufficient justification, to agree a Uu solution, which is slightly different. I also note that for a cpl of meetings RAN2 waited for further LS from RAN3 on the requirement for a Uu solution, but no LS was received, so I assume that RAN3 didn't achieve consensus on the need for a Uu solution.

I hope this issue can be decided in the detail at this plenary meeting to avoid further open-ended WG discussions, as it has now been on the table multiple times. Given the high number of rejected TEI proposals in RAN2 (also with significant operator support), I hope that TEI escalation to plenary will not be a common trend.

5 – Verizon UK Ltd

We support the conclusions

6 – CATT

We believe that the issue on gNB disambiguation should be resolved.As to solutions,if the network based solution could not cover all of the scenarios in the real deplaoyment,then we needs to consider Uu based solution.So,all in all,we suggest to have some discussion and have a common understanding on whether network based solution could work in RAN sharing scenario.

7 – ZTE Corporation

For Conclusion 1:

Actually there are three options for flexible gNB ID configuration on the table:

Approach 1:By OAM. -Already supported since Rel-15.

Approach 2:By network based solution - Already approved in RAN3#113e and then in RAN#93.

Approache 3: By broadcast in SIB.- There is no consensus in recent RAN2#116e.

In our understanding, approach 1 provides basic flexible gNB ID configuration for the network. Approach 2 provides extension flexible gNB ID configuration. During the RAN3#113e, the level of flexible configuration was discussed and "***Unconstrained use of Flexible gNB-IDs***" was not identified in the meeting. Instead, level 2 of flexibility "If one node is reserved as gNB ID, then all its children as cell IDs belongs to this node except if a child node is reserved for a new gNB ID" was identified in the meeting.

Based on above, the requirement of "***Unconstrained use of Flexible gNB-IDs***" was discussed and didn't achieve consensus.

For Conclusion 2:

It can not say the network based solution is just a complement solution as broadcast based solution. The network based solution can provide level 2 of flexibility for gNB ID configuration.

For Conclusion 3:

Yes, but whether solution based on broadcasting of gNB-ID length can be adopted shall follow the decision in RAN2 .

For Conclusion 4:

The CRs work as similar way to solve TNL address discovery for EN-DC in Rel-15.

For Conclusion 5:

The network solution has been developed for ANR and gNB-ID exhaustion. As for RAN sharing scenario, it is noted the new IE introduce in SON Configuration Transfer is NG-RAN CGI, which means the IE already concludes PLMN information to the AMF. Then based on the information, AMF which support MOCN can deduces the gNB ID based on request PLMN. In this way, the network solution can also workable in RAN sharing scenario.

8 – vivo Mobile Communication Co.

We wonder if we should discuss additional solution for Flexible gNB-ID. Currently, there is no clear guidance from RAN3 that network based solution or OAM based solution are not sufficient to deal with the issue. We think RAN2 should wait for RAN3 further progress and LS to RAN2 before RAN2 decide whether to discuss SIB based solution.

9 – MediaTek Inc.

Conclusion 2: We understand RAN3 agreements saying that broadcast based solution is feasible and it is still on the table. We however don't see that statement saying that network based solution is just a complement solution of broadcast based solution.

Conclusion 3: Yes, endorsement of network based solution does not preclude the broadcast based solution. However, it does not imply to support broadcast based solution.

Conclusion 4/5: We prefer to leave the discussion to RAN3.

10 – Nokia

We agree with conclusions 1 and 3, and we acknowledge that network-based solution was already agreed by RAN3. This should not prevent RAN2 from discussing the broadcast of gNB-ID length based on its own merits.

11 – Huawei Tech.(UK) Co.. Ltd

We cannot agree on the conclusion of RP-213245 because we do not acknowledge the argumentation e.g.:

- *"A shared NG-RAN node is connected to different AMFs (from different sharing operators) and such AMFs are typically not connected between each other":* If two AMFs are not connected, ANR could not work, there is no signaling between AMFs, there is no Mobility

- *"ANR between NG RAN nodes connected to different AMFs"*: The network solution works well in this case, because the target TAI will be carried in the TNL lookup message as reported by the UE.

"Unconstrained assignment of gNB-IDs" This scenario is confirmed invalid by RAN3. Below is the agreement in RAN3 113-e: ***If one node is reserved as gNB ID, then all its children as cell IDs belongs to this node except if a child node is reserved for a new gNB ID.***

- Etc…

We also believe there was a confusion in RAN3 around this 'complementary'; technically the two solutions are independent. The network solution work well there is no reason to come back on RAN3 endorsed CRs. The 'complementary' is a consensual approach in RAN3 to allow 2 solutions, but the final decision for RAN2 CR remains to RAN2.

12 – Qualcomm Technologies Int

As a general comment, this discussion in RAN3 started by conflating the feature with a solution, and most of the useful analysis of requirements was in fact done after the LSs to RAN2 were sent. This did not create good conditions in which to progress. The below tries to assert some facts on the conclusions proposed in RP-213245.

Conclusion 1: No - "unconstrained use" is undefined. Please check discussion in RAN3#113-e.

Conclusion 2: "Allowed" only in the sense that this is a possibility, but there is no specific agreement on this, and the solutions work independently. More specifically:

In RAN#112-e, the following was captured as an agreement:

A solution based on inclusion of the gNB-ID length in the system information block is technically feasible and it addresses the identified issues of cases of ANR, RAN sharing, gNB-ID exhaustion; other solutions are not precluded; we should further work on the details.

Which seems fairly open ended, i.e. further work needed. The proponents of the broadcast solution then pushed to send another LS to RAN2 which was effectively trying to create a de facto decision by asking RAN2 to "confirm" whether the feature could be implemented in rel17. The text of the LS was indeed a forced compromise as it stated that RAN3 was working on a network based solution that could work where UEs capable of length detection from the SIB are not present (this of course includes the case where the broadcast feature does not exist or is not deployed).

Then in RAN3#113e, CRs were endorsed for the network based solution, and this followed an analysis of the actual level of flexibility of ID assignment required by operators - something which had not been done before. There was no challenge to the conclusion that the flexibility afforded by the endorsed solution is sufficient.

Conclusion 3: No, but it may imply such rejection. There is no compulsion to have two solutions.

Conclusion 4: These are extensions of ANR which is essentially a RAN functionality. We can of course liaise SA2 for checking impacts etc.

Conclusion 5: No - actually it is factually not clear (and it is certainly not consensual and not asserted at RAN3#113-e) that "the solution does not address all the use cases RAN3 has agreed to be in need of a solution". In fact the "level 2" flexibility (supported by the network based solution) was agreed in RAN3#113-e to be quite sufficient for operator's needs. For sure the use cases mentioned in this conclusion are supported by the network-based solution.

13 – Ericsson LM

Focusing on the conclusions with immediate repercussion on RAN3´s work:

Conclusion 4 points out at the fact that the solution endorsed by RAN3 has not been validated as feasible by any WG in charge of CN functionalities. No matter if the solution is similar or not to other solutions already specified, relevant WGs need to be consulted before any solution based on CN functionalities can be agreed. For this reason, endorsement of the solution in RAN3 shall be revoked and we suggest that the discussion on this topic continues in RAN3.

Conclusion 5 points at the fact that the solutions endorsed in RAN3 do not address the use cases agreed to be of reference. As one example, the solution does not solve the RAN Sharing use case where operators use different, not connected, AMFs. It is therefore unclear how a solution based on gNB-ID disambiguation of cells belonging to different operators could be based on a process at a single AMF. If the ambition of the solution endorsed in RAN3 is to address all use cases of reference, it is therefore obvious that the solution in question is incomplete. It is under this context that the network based solution endorsed by RAN3 can be agreed only if complemented by a broadcast based solution, which will address the remaining use cases.

Some companies in RAN2 assumed that the solution endorsed in RAN3 can address all use cases of reference but as it can be seen by the split opinions in this email thread, this is not the case. Hence the conclusion of RAN2, of not agreeing to a broadcast based solution because the network based solution "does it all" is incorrect.

It should also be noted that 2 TUs have been allocated for TEI 17 in RAN2, hence there should be sufficient time allocated in RAN2 to discuss this matter, which reduces to a rather simple solution in RAN2, i.e. broadcast additional 5 bits in the SIBs.

14 – Apple Benelux B.V.

Conclusion 1: The discussion on the "cost...of network expansion" seems outside of our scope.

Conclusion 2: No

Conclusion 3: Nothing is implied, each solution can be discussed independently

Conclusion 4: We don't see any obstacles to agreeing the solutions in R3-214403 and R3-214404

Conclusion 5: No

The below proposal is proposed in RP-213245:

Proposal: It is proposed continue discussions on Flexible gNB-IDs in the WGs of competence and to task both RAN3 and RAN2 to define respectively a network based solution and a broadcast based solution for the disambiguation of the gNB-ID from a CGI reported by the UE.

Feedback Form 2: Q2) Do you agree the above proposal in RP-213245?

1 – Ericsson LM

Yes, we agree the proposal.

2 – Samsung R&D Institute UK

Agree

3 – Bell Mobility

Agree

4 – MediaTek Inc.

R2 Chair: Comment on the whole, also repeated above.

Note that the TEI17 proposal for a Uu solution was indeed not agreed in RAN2, similar to almost all other TEI17 new NR proposals in RAN2 (Last meeting TEI17 new proposals: 16 were rejected, 6 undecided, none agreed). The acceptance threshold for TEI17 has been very high in RAN2. Note that RAN2 never assumed that the existence of a network solution precludes the existence of a Uu solution which seems insinuated. In RAN2, there were some comments that in the light of the existence of a network solution there is no need = not sufficient justification, to agree a Uu solution, which is slightly different. I also note that for a cpl of meetings RAN2 waited for further LS from RAN3 on the requirement for a Uu solution, but no LS was received, so I assume that RAN3 didn't achieve consensus on the need for a Uu solution.

I hope this issue can be decided in the detail at this plenary meeting to avoid further open-ended WG discussions, as it has now been on the table multiple times. Given the high number of rejected TEI proposals in RAN2 (also with significant operator support), I hope that TEI escalation to plenary will not be a common trend.

5 – Verizon UK Ltd

Agree

6 – CATT

Partially,see our comments in Q1

7 – ZTE Corporation

The discussion and CRs were completed in RAN3 then it is not appropriate to reopen the discussion again, unless the issue on solution can be identified by the group.

In addition, the discussion status in RAN2 should be clear based on the clarification from RAN2 Chair.

8 – vivo Mobile Communication Co.

No, RAN2 should wait for RAN3 further progress and LS to RAN2 before RAN2 decide whether to discuss SIB based solution.

9 – MediaTek Inc.

No. The broadcast based solution is already discussed (multiple times) in both RAN2 and RAN3 and there is no consensus to support it. So, we suggest not to support it.

10 – Nokia

Please see comments to Q1.

11 – Apple R&D

No. We also think RAN2 has already discussed this issue several times and no agreements were achieved. We don't feel it's an essential feature to support especially if NW based solution can already solve the concerned cases.

12 – Huawei Tech.(UK) Co.. Ltd

We are not keen on "come back on RAN3 endorsed CRs" and challenge existing agreement, there is no new facts (including in RP-213245).

The RP-213245 does not bring any argument on complementarity of solutions. RAN2 has discussed this twice and it was not agreed as companies think the network-based solution is sufficient and we should not duplicate the solutions for the same purpose. Therefore we don't see much need to repeat the discussion in RAN.

We also share similar considerations as the RAN2 chair, that it should not be the trend that TEI topics not agreed in RAN WG would then go for RAN plenary. The TEI discussion is led by corresponding RAN WG and this is why it called TEI.

13 – Qualcomm Technologies Int

At this point we see no need to task groups from RAN. Issues can be brought up in the WGs on their own merits, where it is much easier to take into account the full context at WG level including past agreements.

14 – Ericsson LM

As commented above, the conclusion in RAN2 was based on the wrong assumption that a network based solution can address all use cases of reference. This is incorrect. Indeed, the solution endorsed in RAN3 not only does not address all use cases, but it has not even been validated by WGs responsible for CN functionalities and it cannot be agreed.

We consider the use of flexible gNB-IDs a very important feature. We need to point out that lack of a workable solution for flexible eNB-IDs in LTE has led to high impact specification changes due to the fact that some networks experienced eNB-ID exhaustion. We do not want this to happen again.

For this reason, we believe that both RAN2 and RAN3 should work on solutions that can address all use cases. For some use cases, a network based solution of the like of what RAN3 endorsed could be feasible. For other use cases a broadcast based solution is needed. We therefore support that both RAN2 and RAN3 shall develop solutions to fix the issues identified.

1.1 Moderator's Summary

According to the inputs in the initial round, there is no consensus on the conclusions and proposal proposed in RP-213245.

As RAN3 Chair, I also agree with RAN2 Chair that TEI escalation to plenary shall not be a common trend.

According to RP-210826, "TEI" stands for "Small Technical Enhancements and Improvements", and a TEI CR set shall be fully completed within one TSG cycle/quarter in all affected WGs with the understanding that from the agreement to do the TEI proposed. And a TEI proponent should bring all CRs in parallel to the WGs and not just kick-off discussion in one WG.

The solution endorsed in RAN3 does not preclude the existence of other solutions in other WGs, meanwhile there is no compulsion to have two solutions. Issues can always be brought up in the corresponding WGs on their own merits and the decision will be made by the group.

2 Intermediate Round

Based on the inputs and analysis, **moderator suggests to close this TEI dicussion in RAN. Issues can be brought up in the corresponding WGs on their own merits and the decision will be made by the group.**

Feedback Form 3: Do companies have further comments?

1 – Huawei Tech.(UK) Co.. Ltd Agree with the moderator.
2 – MediaTek Inc. We support the proposal from moderator.

3 Conclusion

This TEI dicussion is closed. Issues can be brought up in the corresponding WGs on their own merits and the decision will be made by the group.