3GPP TSG-RAN WG3 #127bis R3-252364

Wuhan, China, 7th – 11th April, 2025

**Agenda Item: 21.3**

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

**Title: (TP to BL CR for TS 38.423) Support of PDU set based QoS handling enhancement**

**Document for: Other**

# Introduction

This TP reflect the change for supporting DL PDU Set marking without PDU Set QoS, and Alternative PDU Set QoS with PSDB and PSER.

The TP includes following changes:

* Add *DL PDU Set Information Marking Support Indication* IE in *QoS Flow Level QoS Parameters* IE.
* Add *PDU Set Packet Delay Budget Downlink* IE, *PDU Set Packet Delay Budget Uplink* IE, *PDU Set Error Rate Downlink* IE, and *PDU Set Error Rate Uplink* IE in *Alternative QoS Parameters Set List* IE.
* Add new codepoint in *Notification Information* IE.

# Annex: TP for 38.423 BL CR to support DL PDU Set marking without PDU Set QoS, and Alternative PDU Set QoS with PSDB and PSER

<<<<<<<<<<<<<<<<<< Begin of the changes >>>>>>>>>>>>>>>>>>>>>>>

### 8.2.1 Handover Preparation

8.2.1.1 General

This procedure is used to establish necessary resources in an NG-RAN node for an incoming handover. If the procedure concerns a conditional handover, parallel transactions are allowed. Possible parallel requests are identified by the target cell ID when the source UE AP IDs are the same.

The procedure uses UE-associated signalling.

8.2.1.2 Successful Operation

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**Figure 8.2.1.2-1: Handover Preparation, successful operation**

The source NG-RAN node initiates the procedure by sending the HANDOVER REQUEST message to the target NG-RAN node. When the source NG-RAN node sends the HANDOVER REQUEST message, it shall start the timer TXnRELOCprep.

<<<Unchanged part is omitted>>>

For each QoS flow which has been successfully established in the target NG-RAN node, if the *QoS Monitoring Request* IE was included in the *QoS Flow Level QoS Parameters* IE contained in the HANDOVER REQUEST message, the target NG-RAN node shall store this information, and shall, if supported, perform delay measurement and QoS monitoring, as specified in TS 23.501 [7]. If the *QoS Monitoring Reporting Frequency* IE was included in the *QoS Flow Level QoS Parameters* IE contained in the HANDOVER REQUEST message, the target NG-RAN node shall store this information, and shall, if supported, use it for RAN part delay reporting. For each QoS Flow, if the *PDU Set QoS Parameters* IE is included in the *QoS Flow Level QoS Parameters* IE in the *PDU Session Resources To Be Setup List* IE, the target NG-RAN node shall, if supported, use it as specified in TS 23.501 [7].

If the HANDOVER REQUEST message includes the *PDU Set QoS Parameters* IE or the *DL PDU Set Information Marking Support Indication* IE, the target NG-RAN node shall, if supported, report in the HANDOVER REQUEST ACKNOWLEDGE message the *PDU Set based Handling Indicator* IE.

For each QoS flow which has been successfully established in the target NG-RAN node, if the *ECN Marking or Congestion Information Reporting Request* IE is included in the *PDU Session Resources To Be Setup List* IE contained in the HANDOVER REQUEST message, the target NG-RAN node shall, if supported, use it accordingly for the specific QoS flow.

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8.2.6 XN-U Address Indication

8.2.6.1 General

For the retrieval of a UE context, the Xn-U Address Indication procedure is used to provide forwarding addresses from the new NG-RAN node to the old NG-RAN node for all PDU session resources successfully established at the new NG-RAN node for which forwarding was requested, and/or all MBS session resources successfully established at the new NG-RAN node for which forwarding was requested.

For MR-DC with 5GC, the Xn-U Address Indication procedure is used to provide data forwarding related information, and Xn-U bearer address information for completion of setup of SN terminated bearers from the M-NG-RAN node to the S-NG-RAN node as specified in TS 37.340 [8].

The procedure uses UE-associated signalling.

8.2.6.2 Successful Operation

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**Figure 8.2.6.2-1: Xn-U Address Indication, successful operation for UE context retrieval**

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**Figure 8.2.6.2-2: Xn-U Address Indication, successful operation for MR-DC with 5GC**

**UE Context Retrieval**

The Xn-U Address Indication procedure is initiated by the new NG-RAN node. Sending the XN-U ADDRESS INDICATION message, the new NG-RAN node informs the old NG-RAN node of successfully established PDU Session Resource contexts, or MBS session resource contexts, or both, to which user data pending at the old NG-RAN node can be forwarded.

The new NG-RAN node may include *Secondary Data Forwarding Info from target NG-RAN node List* IE for an additional Xn-U tunnel for data forwarding.

Upon reception of the XN-U ADDRESS INDICATION message, the old NG-RAN node should forward pending user data to the indicated TNL addresses.

If the XN-U ADDRESS INDICATION message includes the *MBS Data Forwarding Indicator* IE set to "MBS-only", the old NG-RAN node shall, if supported, consider that the XN-U ADDRESS INDICATION message only concerns data forwarding of the indicated MBS sessions.

If the XN-U ADDRESS INDICATION message includes the *MBS Session Information Response List* IE, the old NG-RAN node shall, if supported, use the information for forwarding MBS traffic to the new NG-RAN node.

**Interaction with Retrieve UE Context procedure**

If the RETRIEVE UE CONTEXT RESPONSE message incudes the *PDU Set QoS Parameters* IE or the *DL PDU Set Information Marking Support Indication* IE, the new NG-RAN node shall, if supported, include in the XN-U ADDRESS INDICATION message the *PDU Set based Handling Indicator* IE set to "supported".

For a QoS flow established with PDU Set QoS parameters, if the *PDU Set based Handling Indicator* IE set to "supported" is included in the XN-U ADDRESS INDICATION message, the old NG-RAN node shall, if supported, include the PDU Set Information Container in the data to be forwarded.

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#### 9.2.3.5 QoS Flow Level QoS Parameters

This IE defines the QoS Parameters to be applied to a QoS flow.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| CHOICE *QoS Characteristics* | M |  |  |  | – |  |
| >*Non Dynamic 5QI* |  |  |  |  |  |  |
| >>Non dynamic 5QI Descriptor | M |  | 9.2.3.8 |  | – |  |
| >*Dynamic 5QI* |  |  |  |  |  |  |
| >>Dynamic 5QI Descriptor | M |  | 9.2.3.9 |  | – |  |
| Allocation and Retention Priority | M |  | 9.2.3.7 |  | – |  |
| GBR QoS Flow Information | O |  | 9.2.3.6 | This IE shall be present for GBR QoS flows and is ignored otherwise. | – |  |
| Reflective QoS Attribute | O |  | ENUMERATED (subject to, ...) | Reflective QoS is specified in TS 23.501 [7]. This IE applies to Non-GBR bearers only and is ignored otherwise. | – |  |
| Additional QoS flow Information | O |  | ENUMERATED (more likely, …) | If this IE is set to "more likely", this indicates that traffic for this QoS flow is likely to appear more often than traffic for other flows established for the PDU session. This IE may be present in case of Non-GBR flows only and is ignored otherwise. | – |  |
| QoS Monitoring Request | O |  | ENUMERATED (UL, DL, Both, …) | Indicates to measure UL, or DL, or both UL/DL delays for the associated QoS flow. | YES | ignore |
| QoS Monitoring Reporting Frequency | O |  | INTEGER (1.. 1800, …) | Indicates the Reporting Frequency for RAN part delay for Qos monitoring.  Unit: second | YES | ignore |
| QoS Monitoring Disabled | O |  | ENUMERATED(true, ...) | Indicates to stop the QoS monitoring. | YES | ignore |
| **PDU Set QoS Parameters** |  | *0..1* |  | Indicates the PDU Set QoS Parameters. | YES | ignore |
| >UL PDU Set QoS Information | O |  | PDU Set QoS Information  9.2.3.203 |  | – |  |
| >DL PDU Set QoS Information | O |  | PDU Set QoS Information  9.2.3.203 |  | – |  |
| DL PDU Set Information Marking Support Indication | O |  | ENUMERATED (true, …) |  | YES | ignore |

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#### 9.2.3.57 QoS Flow Notification Control Indication Info

This IE provides information about QoS flows of a PDU Session Resource for which notification control has been requested.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| **QoS Flow Notification Indication Info** |  | *1* |  |  | – |  |
| **>QoS Flows Notify Item** |  | *1..<maxnoofQoSFlows>* |  |  | – |  |
| >>QoS Flow Identifier | M |  | 9.2.3.10 |  | – |  |
| >>Notification Information | M |  | ENUMERATED (fulfilled, not fulfilled, …, not fulfilled DL, not fulfilled UL) |  | – |  |
| >>Current QoS Parameters Set Index | O |  | Alternative QoS Parameters Set Notify Index  9.2.3.104 | Index to the currently fulfilled alternative QoS parameters set. Value 0 indicates that NG-RAN cannot even fulfil the lowest alternative parameter set. | YES | ignore |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoofQoSFlows | Maximum no. of QoS flows allowed within one PDU session. Value is 64. |

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9.2.3.102 Alternative QoS Parameters Set List

This IE contains alternative sets of QoS parameters which the NG-RAN node can indicate to be fulfilled when notification control is enabled and it cannot fulfil the requested list of QoS parameters.

| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** | **Criticality** | **Assigned Criticality** |
| --- | --- | --- | --- | --- | --- | --- |
| **Alternative QoS Parameters Set Item** |  | *1..<maxnoofQoSparaSets>* |  |  | – |  |
| >Alternative QoS Parameters Set Index | M |  | 9.2.3.103 |  | – |  |
| >Guaranteed Flow Bit Rate Downlink | O |  | Bit Rate  9.2.3.4 |  | – |  |
| >Guaranteed Flow Bit Rate Uplink | O |  | Bit Rate  9.2.3.4 |  | – |  |
| >Packet Delay Budget | O |  | 9.2.3.12 |  | – |  |
| >Packet Error Rate | O |  | 9.2.3.13 |  | – |  |
| >Maximum Data Burst Volume | O |  | 9.2.3.15 | Maximum Data Burst Volume is specified in TS 23.501 [7].  This IE is included if the *Delay Critical* IE is set to "delay critical" and is ignored otherwise. | YES | ignore |
| >PDU Set Delay Budget Downlink | O |  | 9.2.3.113 |  | - |  |
| >PDU Set Delay Budget Uplink | O |  | 9.2.3.113 |  | - |  |
| >PDU Set Error Rate Downlink | O |  | 9.2.3.13 |  | - |  |
| >PDU Set Error Rate Uplink | O |  | 9.2.3.13 |  | - |  |

|  |  |
| --- | --- |
| **Range bound** | **Explanation** |
| maxnoofQoSparaSets | Maximum no. of alternative sets of QoS Parameters allowed for the QoS profile. Value is 8. |

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### 9.3.5 Information Element definitions

-- ASN1START

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-- Information Element Definitions

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

XnAP-IEs {

itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)

ngran-access (22) modules (3) xnap (2) version1 (1) xnap-IEs (2) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

IMPORTS

<<<Unchanged part is omitted>>>

id-Transmission-Bandwidth-asymmetric,

id-NRPPaPositioningInformation,

id-DLPDUSetInformationMarkingSupportIndication,

id-PduSetDelayBudgetDownlink,

id-PduSetDelayBudgetUplink,

id-PduSetErrorRateDownlink,

id-PduSetErrorRateUplink,

maxEARFCN,

<<<Unchanged part is omitted>>>

-- A

AlternativeQoSParaSetList ::= SEQUENCE (SIZE(1..maxnoofQoSParaSets)) OF AlternativeQoSParaSetItem

AlternativeQoSParaSetItem ::= SEQUENCE {

alternativeQoSParaSetIndex QoSParaSetIndex,

guaranteedFlowBitRateDL BitRate OPTIONAL,

guaranteedFlowBitRateUL BitRate OPTIONAL,

packetDelayBudget PacketDelayBudget OPTIONAL,

packetErrorRate PacketErrorRate OPTIONAL,

iE-Extensions ProtocolExtensionContainer { {AlternativeQoSParaSetItem-ExtIEs} } OPTIONAL,

...

}

AlternativeQoSParaSetItem-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {

{ ID id-MaximumDataBurstVolume CRITICALITY ignore EXTENSION MaximumDataBurstVolume PRESENCE optional }|

{ ID id-PduSetDelayBudgetDownlink CRITICALITY ignore EXTENSION ExtendedPacketDelayBudget PRESENCE optional }|

{ ID id-PduSetDelayBudgetUplink CRITICALITY ignore EXTENSION ExtendedPacketDelayBudget PRESENCE optional }|

{ ID id-PduSetErrorRateDownlink CRITICALITY ignore EXTENSION PacketErrorRate PRESENCE optional }|

{ ID id-PduSetErrorRateUplink CRITICALITY ignore EXTENSION PacketErrorRate PRESENCE optional },

...

}

<<<Unchanged part is omitted>>>

-- D

XnUAddressInfoperPDUSession-List ::= SEQUENCE (SIZE(1..maxnoofPDUSessions)) OF XnUAddressInfoperPDUSession-Item

XnUAddressInfoperPDUSession-Item ::= SEQUENCE {

pduSession-ID PDUSession-ID,

dataForwardingInfoFromTargetNGRANnode DataForwardingInfoFromTargetNGRANnode OPTIONAL,

pduSessionResourceSetupCompleteInfo-SNterm PDUSessionResourceBearerSetupCompleteInfo-SNterminated OPTIONAL,

iE-Extension ProtocolExtensionContainer { { XnUAddressInfoperPDUSession-Item-ExtIEs} } OPTIONAL,

...

}

<<<Unchanged part is omitted>>>

Dynamic5QIDescriptor-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {

{ ID id-ExtendedPacketDelayBudget CRITICALITY ignore EXTENSION ExtendedPacketDelayBudget PRESENCE optional}|

{ ID id-CNPacketDelayBudgetDownlink CRITICALITY ignore EXTENSION ExtendedPacketDelayBudget PRESENCE optional}|

{ ID id-CNPacketDelayBudgetUplink CRITICALITY ignore EXTENSION ExtendedPacketDelayBudget PRESENCE optional},

...

}

DLPDUSetInformationMarkingSupportIndication ::= ENUMERATED {ture, ...}

<<<Unchanged part is omitted>>>

-- Q

QoSFlowLevelQoSParameters ::= SEQUENCE {

qos-characteristics QoSCharacteristics,

allocationAndRetentionPrio AllocationandRetentionPriority,

gBRQoSFlowInfo GBRQoSFlowInfo OPTIONAL,

reflectiveQoS ReflectiveQoSAttribute OPTIONAL,

additionalQoSflowInfo ENUMERATED {more-likely, ...} OPTIONAL,

iE-Extensions ProtocolExtensionContainer { {QoSFlowLevelQoSParameters-ExtIEs} } OPTIONAL,

...

}

QoSFlowLevelQoSParameters-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {

{ID id-QoSMonitoringRequest CRITICALITY ignore EXTENSION QosMonitoringRequest PRESENCE optional}|

{ID id-QosMonitoringReportingFrequency CRITICALITY ignore EXTENSION QosMonitoringReportingFrequency PRESENCE optional}|

{ID id-QoSMonitoringDisabled CRITICALITY ignore EXTENSION QoSMonitoringDisabled PRESENCE optional}|

{ID id-PDUSetQoSParameters CRITICALITY ignore EXTENSION PDUSetQoSParameters PRESENCE optional}|

{ID id-DLPDUSetInformationMarkingSupportIndication CRITICALITY ignore EXTENSION DLPDUSetInformationMarkingSupportIndication PRESENCE optional},

...

}

QoSFlowMappingIndication ::= ENUMERATED {

ul,

dl,

...

}

QoSFlowNotificationControlIndicationInfo ::= SEQUENCE (SIZE (1..maxnoofQoSFlows)) OF QoSFlowNotify-Item

QoSFlowNotify-Item ::= SEQUENCE {

qosFlowIdentifier QoSFlowIdentifier,

notificationInformation ENUMERATED {fulfilled, not-fulfilled, ..., not-fulfilled-dl, not-fulfilled-ul},

iE-Extensions ProtocolExtensionContainer { {QoSFlowNotificationControlIndicationInfo-ExtIEs} } OPTIONAL,

...

}

<<<Unchanged part is omitted>>>

### 9.3.7 Constant definitions

-- ASN1START

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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-- Constant definitions

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

XnAP-Constants {

itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)

ngran-Access (22) modules (3) xnap (2) version1 (1) xnap-Constants (4) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

IMPORTS

ProcedureCode,

ProtocolIE-ID

FROM XnAP-CommonDataTypes;

<<<Unchanged part is omitted>>>

id-SRSPositioningConfigOrActivationRequest ProtocolIE-ID ::= 473

id-NRPPaPositioningInformation ProtocolIE-ID ::= 474

id-DLPDUSetInformationMarkingSupportIndication ProtocolIE-ID ::= xx1

id-PduSetDelayBudgetDownlink ProtocolIE-ID ::= xx2

id-PduSetDelayBudgetUplink ProtocolIE-ID ::= xx3

id-PduSetErrorRateDownlink ProtocolIE-ID ::= xx4

id-PduSetErrorRateUplink ProtocolIE-ID ::= xx5

END

-- ASN1STOP