TSG-RAN Working Group 2 (Radio layer 2 and Radio layer 3)   *TSGR2#2(99)158*

Stockholm 8th to 11th March 1999

Agenda Item: 7.7.1

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Title: RLC ESTABLISH/RELEASE

Document for: Decision

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1. Introduction

At the last WG2 meeting, establish primitive and release primitive were not included in S2.22 because two major issues existed. One is that RLC connection is established explicitly or implicitly, another is that upper layer on U-plane is not clear. This paper shows the answers to the issues and the necessity of establish primitive and release primitive.

2. ESTABLISH

2.1 Explicit establishment of RLC connection

RLC may be established implicitly as RRC negotiates RLC parameters between peer-entities. But explicit establishment of RLC connection is necessary;

- to transfer credit value for flow control between the RLC peer entities.

   -> The credit value could be transferred over RRC. But it is natural that the credit value is transferred over RLC because it is transferred over RLC when RLC connection is active.

- to confirm the establishment of the RLC connection clearly between the peer RLC entities.

Furthermore explicit establishment procedure will not cause remarkable overhead.

2.2 Primitives for establish

To establish RLC connection explicitly, following four primitives are required.

- RLC-ESTABLISH req. (UPPER LAYER -> RLC)

   It requests to establish RLC connection and transfer RLC parameters (e.g. Timer value).
- RLC-ESTABLISH ind. (RLC -> UPPER LAYER)

   It requests upper layer the RLC parameters.
- RLC-ESTABLISH resp. (UPPER LAYER -> RLC)

   It transfers RLC parameters.
- RLC-ESTABLISH conf. (RLC -> UPPER LAYER)

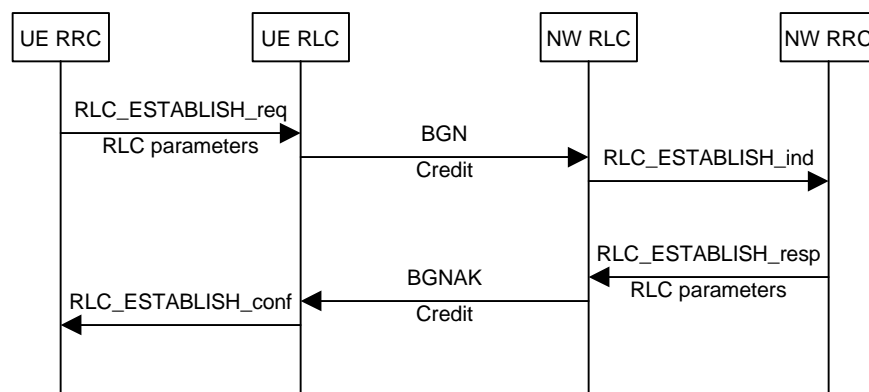   It indicates that RLC connection establishment is completed.

Fig. 1 Explicit establishment

3. RELEASE

3.1 Normal case

RLC connection should be released locally after upper layer's connection release procedure is taken place. The reason is that peer-to-peer RLC release (END/ENDAK procedure) just causes overhead. In this case, layer management requests RLC to release the connection by the following primitive.

- MRLC-RELEASE req. (Layer management -> RLC)

Fig. 2 shows the RLC release procedure in normal case on C-pane. In case of U-plane, the same release procedure can be adopted but upper layer entity and messages may be different from C-plane. Conclusion1: In normal case, peer-to-peer release procedure is not necessary, that is RLC-RELEASE primitive is not necessary in normal case.
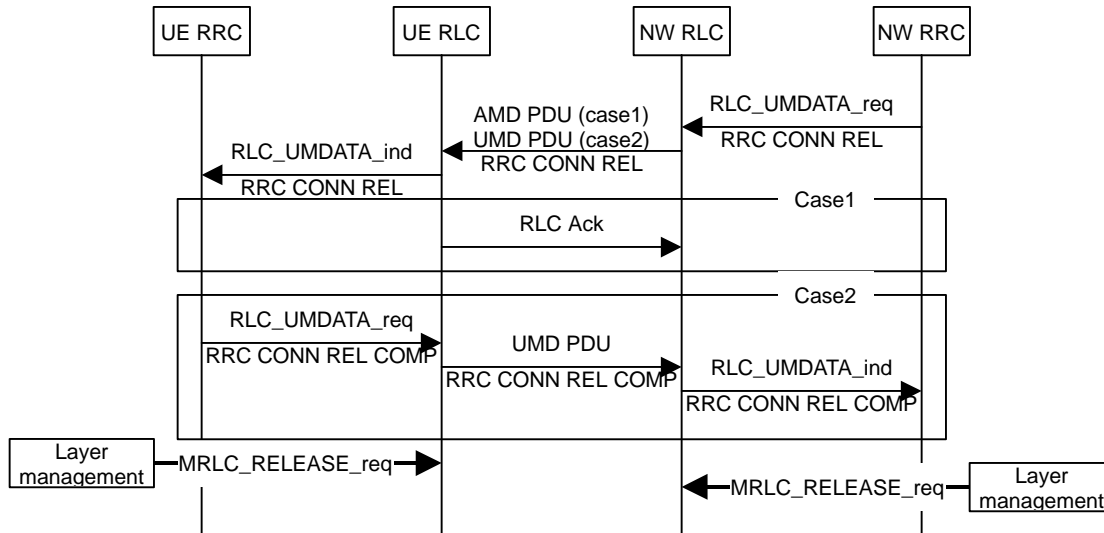

Fig. 2 RLC release in normal case (C-plane)

3.2 Abnormal case

If RLC entity detects abnormal situation (e.g. inconsistency of the state between peer entities), RLC connection is released by peer-to-peer release procedure (END/ENDAK procedure) in order to notify the situation to the peer entity. In this case each RLC entity indicates release of RLC connection to the upper layer by the following primitive.

- RLC-RELEASE ind. (RLC -> UPPER LAYER)

Fig. 3 shows the RLC release procedure in abnormal case on C-pane. In case of U-plane, the same release procedure can be adopted but upper layer entity may be different from C-plane.

Conclusion2: In abnormal case, peer-to-peer release procedure should be performed, therefore "RLC-RELEASE ind." primitive is necessary.
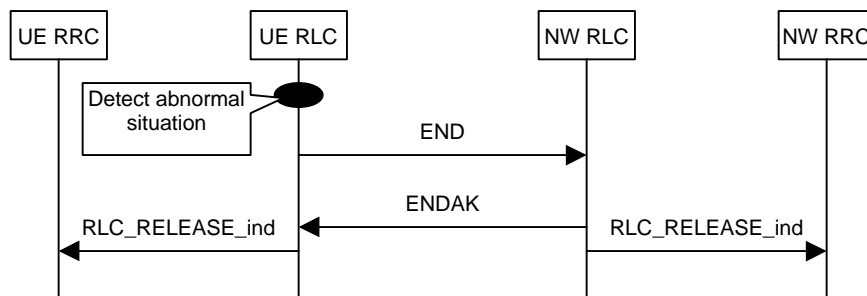

Fig. 3 RLC release in abnormal case (C-plane)

4. Where ESTABLISH and RELEASE primitives should be transferred?

As TTC/ARIB did not have the concept of control-SAP, primitives from/to RRC and primitives from/to Layer-management are transferred on different SAPs. But considering the current RLC Model, it seems that both of them should be transferred on control-SAP because they control RLC connection. So, name of the above primitives are changed as follows.

ESTABLISH

\- RLC-ESTABLISH req/ind/resp/conf -> *MRLC-ESTABLISH req/ind/resp/conf*

RELEASE (Abormal case)

\- RLC-RELEASE ind -> *MRLC-RELESE ind*

5. What is upper layer on U-plane?

At the previous meeting, it is pointed out that upper layer of RLC is not clear on U-plane. But, RLC should be controlled by RNC AP (RRC?), even in case of U-pane. Hence the same establish/release procedures and primitives can be adopted for both C-plane and U-plane.

6. Conclusion

- To establish RLC connection certainly, explicit establish procedure should be adopted. And four primitives should be necessary to perform explicit establishment.
- Upon RLC release procedure, the procedure is different whether normal case or abnormal case. In normal case, RLC connection should be released locally by the primitive from layer management. In abnormal case, peer-to-peer RLC connection release should be performed and it is necessary to indicate the release to upper layer by indication primitive.
- Establish/release procedures can be adopted not only C-plane but also U-plane.
- Establish/release primitives should be transferred on control-SAP and they are named as follows.

  Establish:

  \- *MRLC-ESTABLISH req/ind/resp/conf*

  Release:

  \- *MRLC-RELEASE req.* (Used in abnormal case)

  \- *MRLC-RELEASE ind.* (Used in normal case)