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Elbonia, 19 – 27 May 2021

**Agenda item: 8.4.3**

**Source: Nokia, Nokia Shanghai Bell**

**Title: Summary of 8.4.3: Topology Adaptation Enhancements**

**WID/SID: NR\_IAB\_enh -Core - Release 17**

**Document for: Discussion and Decision**

# 1 Introduction

This document provides a summary of papers submitted to RAN2#114-e Agenda Item 8.4.3 Topology Adaptation enhancements. The overview identifies converging proposals that RAN2 can potentially be easily agreeable in order to progress the topic.

# 2 DAPS-like execution for IAB node

One of the key aspect for Inter-donor topology adaptation in Rel-17 developed by RAN3 that originated RAN2 involvement on DAPS-like solution developments is

* IAB-MT simultaneous connectivity to two IAB-donors, LS on DAPS-like solution in [50]
* **WA: NRDC is supported as a baseline procedure for the IAB-MT’s simultaneous connectivity to two IAB-donors; DAPS-like solution is not precluded**
* **Liaise RAN2 to discuss use cases, functionality, and protocol stack of DAPS-like solutions for IAB.**

While addressing the LS, RAN2 noted the following points:

* Consider enhancements to topology adaptation that improve:
* DAPS and potential IAB-specific enhancements of DAPS is not precluded for now (but as there is no PDCP it is not clear how to support DAPS).

**RAN2#112e**

* Consider enhancements to topology adaptation that improve:
* DAPS and potential IAB-specific enhancements of DAPS is not precluded for now (but as there is no PDCP it is not clear how to support DAPS).

**RAN2#113e**

* Will indicate regarding P3 that R2 doesn’t understand what is asked by “DAPS-like”, Ask R3 to clarify what they want to achieve.

**RAN2#113bis-e**

- “Chair: We will not make any general agreement to support or not support *DAPS-like* mobility as this is too wide and there is divergent understanding what are the issues to resolve and how.”

Following the status, several contributions to RAN2#114 address the topic. There can be very diverging proposals noted.

From:

* excluding or postponing the DAPS-like solution from Rel-17 IAB enhancements

due to complexities identified existing solutions for the service interruption reduction (i.e. Dual Connectivity), lack of benefits over Dual Connectivity, or standardization efforts spanning across several WGs [21][39][44]),

to:

* unconditional requirement to support IAB-specific DAPS-like handover for load balancing [2][28] or service interruption reduction in a single connectivity [25], which seem to be a different use case than requested by RAN3.

Besides these, most of the other DAPS-like related proposals represent different options on how the DAPS-like functionality could be realized [11][12][13][20][28], while at the same time discussions are at the stage of careful studies and analysis [12]. From these inputs various limitations are observed e.g. missing RAN1 guidelines on new data transmission after UL data switching [11] or new procedures and behaviours that DAPS-like would require (e.g. proposal on introduction of PDCP to the BH link [20] and overall complexity brought to the UE [13]). [12] arrives to a conclusion that DAPS migration in their current state can only be applied for inter-donor migration scenarios. All the inputs identify issues, that do not seem to have converging conclusions, yet.

Hence, fundamentally, the existing DAPS solution cannot be reused without modifications. Any DAPS-like for IAB has to be different from Rel-16 DAPS baseline (e.g. due to protocol stack differences and missing simultaneous transmission in UL).

**Proposal 1:** RAN2 confirm the existing Rel-16 DAPS solution cannot be reused for IAB without modifications.

**Proposal 2:** RAN2 discuss whether DAPS-like solution is further evaluated (e.g. what modifications are necessary) or deferred to a later release.

# 3 CHO for IAB node

## 3.1 CHO execution condition

For service interruption reduction and robust migration of an IAB node (in case of BH RLF on the source link), CHO has been agreed to be developed for Rel-17 IAB nodes. In RAN2#113bis-e agreed that condEventA3 and condEventA5 are applicable to IAB-MT and other CHO execution condition is FFS.

|  |
| --- |
| * The use cases for IAB-MT CHO should be migration and RLF recovery. * RAN2 should have a common solution for intra-CU/intra-DU CHO and intra-CU/inter-DU CHO. * condEventA3 and condEventA5 are applicable to IAB-MT * FFS if other CHO execution condition is needed (e.g. whether type 2 RLF indication can be used as trigger) |

CHO execution and triggers have been discussed in [2][6][17][26][31][34][39][44]. Mainly discussed conditions are:

* BH RLF
  + type-2 RLF indication,
  + type-4 RLF indication,
* mobility event A4.

It is noted that other CHO triggering conditions being proposed by companies, include:

* Latency-based condition:
* Load-based condition
* congestion indication from a parent node
* indication from a parent of a successful CHO/HO

however, given the limited discussion (while compared to the mainly discussed conditions) they require further discussions, and less convergence is seen on those. They need more discussion and verification, thus are not considered as easily agreeable.

Proposals on CHO execution conditions can be categorized into two cases:

* CHO for migrating/recovery IAB-MT, which concern **CHO** triggering in terms of handover **execution**
* CHO for descendant node, which concern **CHO triggering** in terms of **configuration.**

Based on the contributions for the first set of the CHO execution conditions, several companies made the following proposals:

* The impact on descendant IAB nodes/UEs of a migrating IAB node is the same, irrespective of whether the migration is an ordinary migration or it is triggered by CHO. [39]
* For intra-donor CHO of a migrating node, existing intra-donor topology adaptation as specified in RAN3 specification (R16) is applicable to intra-donor CHO without further enhancements in RAN2, i.e., descendent IAB nodes and UEs do not automatically perform any form of mobility. [34]
* For migrating/recovery IAB-MT, existing CHO execution conditions could be applied, and no additional CHO execution condition is needed [11]
* UE is not impacted in intra-Donor CU CHO case [26]
* The field conditionalReconfiguration in RRCReconfiguration message is reused to carry conditional RRCReconfiguration from CHO candidate IAB node(s)/cell(s) for an IAB-MT [6]
* Type-2 RLF indication is not needed as CHO execution condition [6]
* Event A4 is not needed as CHO execution condition [6]
* New CHO triggering conditions for IAB node migration, such as RLF detection, Type 2/Type4 RLF indication, are not needed [13]
* type 2 type 3 and type 4 RLF indicating for the trigger of CHO of IAB node should not be supported [26]
* event A4 should not be support for IAB CHO [26]
* descendant node DRB is not impacted [26]

Given some convergence and views that conditions can be applied to IAB-MT CHO without RAN2 specification impacts, it is proposed to discuss the following selected proposals:

**Proposal 3:** For migrating/recovery IAB-MT, existing CHO execution conditions in RRC can be applied, no additional CHO execution conditions are needed in Rel-17.

**Proposal 4:** Event A4 is not needed as CHO execution condition.

## 3.2 CHO triggers for descendant IAB node and configuration

When it comes **CHO triggering** based on BH RLF, it is in general noted in [34][39] that essentially, procedures support already IAB migration in case CHO is applied. Further, it’s noted several companies made the following converging proposals:

* The impact on descendant IAB nodes/UEs of a migrating IAB node is the same, irrespective of whether the migration is an ordinary migration, or it is triggered by CHO [11]
* Type-2 RLF indication is not needed as CHO execution condition [6]
* New CHO triggering conditions for IAB node migration, such as RLF detection, Type 2/Type4 RLF indication, are not needed [13]
* type 2 type 3 and type 4 RLF indicating for the trigger of CHO of IAB node should not be supported [26]
* Type-2 RLF indication and Event A4 are not supported as CHO execution conditions.
* Reception of type-3 indication is not used as an execution condition of CHO [45]
* Do not specify reception of type-4 BH RLF indication as CHO execution condition [45]
* Upon receiving type-3 indication, IAB-MT may revert back to the original routing from the one resulting from local re-routing that is triggered upon type-2 indication, if previously triggered [45]
* Upon receiving a Type-2 RLF indication, the IAB node should not perform CHO since the link may recover soon [10]
* [Related to type-2 RLF, RAN2 to continue the discussion on whether/how to capture in specification the possible IAB node behaviours at type-2 RLF reception, using the agreements in RAN2#113 as baseline.](#_Toc71572477)[40]
* RAN2 to de-prioritize type-4 RLF discussion for Rel-17. [12]
* A Type-3 RLF indication should invalidate the CHO configuration for migration of an IAB Node [12]

There are number of companies that do not see a need to use the RLF type-2, type-3 and type-4 as a specific requirement or condition for CHO execution. Based on that it is proposed RAN2 to discuss:

**Proposal 5:** For descendant IAB node, reception of type-2 BH RLF is not used as the trigger for CHO.

**Proposal 6:** For descendant IAB node, reception of type-3 BH RLF is not used as the trigger for CHO.

**Proposal 7:** For descendant IAB node, reception of type-4 BH RLF is not used as the trigger for CHO.

However it’s worth noting that some of these companies believe Rel-17 enhancements for CHO at IAB still consider possible triggering conditions for RRC Reconfiguration based on enhancements discussed for local re-routing (see section 4) and generic methods and procedures:

* RRC reconfiguration to the descendant IAB-node can be pre-configured by source CU and activated by the migration IAB-node [2]
* RRCReconfiguration messages for the descendant nodes is configured via target path after migrating IAB node’s CHO completion [6]
* After RLF is declared, the IAB-MT determines whether and which CHO candidate(s) cell can be selected and attempts CHO execution for the cell [17]
* When intra-CU intra-donor-DU CHO is triggered for a migration IAB node, the BAP path of all descendant IAB nodes of the migration IAB node can be reconfigured by the CU. [13]
* [As per Rel.16 specification, an IAB node can be configured with CHO and trigger migration after fulfilling A3/A5 events, or upon declaring RLF for the link with the parent node, or upon receiving BH RLF recovery failure from the parent node.](#_Toc71572475)[39]
* Whether to trigger CHO upon reception a specific type of BH RLF indication is configurable. Static configuration via RRC and dynamic indication via BH RLF indication are considered for further discussion [44]
* The CHO configuration for descendant nodes which is used due to the migration of the upstream node shall include the default routing ID, defaultBH RLC channel and IP address(es). [11]

However, the assumed configurations for descendant nodes remain in RAN3 scope. Hence, the proposal is to confirm only generic aspects in context of CHO configurations and the following selected proposals:

**Proposal 8:** RAN2 to confirm: As per Rel.16 specification, an IAB node configured with CHO can trigger migration after fulfilling A3/A5 events, or upon declaring RLF for the link with the parent node, or upon receiving BH RLF recovery failure from the parent node.

# 4 Use of RLF indications

For local re-routing, RAN2 agreed to support type-2 RLF indication (indicating an ongoing BH RLF) and type-3 RLF indication (indicating a recovered BH RLF). However, the behaviors of the node after receiving the indications did not reach consensus.

Contributions to RAN2#114 address in particular the below agreements reached RAN2#113bis-e:

|  |
| --- |
| RAN2#113bis-e   * RAN2 to support type-2/3 RLF indication (FFS specified behavior(s) TS impact, FFS details). * Type-2 RLF indication may be used to trigger local rerouting * Type-2 RLF indication may be used to trigger deactivation of IAB-supported in SIB * Type-2 RLF indication may be used to trigger deactivation or reduction of SR and/or BSR transmissions * Local rerouting can be triggered by indication of hop-by-hop flow control. Further details, e.g., on trigger information, trigger conditions, role of CU configuration, are FFS. * RAN2 considers inter-donor-DU local rerouting to be in scope |

### 4.1 Type-2 and Type-3 RLF indications

The proposals made by companies on RLF indications addressed:

* RLF indications purposes (to extend the list of the agreed use cases or clarify applicability to parent and child),
* triggers determining the indicators [9][30],
* actions triggered upon RLF indicator perception [10][20][24], or
* transferred information (as the required content associated with the indicator) [9][22].

Several companies discussed RLF Type 2 “Trying to recover” and RLF Type 3 “BH link recovered” depending on single connectivity or Dual Connectivity of IAB node [9][22][30]. Proposals vary from leaving the actions implementation-specific [3][10][20] to actions dependant on other RLF indicator [9][5]. Companies have also diverging views on related procedures for the indicators (e.g. where to transmit, how to propagate, when deactivate). There is also view in [20], that the overall handling of RLF indicator should be left to implementation. Hence, the rapporteur thinks RAN2 should try to establish very basic framework first, based on a few converging proposals:

**Proposal 9:** The trigger for type 2 RLF indication transmission is the start of RRC Reestablishment procedure. FFS whether for both: single and dual connection cases.

**Proposal 10:** Type 2 RLF indication can include list of BAP destinations. Details FFS.

**Proposal 11:** The trigger for type 3 RLF indication transmission is successful recovery after BH RLF. FFS whether for both: single and dual connection cases.

**Proposal 12:** Type 2 and Type 3 BH RLF Indications are transmitted via BAP Control PDU.

**Proposal 13:** There are cases when upon reception of Type-2/3 RLF indication from a parent node, the IAB node may transmit Type-2/3 RLF indication to its child nodes.FFS on details.

### 4.2 iab-Support deactivation upon RLF

It is also noted that [8][24][3] discussed deactivation of IAB-supported in SIB and presented different options.

[8] proposed to bar access to new IAB nodes based on type-4 RLF indicator, while [24] proposed (as an option) to confirm the possibility with stage 2 impacts only, whereas [3] claimed that RAN2 should not support deactivating iab-Support by child node, as the intended effect wont be achieved. Since signalling capabilities allow to modify the SIB and suppress the iab-Support bit, it is proposed:

**Proposal 14:** iab-Support can be deactivated upon type-2 RLF indications without specification impacts.

# 5 Local rerouting

### 5.1 RAN3 BAP routing issue

RAN3 LS in [51] tasked RAN2 to work on the following:

* **Issue 2. BAP routing towards the target IAB-donor-DU**. This issue mainly focuses on how to enable the re-routed packets being routed to the target IAB-donor-DU, when the destination BAP address in the BAP routing ID of the re-routed packets does not correspond to target IAB-donor-DU.

The issue is particularly addressed in [9][19][29][23] [33] [35]. Based on the discussion there are very diverging proposals on solutions for inter-donor-DU rerouting. E.g:

* BAP header change
* Using shared BAP address among the subset of IAB-donor-DUs which allow re-routing
* Changing of BAP receiving behavior at the IAB-donor-DU
* configure a default BH RLC CH and default BAP routing ID
* new parameters in routing configuration
* update the donor DU’s UL receiving operation
* new actions of IAB-node on routing table
* Using Donor-CU BAP address for upstream routing. Separate Donor-DU BAP address is still used as Next Hop BAP address by its child nodes.

Given the options it seems too premature to establish common understanding on how the issue should be resolved. However, as per [33] it is worth noting, that in case BAP header modification mechanism was adopted it could also handle the routing problems for inter-topology. Therefore, [33] proposes a unified solution which can be achieved if BAP header modification is considered for inter-donor-DU rerouting.

**Proposal 15:** RAN2 will work on BAP routing towards the target IAB-donor-DU.

### 5.2 Generic

For local rerouting, contributions to RAN2#114 address in particular the below agreements reached RAN2#113bis-e:

|  |
| --- |
| RAN2#113bis-e   * Local rerouting can be triggered by indication of hop-by-hop flow control. Further details, e.g., on trigger information, trigger conditions, role of CU configuration, are FFS. * RAN2 considers inter-donor-DU local rerouting to be in scope |

Some generic aspects related to triggering of local rerouting were discussed in [3][9][19][22][24]. [3] present the proposals which restrict related Rel-17 enhancements to minimum (leaving to implementation), as it was in Rel-16. However, [24] noted that Rel-16 local rerouting is up to IAB-node implementation which path is selected as the alternative path, as long as the destination is the same. It meant the local rerouting is based on the local decision and uncontrollable from the IAB-donor’s perspective, which may not align with the topology-wide objective, especially in case many local decisions happen and accumulate in the IAB topology. The IAB-donor’s controllability should become more important if the local rerouting is extended beyond BH RLF case. It’s straight forward that the IAB-donor may configure the alternative path(s), whereby the IAB-node should act on the alternative path when it performs the local rerouting. The modelling of alternative path(s) should be left for further discussion, but fundamental assumption that few companies seem to take is based on the following:

### **Proposal 16:** As in Rel-16,the IAB-donor may configure the IAB-node with routing path(s). FFS on whether extensions are needed on top of Rel-16 routing configuration.5.2 By flow control

Further, [3][9][19][22] seemed to achieve a common ground on the following aspects:

**Proposal 17:** A triggering condition for local re-routing (on top of type-2 BH RLF) is flow control feedback info including an indication on available buffer size.

### 5.3 Inter-donor-DU rerouting

Inter-donor-DU rerouting is being discussed with relation to RAN3 LS received on Topology redundancy in [48]. The contributions addressing the subject [3][7][9][10][15][20][23][29][30][37][38][41] continue RAN2 email discussion discussion on this matter in [Post113-e][058][IAB17] on inter-donor topology adaptation [46]. There were two aspects discussed BAP routing and bearer mapping. Since on bearer mapping at the boundary node, relatively limited views have been provided by companies, it is suggested to focus RAN2 discussion in RAN2#114 on BAP routing, identified in the RAN3 LS:

**About BAP routing and bearer mapping between two topologies:**

To support the bearer mapping across two topologies at the boundary IAB node, the non-F1-termination donor CU needs to provide the ingress BH RLC CH ID(s) for DL traffic and egress BH RLC CH ID(s) for UL traffic to the F1-termination donor CU.

* + **The boundary IAB node belongs to two topologies of two donor CUs.**
  + **RAN3 has considered the following options for the BAP routing across two topologies, i.e.,**
* **Option 1: OAM based solution**
* **Option 3: routing via a new unique identity (e.g., extended BAP address with CU component, separate set of (e)LCIDs)**
* **Option 4: BAP header rewriting based on BAP routing ID at, e.g., the boundary node**
* **Option 5: BAP header rewriting based on IP header at, e.g., the boundary node (seems to also impact RAN2)**

There are inputs that provide very detailed views and advanced understanding on how the related requirements procedures should be potentially defined, however in order to facilitate further agreements, rapporteur suggest to first confirm the scenario related to local rerouting enhancements enabled by BAP routing.

RAN3 scenarios clearly assume the boundary IAB node belongs to two topologies of two donor CUs, while it seems that RAN2 proposals target common solution for the inter-donor-DU re-routing should be supported for both the intra-donor-CU and inter-donor-CU cases:

* For intra-donor dual-parent IAB-node, local rerouting is supported to be triggered by latency requirement. [7]
* For intra-donor dual-parent IAB-node, local rerouting is supported to be triggered by link conditions of configured egress BH links.[7]
* For intra-donor dual-parent IAB-node, IAB node reports the updated BH mapping information to IAB-donor-CU via F1-C after local rerouting. [7]
* Support UL inter-donor-DU re-routing for both intra-CU and inter-CU topology [33]
* The inter-donor-DU re-routing should be supported for both the intra-donor-CU and inter-donor-CU cases, as listed in Proposal 1.[41]
* BAP header rewriting by the IAB node initiating local rerouting is supported for intra-CU intra/inter-donor DU local rerouting.[15]
* Donor-CU BAP address can be used in both intra-donor-CU and in inter-donor-CU re-routing. [23]

Therefore, it is proposed RAN2 discusses:

**Proposal 18:** For inter-donor-DU re-routing enhancements, RAN2 targets solutions that support both the intra-donor-CU and inter-donor-CU cases.

Detailed handling remains to be worked out, while it seems RAN2 should further focus work on identified by RAN3 requirements for BAP routing.

In order to facilitate further progress, it is proposed to select Option 4 based on BAP header rewriting as the method having least impact on BAP, requiring potentially only boundary nodes impacts and supported by majority in [46]. As analysed in [38] another potentially attractive solution from RAN2 viewpoint could be the option 5. However, since IP layer is involved in this solution, RAN2 should wait for RAN3 further progress, but RAN2 could elaborate on differences and similarities of the two Options based on BAP header rewriting:

**Proposal 19:** RAN2 to support inter-topology routing via BAP header rewriting based on BAP routing ID or work on commonalities of Option 4 with Option 5.

# 6 CU/UP separation

To improve the reliability and reduce the latency of F1-C traffic, RAN3 introduced 2 scenarios of CP-UP separation and identified the benefit of allowing the F1-C over NR access link in FR1 [47].

In the 2 scenarios, F1-C traffic is transmitted in the path with one hop via non-donor node and F1-U traffic is transmitted in the path with multiple hops via donor node.

Following the RAN3 LS in [47], RAN2 reached the basic agreements on CP/UP separation:

|  |
| --- |
| * SRB2 can be used for F1-C transport in CP/UP-separation scenario 1 (FFS other cases) * Split SRB2 can be used for F1-C transport in CP/UP-separation scenario 2 (FFS other cases) |

It is noted that [7][10][14][18][23] [38] discussed further details on CU/UP separation, while the conclusive proposals concerned:

* NR RRC message(s) to include F1-C traffic container
* F1-C over RRC vs. F1-C over BAP (simultaneous support) in CP/UP separation scenarios.

Based on [46][10][38] it seems converging proposals for RAN2 to discuss are:

**Proposal 20 :** NR *DLInformationTransfer* and *ULInformationTransfer* messages can be enhanced to transfer F1-C related packets in CP/UP separation.

**Proposal 21:** A new IE named *DedicatedInfoF1c* can be defined to transfer F1-C related packets via NR RRC message between the non-donor node and the IAB Node in CP/UP separation scenario 1.

Further, it should be emphasized that discussion is based on the provided RAN3 scenarios, where the F1-C traffic is only allowed to be transmitted via the non-donor node. Hence, as noted in [1] and [10], if F1-C traffic is transmitted via BH link, the purpose of CP/UP separation cannot be achieved. Following this conclusion, companies propose:

**F1-C over RRC and F1-C over BAP should not be supported simultaneously on the same parent link.[1]**

**F1-C-over-RRC and F1-C-over-BAP should not be simultaneously supported on the same parent link in the CP/UP separation scenario 1 and 2. [10]**

**Proposal 22:** F1-C over RRC and F1-C over BAP should not be supported simultaneously on the same parent link.

Rapporteur also notes that [10] provides protocol stacks for scenario 1 and scenario 2 (see Annex) that can be further used by RAN2 in the LS to RAN3.

# 7 Conclusion

This document provides a summary of papers submitted to AI 8.11.5 for RAN2 #114e. The summary identified the following proposals as potentially converging ones for further discussion in RAN2:

DAPS-like execution for IAB node

**Proposal 1:** RAN2 confirm the existing Rel-16 DAPS solution cannot be reused for IAB without modifications.

**Proposal 2:** RAN2 discuss whether DAPS-like solution is further evaluated (e.g. what modifications are necessary) or deferred to a later release.

CHO for IAB node

**Proposal 3:** For migrating/recovery IAB-MT, existing CHO execution conditions in RRC can be applied, no additional CHO execution conditions are needed in Rel-17.

**Proposal 4:** Event A4 is not needed as CHO execution condition.

**Proposal 5:** For descendant IAB node, reception of type-2 BH RLF is not used as the trigger for CHO.

**Proposal 6:** For descendant IAB node, reception of type-3 BH RLF is not used as the trigger for CHO.

**Proposal 7:** For descendant IAB node, reception of type-4 BH RLF is not used as the trigger for CHO.

**Proposal 8:** RAN2 to confirm:[As per Rel.16 specification, an IAB node configured with CHO can trigger migration after fulfilling A3/A5 events, or upon declaring RLF for the link with the parent node, or upon receiving BH RLF recovery failure from the parent node.](#_Toc71572475)

Use of RLF indications

**Proposal 9:** The trigger for type 2 RLF indication transmission is the start of RRC Reestablishment procedure. FFS whether for both: single and dual connection cases.

**Proposal 10:** Type 2 RLF indication can include list of BAP destinations to enable local re-routing. Details FFS.

**Proposal 11:** The trigger for type 3 RLF indication transmission is successful recovery after BH RLF. FFS whether for both: single and dual connection cases.

**Proposal 12:** Type 2 and Type 3 BH RLF Indications are transmitted via BAP Control PDU.

**Proposal 13:** There are cases whenupon reception of Type-2/3 RLF indication from a parent node, the IAB node may transmit Type-2/3 RLF indication to its child nodes.FFS on details.

**Proposal 14:** iab-Support can be deactivated upon type-2 RLF indications without specification impacts.

Local rerouting

**Proposal 15:** RAN2 will work on BAP routing towards the target IAB-donor-DU-.

**Proposal 16: As in Rel-16,** the IAB-donor may configure the IAB-node with path(s). FFS on whether extensions are needed on top of Rel-16 routing configuration.

**Proposal 17:** A triggering condition for local re-routing (on top of type-2 BH RLF) is flow control feedback info including an indication on available buffer size.

**Proposal 18:** For inter-donor-DU re-routing enhancements, RAN2 assumes a solution should be supported for both the intra-donor-CU and inter-donor-CU cases.

**Proposal19:** RAN2 to support inter-topology routing via BAP header rewriting based on BAP routing ID or work on commonalities of Option 4 with Option 5.

CU/UP separation

**Proposal 22:** NR *DLInformationTransfer* and *ULInformationTransfer* messages can be enhanced to transfer F1-C related packets in CP/UP separation.

**Proposal 21:** A new IE named *DedicatedInfoF1c* can be defined to transfer F1-C related packets via NR RRC message

**Proposal 22:** F1-C over RRC and F1-C over BAP should not be supported simultaneously on the same parent link.

Rapporteur also notes that [10] provides protocol stacks for scenario 1 and scenario 2 (see Annex) that can be further used by RAN2 in the LS to RAN3.

# 7 References

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7. R2-2104879 dual-parent IAB-node topology adaptation enhancement Intel Corporation
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10. R2-2104973 Discussion on CP-UP separation and topology redundancy ZTE, Sanechips
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12. R2-2105123 Migration and RLF handling in eIAB Networks Apple
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16. R2-2105376 Handling Type-2 & Type-3 RLF indication ASUSTeK
17. R2-2105396 Conditional HO for RLF recovery Fujitsu
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20. R2-2105454 RAN2 impacts of Rel.17 IAB topology adaptation enhancements Futurewei Technologies
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23. R2-2105483 Inter-donor-DU rerouting Nokia, Nokia Shanghai Bell
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26. R2-2105595 CHO for IAB NEC
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31. R2-2105802 CHO triggering in IAB InterDigital
32. R2-2105803 DAPS support in IAB InterDigital
33. R2-2105815 Discussion on IAB packet rerouting Lenovo, Motorola Mobility
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35. R2-2105848 Discussion on inter-donor DU local re-routing CANON Research Centre France
36. R2-2105861 Discussion on Inter-donor topology redundancy CANON Research Centre France
37. R2-2105864 Discussion on RLF indication and local rerouting enhancements CANON Research Centre France
38. R2-2106029 On IAB Inter-donor Topology Adaptation Ericsson
39. R2-2106030 On CHO and DAPS for IAB Ericsson
40. R2-2106033 Remaining Issues Related to CP/UP Separation in IAB Network Ericsson
41. R2-2106278 Inter-donor-DU rerouting and local rerouting for R17-IAB Huawei, HiSilicon
42. R2-2106279 Running CR of TS 38.340 for eIAB Huawei, HiSilicon
43. R2-2106280 Inter-donor topology routing, F1 over NR access link and CHO Huawei, HiSilicon
44. R2-2106298 CHO and DAPS-like Solution for eIAB LG Electronics
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1. [R2-2103083](file:///D:\\Documents\\3GPP\\tsg_ran\\WG2\\TSGR2_113bis-e\\Docs\\R2-2103083.zip" \o "D:Documents3GPPtsg_ranWG2TSGR2_113bis-eDocsR2-2103083.zip) Report [Post113-e][058][IAB17] Inter-donor topology adaptation
2. R2-2100040 LS on CP-UP separation of Rel-17 IAB RAN3 LS

1. [R2-2102638](file:///D:\\Documents\\3GPP\\tsg_ran\\WG2\\TSGR2_113bis-e\\Docs\\R2-2102638.zip" \o "D:Documents3GPPtsg_ranWG2TSGR2_113bis-eDocsR2-2102638.zip) LS on inter-donor topology redundancy RAN3 LS
2. Report of 3GPP TSG RAN WG2 meeting #113bis-e, Online
3. R2-2102637 LS on DAPS-like solution for IAB, RAN3, RAN3#111e
4. [R2-2102730](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113bis-e\Docs\R2-2102730.zip) Report from email discussion [Post113-e][057][IAB17] CHO and DAPS for IAB (CATT)
5. R3-211298 LS on inter-donor-DU re-routing, RAN3, RAN3#111e

# Annex

Protocol stacks for IAB F1-C traffic delivered with CU/UP separation:

**IAB-node**

F1AP

SCTP

IP

F1AP

SCTP

IP

XnAP

SCTP

IP

L2

L1

XnAP

SCTP

IP

L2

L1

NR RRC

NR PDCP

NR RLC

NR MAC

NR PHY

NR RRC

NR PDCP

NR RLC

NR MAC

NR PHY

IAB-DU

IAB-MT

**Non-donor node**

**IAB-donor-CU-CP**

SRB 2

Xn-C

Fig. 1: Protocol stack for IAB F1-C traffic delivered via the Non-donor node in scenario 1

**IAB-node**

F1AP

SCTP

IP

F1AP

SCTP

IP

RRC

PDCP

XnAP

SCTP/IP

L2/L1

XnAP

SCTP/IP

L2/L1

NR RLC

NR MAC

NR PHY

NR RRC

NR PDCP

NR RLC

NR MAC

NR PHY

IAB-DU

IAB-MT

**Non-donor node**

**IAB-donor-CU-CP**

Split SRB

Xn-C

Fig. 2: Protocol stack for IAB F1-C traffic delivered over split SRB2 in scenario 2.