3GPP TSG-RAN WG3 Meeting #122 R3-23xxxx

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**Agenda item: 25.2.1**

**Source:** **Lenovo, Ericsson, Samsung**

**Title: (TP for BLCR to TS 38.415) On User Plane Protocol for PDU Set Information**

**Document for: Discussion and Decision**

# **Introduction**

This contribution provides text proposal to the TS 38.415 for the new PDU Set Information container.

# Text Proposal

***------------------------------------------------------------Change Start -------------------------------------------------------------------***

1 Scope

The present document specifies the PDU Session user plane protocol being used over the NG-U, Xn-U and N9 interfaces. Applicability to other interfaces is not precluded.

This present document also specifies the PDU Set Information user plane protocol being used over the NG-U, Xn-U, F1-U and N9 interfaces. Applicability to other interfaces is not precluded.

***------------------------------------------------------------Next Change -------------------------------------------------------------------***

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 the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 38.300: "NextGen Radio Access Network (NG-RAN); Overall description; Stage 2".

[3] 3GPP TS 29.281: "General Packet Radio System (GPRS) Tunnelling Protocol User Plane (GTPv1-U)".

[4] 3GPP TS 37.324: "E-UTRA and NR; Service Data Application Protocol (SDAP) specification".

[5] 3GPP TS 23.501: "System Architecture for the 5G System; Stage 2".

[6] IETF RFC 5905 (2010-06): "Network Time Protocol Version 4: Protocol and Algorithms Specification".

[7] 3GPP TS 38.413: "NG-RAN; NG Application Protocol (NGAP)".

[8] 3GPP TS 38.470: "NG-RAN; F1 general aspects and principles".

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3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in 3GPP TR 21.905 [1] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in 3GPP TR 21.905 [1].

**Multicast Broadcast User Plane Function**: as defined in TS 23.501 [5].

**NG-U**: logical interface between NG-RAN node and UPF as described in TS 38.300 [2].

**Xn-U**: logical interface between NG-RAN nodes as defined in TS 38.300 [2].

**F1-U**: logical interface between gNB-CU and gNB-DU as defined in TS 38.470 [8].

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4 General

4.1 General aspects

The PDU Session User Plane protocol and PDU Set Information User Plane protocol are located in the User Plane of the Radio Network Layer above the Transport Network Layer of the interface.

Each PDU session User Plane protocol instance and PDU Set Information User Plane protocol instance are associated to one PDU Session.

In this version of the present document, the PDU session user plane protocol data is conveyed by GTP-U protocol means, more specifically, by means of the "GTP-U Container" GTP-U Extension Header as defined in TS 29.281 [3].

In this version of the present document, the PDU set information user plane protocol data is conveyed by GTP-U protocol means, more specifically, by means of the "GTP-U Container" GTP-U Extension Header as defined in TS 29.281 [3].

# X PDU Set Information user plane protocol

## X.1 General

The PDU Set Information UP layer uses services of the Transport Network Layer in order to send its packets over the interface.

## X.2 PDU Set Information user plane protocol layer services

The following functions are provided by the PDU Set Information user plane protocol:

- Provision of PDU set information elements associated with a QoS flow of a PDU session.

- Provision of Indication of End of Data Burst for a QoS flow.

## X.3 Services expected from the Transport Network Layer

The PDU set information UP layer expects the following services from the Transport Network Layer:

- Transfer of PDU Set Information User Plane PDUs.

## X.4 Elementary procedures

### X.4.1 Transfer of DL PDU Set Information

#### X.4.1.1 Successful operation

The purpose of the Transfer of DL PDU Set Information procedure is to send PDU Set information and indication of End of Data Burst related to a QoS flow of a PDU Session from UPF to NG-RAN node or between NG-RAN nodes.

The DL PDU SET INFORMATION frame includes a QoS Flow Identifier (QFI) field associated with the transferred packet. The NG-RAN shall use the received QFI to determine the QoS flow and QoS profile which are associated with the received packet.

The DL PDU SET INFORMATION frame may include the PDU Set Information (i.e., PDU Set Sequence Number, PDU Sequence Number within a PDU Set, PDU Set Size, PDU Set Importance, and End PDU of the PDU Set) as specified in TS 23.501 [5].

The DL PDU SET INFORMATION frame may include indication of End of Data Burst as specified in TS 23.501 [5].



Figure X.4.1.1-1: Successful Transfer of DL PDU Set Information



Figure X.4.1.1-2: Successful Transfer of DL PDU Set Information

#### X.4.1.2 Unsuccessful operation

Void.

## X.5 Elements for the PDU Set Information user plane protocol

### X.5.1 General

The structure of frames is specified as in the section 5.5.1.

X.5.2 Frame format for the PDU Set Information user plane protocol

5.5.2.1 DL PDU SET INFORMATION (PDU Type 0)

This frame format is defined to allow the NG-RAN to receive PDU Set Information and indication of End of Data Burst of a QoS flow.

The following shows the respective DL PDU SET INFORMATION frame.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Bits | | | | | | | | Number of Octets |
| 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| PDU Type (=0) | | | | PSSNI | PSIP | EPI | EDBI | 1 |
| Spare | Spare | QoS Flow Identifier (QFI) | | | | | | 1 |
| EPDU | EDB | | | PSI | | | | 0 or 1 |
| PSSN | | | | | | | | 0 or 2 |
| PSN | | | | | | | | 0 or 1 |
| PSSize | | | | | | | | 0 or 3 |
| Padding | | | | | | | | 0-3 |

**Figure X.5.2.1-1: DL PDU SET INFORMATION (PDU Type 0) Format**

X.5.3 Coding of information elements in frames

X.5.3.1 PDU Type

**Description:** The PDU Type indicates the structure of the PDU Set UP frame. The field takes the value of the PDU Type it identifies; i.e. "0" for PDU Type 0. The PDU type is in bit 4 to bit 7 in the first octet of the frame.

**Value range:** {0= DL PDU SET INFORMATION, 1-15=reserved for future PDU type extensions}.

**Field length:** 4 bits.

#### X.5.3.2 Spare

**Description:** The spare field is set to "0" by the sender and should not be interpreted by the receiver. This field is reserved for later versions.

**Value range:** (0–2n-1).

**Field Length:** n bits.

#### X.5.3.3 QoS Flow Identifier (QFI)

**Description:** When present this parameter indicates the QoS Flow Identifier of the QoS flow to which the transferred packet belongs.

**Value range:** {0..26-1}.

**Field length:** 6 bits.

X.5.3.4 PSNI (PDU Sequence Number Indicator)

**Description:** This parameter indicates the presence of PDU Set Sequence Number (PSSN) and PDU Sequence Number within a PDU Set (PSN).

**Value range:** {0= PSSN and PSN not present, 1= PSSN and PSN present}.

**Field length:** 1 bit.

X.5.3.5 PSIS (PDU Set Importance Presence)

**Description:** This parameter indicates the presence of PDU Set Importance (PSI) and PDU Set Size (PSSize).

**Value range:** {0= PSI and PSSize not present, 1= PSI and PSSize present}.

**Field length:** 1 bit.

X.5.3.6 EPI (End PDU indicator)

**Description:** This parameter indicates the presence of End PDU of the PDU Set (EPDU).

**Value range:** {0= EPDU not present, 1= EPDU present}.

**Field length:** 1 bit.

X.5.3.7 EDBI (End Data Burst indicator)

**Description:** This parameter indicates the presence of End of Data Burst (EDB).

**Value range:** {0= EDB not present, 1= EDB present}.

**Field length:** 1 bit.

X.5.3.8 End PDU of the PDU Set (EPDU)

**Description:** This parameter indicates whether the current PDU is the last PDU of the PDU set.

**Value range:** {0= all other PDUs of the PDU Set, 1= last PDU of the PDU set}.

**Field length:** 1 bit.

X.5.3.9 End of Data Burst (EDB)

**Description:** This parameter indicates the end of a Data Burst.

**Value range:** {0..23-1}.

**Field length:** 3 bits.

X.5.3.10 PDU Set Importance (PSI)

**Description:** This parameter indicates the importance of the current PDU Set compared to other PDU Sets within the same QoS flow. Lower values shall indicate a higher importance. PDU Set with the highest importance PDU Set is indicated by 0 and the lowest importance PDU Set is indicated by 15.

**Value range:** {0..24-1}.

**Field length:** 4 bits.

X.5.3.11 PDU Set Sequence Number (PSSN)

**Description:** This parameter indicates the sequence number of the PDU Set to which the current PDU belongs acting as an identifier for the PDU Set.

**Value range:** {0..216-1}.

**Field length:** 2 octets.

X.5.3.12 PDU Sequence Number within a PDU Set (PSN)

**Description:** This parameter indicates the sequence number of the current PDU within the PDU Set. The PSN shall be set to 0 for the first PDU in the PDU Set and incremented monotonically for every PDU in the PDU set in order of transmission from the sender.

**Value range:** {0..28-1}.

**Field length:** 1 octet.

X.5.3.x12 PDU Set Size (PSSize)

**Description:** This parameter indicates the total size of all PDUs of the PDU Set to which the current PDU belongs.

**Value range:** {0..224-1}.

**Field length:** 3 octets.

### X.5.4 Timers

Void.

## X.6 Handling of unknown, unforeseen and erroneous protocol data

Void.