

Agenda item: 5.2.2
Source: Motorola
Title: RLC Polling Related Issues
Document for: Discussion and Approval

1 Introduction

Polling and status reporting mechanism is the basic approach to exchange RLC control information. Contributions [2] and [3] to RAN WG2#58bis focus on status reporting related issues, such as triggers. In this document we discuss RLC polling related issues, including triggers of polling, indication of polling requests and polling related timers.

2 Triggers of Polling

A transmitting AM RLC entity can poll its peer receiving AM RLC entity in order to trigger STATUS reporting at the peer receiving AM RLC entity. The trigger that has been defined in [1] is:

0. Transmission of the last data in the buffer.

In addition, we suggest the following polling triggers shall be defined, for the reasons given afterwards.

1. Handover preparation.

During handover procedures, it is necessary to find out which SDUs have been received successfully before the handover, so that those SDUs do not need to be forwarded from source eNB to target eNB. The exact handover signalling command which triggers the polling is FFS.

2. Transmission of every N bytes data.

The sender triggers the polling function for every N bytes of data transmitted which haven't been ACK/NACK yet. This trigger aims at avoiding RLC buffer overflows. Note that RLC PDU size is flexible in LTE system, so the byte based polling is more accurate in reflecting the potential buffer level than PDU or SDU counts.

3. Transmission of every K TTIs.

The sender triggers the polling function periodically. This may be necessary if the transmitter wants to get the receiver updates periodically.

4. Poll retransmission timer expiration.

A poll retransmission timer is started when a polling request is sent out. It will be stopped if the corresponding status report is received. If no status report has been received upon the expiration of the poll retransmission timer, the polling request shall be retransmitted.

3 Indication of Polling Request

There are two options to indicate polling request: a poll bit in the header, and/or a RLC Poll SUFI in a RLC control PDU. We believe that a RLC Poll SUFI is necessary considering the fact that eNB may solicit STATUS report from UEs even if it has no data to transmit to UE for the moment. We also suggest that a poll bit to be included in the PDU header, as long as the size of other RLC header fields is not exactly multiple bytes. The reasons are that the RLC

header is byte-aligned [1], and that the poll bit in the header provides more flexibility in signalling polling request with no additional overhead.

Polling request indicated through RLC Poll SUFI shall be supported. Polling request indicated through poll bit in RLC PDU header can be supported if extra bit is available in header field.

4 Polling Related Timers

Poll Prohibit timer

A poll prohibit timer is necessary under certain situation. For example, suppose the polling trigger of transmission of the last data in the buffer is configured. If the traffic source generates one packet every 2 TTIs and no poll prohibit timer is setup, the transmitter will send out polling request every 2 TTIs, because the packet to be transmitted is always the last one in the buffer. It is not desirable to poll the receiving RLC entity so frequently. Therefore, a poll prohibit timer is necessary for the above scenario.

Poll retransmission timer

A poll retransmission timer is also necessary to ensure the reliable information exchange between sender and receiver. Consider the example when the polling request is sent together with the last data in the buffer. Suppose the transmission fails but HARQ NACK->ACK error occurs, then the sender cannot detect the failure, and the receiver will not receive the data and the polling request. With no data to transmit and no RLC NACK status report, the sender will not be able to detect the loss of the last PDU if poll retransmission timer is not setup.

Poll Prohibit Timer and Poll Retransmission Timer shall be supported.

5 Conclusions

It is proposed to agree on the following polling triggers:

- **Handover preparation.**
- **Transmission of every N bytes data.**
- **Transmission of every K TTIs.**
- **Poll retransmission timer expiration.**

It is proposed to agree on the following polling related timers:

- **Poll Prohibit Timer.**
- **Poll Retransmission Timer.**

In addition, we suggest that **polling request indicated through RLC Poll SUFI shall be supported. Polling request indicated through poll bit in RLC PDU header can be supported if extra bit is available in header field.**

References

- [1] 3GPP TS 36.322 v0.1.4, "Radio Link Control (RLC) protocol specification (Release 8)"
- [2] R2-072568, "RLC Status Reporting Mechanisms", Ericsson
- [3] R2-072620, "RLC Status Report Trigger", LGE