**3GPP TSG-RAN WG2 Meeting #103bis R2-18xxxxx**

**Chengdu, China, Oct 8th – 12th, 2018**

**Agenda item:** 11.1.2

**Source:** Qualcomm Incorporated (Rapporteur)

**Title:** Email discussion [103bis#31][NR - IAB] Adaptation layer in MT

**Document for:** Discussion

# **1. Introduction**

This document contains email discussion:

**[103bis#32][NR - IAB] Unified design (Qualcomm)**

 **Intended outcome: attempt to extract a set of limited aspects to help reaching consensus on UP transport of unified design. No new architecture options should be considered.**

 **Intended outcome: Report to next meeting**

 **Deadline: Thursday 2018-11-01**

This email discussion is based on online discussion:

**F1-U termination**

[R2-1814369](file:///C%3A%5CUsers%5Cpanidx%5CDocuments%5CRAN%5CRAN2%5C103bis%20-%20Chengdu%5CDocs%5CR2-1814369.zip) Way forward on F1-U termination Ericsson, AT&T, KDDI discussion Rel-15 FS\_NR\_IAB

*Proposal 1. Further work on IAB for architecture group 1A should only consider solutions based on terminating GTP-U and NR user plane protocol in the IAB node.*

- Qualcomm thinks that we can put some of the GTP-U can be included in the adapt header. Ericsson indicates that we also have the flow control.

- Qualcomm thinks that we should consider this with the unified design and consider user plane transport as well.

- Huawei and Intel thought this is RAN3. Qualcomm explains that this is F1-U and adaptation layer design.

*Proposal 2 If the previous proposal is agreed, the remaining work on architecture group 1A should focus on alternatives d) and e) in figure 8.2.2 – 1 in TR 38.874.*

- Qualcomm thinks that this is a WI level decision

=> Placement of the adaptation layer and details of the adaptation layer should be analysed in view of the unified design

=> Noted

# **2. Discussion**

This discussion aims to identify design examples for the unified design. Each example specifies identifiers carried on F1\*-U, where these identifiers are carried in the L2-header-stack, and how they are processed.

The design examples illustrate how the unified design could be realized, identify potential constraints, and may serve as guide for WI stage. Since these designs are solely examples there won’t be any down selection.

Companies should feel free to propose their favorite design example. We should end up with at least one design example, which rapporteur has already provided below. We may end up with a few. In case there are too many design examples, some consolidation will be done, e.g. combine those that only differ with respect to stage-3 aspects.

The discussion contains two phases:

Phase 1: Collecting design examples for unified architecture

Phase 2: Conducting comparison among design examples

The TP will contain the design examples proposed (and potentially consolidated) and the comparison among them.

Each design example should address the following points:

* Characteristics: A few points on which of the present TR design aspects are applied to design. This should include how N:1 and 1:1 bearer mapping is supported, LCID space shortage, etc.
* F1\*-U identifiers used and their placement on L2 header stack
* Downstream processing of F1-U and F1\*-U identifiers by IAB-donor-DU and IAB-node

It is important to include the processing of F1-U and F1\*-U identifiers so that is becomes clear how the design works.

Please see example 1 below and use this template for further design proposals.

## **2.1 Phase 1: UP examples**

**Example 1 (Qualcomm)**

Characteristics:

* Non-IP-based Adapt
* UE-bearers are N:1-mapped to RLC-channels
* RLC-channels are 1:1-mapped to LCHs
* LCID-space extension necessary to support 1:1 bearer mapping

F1\*-U identifiers and their placement in L2 header stack:

* **UE-bearer-ID** above RLC
* **IAB-node-address** above RLC
* **LCID** with extended space on MAC-sub-header

Processing of F1-U and F1\*-U identifiers by IAB-donor-DU and IAB-node

**Table 1: Processing for example 1 (red:** ingress parameters; **blue:** egress parameters)

|  |  |  |
| --- | --- | --- |
|  | **IAB-donor DU** | **IAB-node** |
| **Ingress****packet** | F1-U packet received from CU holds **F1-U-info** with:* **UE-bearer-ID (=GTP-U TEID)**
 | F1\*-U packet received from parent holds **F1\*-U-info** with:* **UE-bearer-ID**
* **IAB-node-address**
* **LCID**
 |
| **Packet****processing** | Node derives from **F1-U-info** and lookup tables:* **IAB-node-address** based on **UE-bearer-ID**
* Egress link type (i.e. if access or BH link) based on **UE-bearer-ID**
	+ “Access” if UE of UE-bearer-ID is local
	+ “BH” if UE of UE-bearer-ID is remote
* If egress = “Access”, derive:
	+ UE-bearer based on **UE-bearer-ID**
* If egress = “BH”, derive:
	+ Egress link based on **IAB-node-address** (routing)
	+ Egress RLC-channel based on **UE-bearer-ID** (N:1 bearer mapping).
	+ **LCID** based on 1:1 mapping between RLC channel and LCH.
 | Node derives from **F1\*-U info** and lookup tables:* Ingress RLC channel through 1:1 mapping from **LCID**
* Egress link type (i.e. if access or BH link) based on **IAB-node-address**
	+ “Access” if address is local
	+ “BH” if address is remote
* If egress = “Access”, derive:
	+ UE-bearer from **UE-bearer-ID**
* If egress = “BH”, derive:
	+ Egress **IAB-node-address** = Ingress **IAB-node-address**
	+ Egress link based on **IAB-node-address**
	+ Egress RLC channel based on ingress RLC channel and **IAB-node-address** (mapping between BH RLC channels)
	+ **LCID** via 1:1 mapping between RLC channel and LCH.
 |
| **Egress****packet** | F1\*-U packet transmitted to child holds **F1\*-U-info** with:* **UE-bearer-ID**
* **IAB-node-address**
* **LCID**
 | F1\*-U packet transmitted to child holds **F1\*-U-info** with:* **UE-bearer-ID**
* **IAB-node-address**
* **LCID**
 |

**Example 2 (Company Name)**

Characteristics:

* Non-IP-based or IP-based Adapt?
* How is N:1 and 1:1 bearer mapping achieved?
* Is LCID-space extension required?
* Others aspects?

F1\*-U identifiers and their placement in L2 header stack:

* …

Processing of F1-U and F1\*-U identifiers by IAB-donor-DU and IAB-node

**Table 2: UP processing for example 2 (red:** ingress parameters; **blue:** egress parameters)

|  |  |  |
| --- | --- | --- |
|  | **IAB-donor DU** | **IAB-node** |
| **Ingress****packet** | F1-U packet received from CU holds **F1-U-info** with:* **UE-bearer-ID (=GTP-U TEID)**
* …
 | F1\*-U packet received from parent holds **F1\*-U-info** with:* **…**
 |
| **Packet****processing** | Node derives from **F1-U-info** and lookup tables:* **…**
 | Node derives from **F1\*-U info** + lookup tables:* …
 |
| **Egress****packet** | F1\*-U packet transmitted to child holds **F1\*-U-info** with:* **…**
 | F1\*-U packet transmitted to child holds **F1\*-U-info** with:* **…**
 |

**…**

**2.2 Phase 2: Comparison of Design Examples**

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# **3. Text Proposal**

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