**3GPP TSG-RAN WG3 Meeting #129** **R3-255863**

**Bengaluru, India, 25 – 29 August, 2025**

**Agenda item: 21.3**

**Source: Huawei, Nokia, Nokia Shanghai Bell**

**Title: (TP to BL CR for TS 38.425) enhancements to support timely RLC retransmissions**

**Document for: Discussion and Decision**

1. Introduction

This TP introduces changes to support the timely RLC retransmission/polling.

Annex – TP for BL CR for TS 38.425

*CHANGE STARTS*

5.4.1 Transfer of Downlink User Data

5.4.1.1 Successful operation

The purpose of the Transfer of Downlink User Data procedure is to provide NR-U specific sequence number information at the transfer of user data carrying a DL NR PDCP PDU from the node hosting the NR PDCP entity to the corresponding node.

An NR user plane protocol instance making use of the Transfer of Downlink User Data procedure is associated to a single radio bearer only.

The node hosting the NR PDCP entity shall assign consecutive NR-U sequence numbers to each transferred NR-U packet. A retransmitted NR PDCP PDU shall be assigned a new NR-U sequence number.

The node hosting the NR PDCP entity indicates to the corresponding node whether this NR-U packet is a retransmission of NR PDCP PDU.

The node hosting the NR PDCP entity can indicate to the corresponding node to either discard all NR PDCP PDUs up to and including a defined DL discard NR PDCP PDU SN or discard one or a number of blocks of downlink NR PDCP PDUs.

If the Assistance Information Report Polling Flag is equal to 1, the corresponding node shall, if supported, send the ASSISTANCE INFORMATION DATA to the node hosting the NR PDCP entity.

The corresponding node shall detect whether an NR-U packet was lost and memorise the respective sequence number after it has declared the respective NR-U packet as being "lost".

The corresponding node shall transfer the remaining NR PDCP PDUs towards the UE and memorise the highest NR PDCP PDU sequence number of the NR PDCP PDU that was successfully delivered (as defined in TS 36.322 [6] and TS 38.322 [7]) in sequence towards the UE (in case RLC AM is used) and the highest NR PDCP PDU sequence number of the NR PDCP PDU that was transmitted to the lower layers.

The corresponding node shall send the DL DATA DELIVERY STATUS if the Report Polling Flag is set to 1 or when the NR PDCP PDU with the indicated DL report NR PDCP PDU SN has been successfully delivered, unless a situation of overload at the corresponding node is encountered. The DL DATA DELIVERY STATUS sent as a response to a specific DL report NR PDCP PDU SN shall be sent only when all PDCP PDU SNs up to this DL report NR PDCP PDU have been successfully delivered in-sequence.

If the Request OutOfSeq Report is set to 1, the corresponding node shall, if supported, include the NR PDCP PDU sequence number successfully delivered out of sequence in the DL DATA DELIVERY STATUS to the node hosting the NR PDCP entity.

NOTE: The Transfer of Downlink User Data procedure and the associated feedback of lost NR-U packets assist the node hosting the NR PDCP entity in avoiding NR PDCP HFN de-synchronisation. If a deployment decides to not use the Transfer of Downlink User Data procedure, NR PDCP HFN synchronization should be ensured by other means.

If the User data existence flag is set to 1, the corresponding node assumes that the node hosting the NR PDCP entity has some user data for the concerned data radio bearer. The corresponding node decides whether and when to use DRX for the UE (i.e. the corresponding node may indicate the UE to use DRX even if the flag is set to 1 and the received DL USER DATA frame contains no user data).

The node hosting the NR PDCP entity can indicate to the corresponding node to either retransmit all NR PDCP PDUs up to and including a defined DL retransmission NR PDCP PDU SN or retransmit one or a number of blocks of downlink NR PDCP PDUs, as specified in TS 38.322 [7].

The node hosting the NR PDCP entity can indicate to the corresponding node to either trigger polling for all NR PDCP PDUs up to and including a defined DL polling NR PDCP PDU SN or trigger polling for one or a number of blocks of downlink NR PDCP PDUs, as specified in TS 38.322 [7].

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**Figure 5.4.1.1-1: Successful Transfer of Downlink User Data**

*NEXT CHANGE*

5.5.2.1 DL USER DATA (PDU Type 0)

This frame format is defined e.g. to allow the corresponding node to detect lost NR-U packets and may be associated with the transfer of a Downlink PDCP PDU.

The following shows the respective DL USER DATA frame.

NOTE 1: All information elements defined in Figure 5.5.2.1-1 are also applicable to E-UTRA PDCP. With this understanding, each instance of NR PDCP can be replaced by E-UTRA PDCP.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Bits | | | | | | | | | | | | | | | | Number of Octets |
| 7 | 6 | | 5 | | | 4 | | 3 | | 2 | | 1 | | | 0 |
| PDU Type (=0) | | | | | | | | Spare | | DL Discard Blocks | | DL Flush | | | Report polling | 1 |
| New IE Flag | BSSI | | | TTNBI | | Request OutofSeq Report | | Report Delivered | | User data existence flag | | Assistance Info. Report Polling Flag | | | Retransmission flag | 1 |
| NR-U Sequence Number | | | | | | | | | | | | | | | | 3 |
| DL discard NR PDCP PDU SN | | | | | | | | | | | | | | | | 0 or 3 |
| DL discard Number of blocks | | | | | | | | | | | | | | | | 0 or 1 |
| DL discard NR PDCP PDU SN start (first block) | | | | | | | | | | | | | | | | 0 or 3 |
| Discarded Block size (first block) | | | | | | | | | | | | | | | | 0 or 1 |
| … | | | | | | | | | | | | | | | |  |
| DL discard NR PDCP PDU SN start (last block) | | | | | | | | | | | | | | | | 0 or 3 |
| Discarded Block size (last block) | | | | | | | | | | | | | | | | 0 or 1 |
| DL report NR PDCP PDU SN | | | | | | | | | | | | | | | | 0 or 3 |
| BSSize | | | | | | | | | | | | | | | | 0 or 3 |
| TTNB | | | | | | | | | | | | | | | | 0 or 2 |
| New IE Flag 7(E) | | New IE Flag 6 | | | New IE Flag 5 | | New IE Flag 4 | | New IE Flag 3 | | New IE Flag 2 | | New IE Flag 1 | New IE Flag 0 | | 0 or 1  New IE Flags Octet |
| DL retransmission NR PDCP PDU SN | | | | | | | | | | | | | | | | 0 or 3 |
| DL retransmission Number of blocks | | | | | | | | | | | | | | | | 0 or 1 |
| DL retransmission NR PDCP PDU SN start (first block) | | | | | | | | | | | | | | | | 0 or 3 |
| Retransmission Block size (first block) | | | | | | | | | | | | | | | | 0 or 1 |
| … | | | | | | | | | | | | | | | |  |
| DL retransmission NR PDCP PDU SN start (last block) | | | | | | | | | | | | | | | | 0 or 3 |
| Retransmission Block size (last block) | | | | | | | | | | | | | | | | 0 or 1 |
| DL polling NR PDCP PDU SN | | | | | | | | | | | | | | | | 0 or 3 |
| DL polling Number of blocks | | | | | | | | | | | | | | | | 0 or 1 |
| DL polling NR PDCP PDU SN start (first block) | | | | | | | | | | | | | | | | 0 or 3 |
| Polling Block size (first block) | | | | | | | | | | | | | | | | 0 or 1 |
| … | | | | | | | | | | | | | | | |  |
| DL polling NR PDCP PDU SN start (last block) | | | | | | | | | | | | | | | | 0 or 3 |
| Polling Block size (last block) | | | | | | | | | | | | | | | | 0 or 1 |
| Padding | | | | | | | | | | | | | | | | 0-3 |

**Figure 5.5.2.1-1: DL USER DATA (PDU Type 0) Format**

The New IE Flag in bit 7 of 2nd octet in DL USER DATA (PDU Type 0) indicates if the first octet ofNew IE Flags Octet is present or not.

Bit 0 of New IE Flags Octet in DL USER DATA (PDU Type 0) indicates if the DL retransmission NR PDCP PDU SN is present (1) or not (0).

Bit 1 of New IE Flags Octet in DL USER DATA (PDU Type 0) indicates if the DL retransmission Number of blocks, DL retransmission NR PDCP PDU SN start and Retransmission Block size are present (1) or not (0).

Bit 2 of New IE Flags Octet in DL USER DATA (PDU Type 0) indicates if the DL polling NR PDCP PDU SN is present (1) or not (0).

Bit 3 of New IE Flags Octet in DL USER DATA (PDU Type 0) indicates if the DL polling Number of blocks, DL polling NR PDCP PDU SN start and Polling Block size are present (1) or not (0).

*NEXT CHANGE*

5.5.3.a DL retransmission NR PDCP PDU SN

**Description:** This parameter indicates the downlink NR PDCP PDU sequence number up to and including which all the NR PDCP PDUs should be considered for remaining time based retransmission, as specified in TS 38.322 [7].

**Value range:** {0..218-1}.

**Field length:** 3 octets.

5.5.3.b DL retransmission NR PDCP PDU SN start

**Description:** This parameter indicates the starting SN of a downlink NR PDCP PDU block to be considered for remaining time based retransmission, as specified in TS 38.322 [7].

**Value range:** {0..218-1}.

**Field length:** 3 octets.

5.5.3.c DL retransmission Number of blocks

**Description:** This parameter indicates the number of NR PDCP PDU blocks to be considered for remaining time based retransmission, as specified in TS 38.322 [7].

**Value range:** {1..244}.

**Field length:** 1 octet.

5.5.3.d Retransmission Block size

**Description:** This parameter indicates the number of NR PDCP PDUs counted from the starting SN to be considered for remaining time based retransmission, as specified in TS 38.322 [7].

**Value range:** {1..255}.

**Field length:** 1 octet.

5.5.3.e DL polling NR PDCP PDU SN

**Description:** This parameter indicates the downlink NR PDCP PDU sequence number up to and including which all the NR PDCP PDUs should be considered for remaining time based polling, as specified in TS 38.322 [7].

**Value range:** {0..218-1}.

**Field length:** 3 octets.

5.5.3.f DL polling NR PDCP PDU SN start

**Description:** This parameter indicates the starting SN of a downlink NR PDCP PDU block to be considered for remaining time based polling, as specified in TS 38.322 [7].

**Value range:** {0..218-1}.

**Field length:** 3 octets.

5.5.3.g DL polling Number of blocks

**Description:** This parameter indicates the number of NR PDCP PDU blocks to be considered for remaining time based polling, as specified in TS 38.322 [7].

**Value range:** {1..244}.

**Field length:** 1 octet.

5.5.3.h Polling Block size

**Description:** This parameter indicates the number of NR PDCP PDUs counted from the starting SN to be considered for remaining time based polling, as specified in TS 38.322 [7].

**Value range:** {1..255}.

**Field length:** 1 octet.

*CHANGES END*