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Technical Specification

O-RAN Open F1/W1/E1/X2/Xn Interfaces Working Group

NR U-plane profile for EN-DC

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# Revision History

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# 1 Scope

The present document provides profiles for the EN-DC related NR U-plane procedures and functions to achieve interoperability among different vendors. The profiles specify the expected behavior of each node, e.g., call flow of each use case, definitions of IEs, etc. which is not specified in 3GPP specifications. The profile specification provided in this document does not violate 3GPP specifications. Overall architecture in EN-DC is illustrated in TS 37.340 [1].

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Figure 1-1: EN-DC Overall Architecture [1]

# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non‑specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document in Release 15.

[1] 3GPP TS 37.340: "Evolved Universal Terrestrial Radio Access (E-UTRA) and NR; Multi-connectivity; Stage 2".

[2] 3GPP TS 38.425 V15.3.0: "NG-RAN; NR user plane protocol".

# 3 Definitions and abbreviations

## 3.1 Definitions

Definitions used in this specification refer to the ones defined in TS 37.340 [1] or TS 38.425 [2].

## 3.2 Abbreviations

Abbreviations defined in this document take precedence over the definition of 3GPP TS 37.340 [1] or TS 38.425 [2].

DDDS DL DATA DELIVERY STATUS

AID ASSITANCE INFORMATION DATA

# 4 User plane function

This section provides NR U-plane profile to achieve interoperability. In this version of the profile, only RLC-AM is supported. In this version of the profile, the following procedure is defined.

* Flow control

## 4.1 Flow control

### 4.1.1 Elementary procedures

#### 4.1.1.1 Node behaviour of the corresponding node

* When the corresponding node indicates Radio Link Outage over NR-U, the corresponding node shall not interpret the Radio Link Outage indication as a trigger to discard any remaining packets for RLC-AM and shall not discard the packets unless receiving indication from the higher layer, e.g. RLC entity re-establishment/release, or buffer discard indication from the node hosting the NR PDCP entity.

### 4.1.2 Elements for the NR user plane protocols

#### 4.1.2.1 General

* For the optional fields of DDDS, if the corresponding value is not available yet (e.g. no valid corresponding PDCP SN to be reported as the corresponding node hasn't yet transmitted any NR PDCP PDU to the lower layer), the corresponding node shall not include the corresponding IEs (including the corresponding indication for presence) in the DDDS. Once the value comes to be valid or updated, the corresponding node shall include them at least in the next DDDS.

NOTE: For Lost Packet Report fields, if the value is continuously reported in the consecutive DDDS, the node hosting the NR PDCP entity cannot identify whether the reported lost NR-U Sequence Number is for before or after the wrap around. How to prevent this is up to implementation.

#### 4.1.2.2 Report polling

* The node hosting the NR PDCP entity shall use this IE to trigger the corresponding node sending DDDS whenever it needs.
* The corresponding node shall send DDDS without receiving polling frame at least in the following cases in addition to the cases TS 38.425[2] defines.
  + Lost packet detection
  + Radio link outage
  + Stop scheduling for the data bearer

NOTE: Whether the corresponding node sends DDDS by itself in addition to the above cases is up to implementation.

NOTE: The corresponding node sends DDDS as soon as possible, unless it encounters a situation of overload.

#### 4.1.2.3 Buffer discard Indication

* The corresponding node shall support both DL Discard Blocks and DL Flush for the buffer discard indication.

#### 4.1.2.4 User data existence flag

* In case of split bearer, when the corresponding node does not support the IE, e.g. for the corresponding node compliant with the former version of 3GPP specification, the node hosting the NR PDCP entity shall send the actual user data to notify the existence of user data.

#### 4.1.2.5 Assistance Information Report Polling Flag

* The node hosting the NR PDCP entity shall use this IE to trigger the corresponding node sending AID whenever it needs.

NOTE: Whether the corresponding node sends AID by itself is up to implementation.

#### 4.1.2.6 Radio quality assistance information

* It is configured via M-plane which assistance information to be included in AID.
* For the information configured to be reported and supported by the corresponding node:
  + if corresponding value is not available yet (e.g. no valid Power Headroom Report to be reported as the corresponding node hasn't yet received any Power Headroom Report from the UE):
    - the corresponding node shall not include the corresponding information in the reporting AID.
  + else:
    - the corresponding node shall include the latest value as the corresponding information in the consecutive AID, even when there is no update from the previous reported AID.
    - when Power Headroom Report is configured to be reported and multiple data bearers are configured to one UE, the corresponding node shall include Power Headroom Report information in all the reporting AID.
* For the information configured not to be reported or not supported by the corresponding node, the corresponding node shall not include the corresponding information in the AID.

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