3GPP TSG-RAN WG3 Meeting #119bis-e R3-23xxxx

Electronic, 17 - 26 April 2023

**Agenda item: 26.2**

**Source: TBD**

**Title: (TP for TS 38.413 BL CR) RAN feedback for low latency communication**

**Document for: Discussion and Decision**

# 1 Introduction

At RAN#99, a new WID on NR Timing Resiliency and URLLC enhancements was approved in [1]. It includes the following objective:

|  |
| --- |
| 3. Adapting downstream and upstream scheduling based on RAN feedback for low latency communication [RAN3, RAN2]:  a. RAN enhancements in order for application to adapt scheduling based on RAN feedback (e.g., feedback regarding burst arrival time, periodicity) for low latency communication.  Note 3: Reactive RAN feedback for upstream scheduling is pending RAN2 conclusion on burst arrival time (BAT) offset derivation. |

A text proposal for TS 38.413 is provided in Annex A, reflecting the outcome of RAN3#119bis-e discussion as summarized in the SoD [2].

# References

1. RP-230754 *New WID on NR Timing Resiliency and URLLC enhancements*, Nokia, Nokia Shanghai Bell
2. R3-231899 Summary of Offline Discussion for CB # URLLC\_RANenh

# Annex A: Text Proposal for TS 38.413

*First Modification*

#### 9.3.1.131 TSC Assistance Information

This IE provides the TSC assistance information for a TSC QoS flow in the uplink or downlink (see TS 23.501 [9]).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Periodicity | M |  | 9.3.1.132 |  | - |  |
| Burst Arrival Time | O |  | 9.3.1.133 |  | - |  |
| Survival Time | O |  | 9.3.1.221 |  | YES | ignore |
| CHOICE *RAN feedback type* |  | *0..1* |  |  | YES | ignore |
| >*proactive* |  |  |  |  |  |  |
| >>Burst Arrival Time Window | M |  | 9.3.1.z1 |  | - |  |
| >>Periodicity Range | O |  | 9.3.1.z2 |  | - |  |
| >*reactive* |  |  |  |  |  |  |
| >>Capability for BAT Adaptation | M |  | 9.3.1.z3 |  | - |  |

*Next Modification*

#### 9.3.1.z1 Burst Arrival Time Window

This IE indicates the burst arrival time window of the TSC QoS flow as defined in TS 23.501 [9].

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| [FFS] |  |  |  |  |

#### 9.3.1.z2 Periodicity Range

This IE indicates the periodicity range for the TSC QoS flow as defined in TS 23.501 [9].

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| [FFS] |  |  |  |  |

#### 9.3.1.z3 Capability for BAT Adaptation

This IE indicates the capability for BAT adaptation for the TSC QoS flow as defined in TS 23.501 [9].

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| [FFS] |  |  |  |  |

#### 9.3.1.z4 TSC Traffic Characteristics Feedback

This IE provides the TSC traffic characteristics feedback of a TSC QoS flow (see TS 23.501 [9].

Editor’s Note: Whether uplink is supported for reactive feedback is FFS pending RAN2.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| TSC Feedback Information Downlink | O |  | TSC Feedback Information  9.3.1.z5 |  |
| TSC Feedback Information Uplink | O |  | TSC Feedback Information  9.3.1.z5 |  |

#### 9.3.1.z5 TSC Feedback Information

This IE provides the TSC feedback information for a TSC QoS flow in the uplink or downlink (see TS 23.501 [9]).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| Burst Arrival Time Offset | M |  | [FFS] |  |
| Adjusted Periodicity | O |  | [FFS] | Not applicable to reactive RAN feedback. |

*Next Modification*

#### 9.3.4.2 PDU Session Resource Setup Response Transfer

This IE is transparent to the AMF.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| DL QoS Flow per TNL Information | M |  | QoS Flow per TNL Information  9.3.2.8 | NG-RAN node endpoint of the NG-U transport bearer for delivery of DL PDUs, together with associated QoS flows. | - |  |
| Additional DL QoS Flow per TNL Information | O |  | QoS Flow per TNL Information List  9.3.2.1 | NG-RAN node endpoint of the additional NG-U transport bearer(s) for delivery of DL PDUs for split PDU session, together with associated QoS flows and corresponding to the *Additional UL NG-U UP TNL Information* IE in the *PDU Session Resource Setup Request Transfer* IE. | - |  |
| Security Result | O |  | 9.3.1.59 |  | - |  |
| QoS Flow Failed to Setup List | O |  | QoS Flow List with Cause  9.3.1.13 |  | - |  |
| Redundant DL QoS Flow per TNL Information | O |  | QoS Flow per TNL Information  9.3.2.8 | NG-RAN node endpoint of the NG-U transport bearer(s) for delivery of DL PDUs of the indicated Redundant QoS Flow(s) and corresponding to the *Redundant UL NG-U UP TNL Information* IE in the *PDU Session Resource Setup Request Transfer* IE. | YES | ignore |
| Additional Redundant DL QoS Flow per TNL Information | O |  | QoS Flow per TNL Information List  9.3.2.1 | NG-RAN node endpoint of the additional NG-U transport bearer(s) for delivery of redundant DL PDUs for split PDU session, together with associated QoS flows and corresponding to the *Additional Redundant UL NG-U UP TNL Information* IE in the *PDU Session Resource Setup Request Transfer* IE. | YES | ignore |
| Used RSN Information | O |  | Redundant PDU Session Information  9.3.1.136 |  | YES | ignore |
| Global RAN Node ID of Secondary NG-RAN Node | O |  | Global RAN Node ID  9.3.1.5 |  | YES | ignore |
| MBS Support Indicator | O |  | 9.3.1.210 |  | YES | ignore |
| MBS Session Setup Response List | O |  | 9.3.1.213 |  | YES | ignore |
| MBS Session Failed to Setup List | O |  | 9.3.1.214 |  | YES | ignore |
| **QoS Flow TSC Feedback List** |  | *0..1* |  |  | YES | ignore |
| **>QoS Flow TSC Feedback Item** |  | *1..<maxnoofQoSFlows>* |  |  | - |  |
| >>QoS Flow Identifier | M |  | 9.3.1.51 |  | - |  |
| >>TSC Traffic Characteristics Feedback | M |  | 9.3.1.z4 |  | - |  |

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

*Next Modification*

#### 9.3.4.4 PDU Session Resource Modify Response Transfer

This IE is transparent to the AMF.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| DL NG-U UP TNL Information | O |  | UP Transport Layer Information  9.3.2.2 | NG-RAN node endpoint of the NG-U transport bearer, for delivery of DL PDUs. | - |  |
| UL NG-U UP TNL Information | O |  | UP Transport Layer Information  9.3.2.2 | Identifies the NG-U transport bearer at the 5GC node. | - |  |
| **QoS Flow Add or Modify Response List** |  | *0..1* |  |  | - |  |
| **>QoS Flow Add or Modify Response Item** |  | *1..<maxnoofQoSFlows>* |  |  | - |  |
| >>QoS Flow Identifier | M |  | 9.3.1.51 |  | - |  |
| >>Current QoS Parameters Set Index | O |  | Alternative QoS Parameters Set Index  9.3.1.152 | Index to the currently fulfilled alternative QoS parameters set | YES | Ignore |
| >>TSC Traffic Characteristics Feedback | O |  | 9.3.1.z4 |  | YES | Ignore |
| Additional DL QoS Flow per TNL Information | O |  | QoS Flow per TNL Information List  9.3.2.1 | NG-RAN node endpoint of the additional NG-U transport bearer(s) for delivery of DL PDUs for split PDU session, together with associated QoS flows. | - |  |
| QoS Flow Failed to Add or Modify List | O |  | QoS Flow List with Cause  9.3.1.13 |  | - |  |
| Additional NG-U UP TNL Information | O |  | UP Transport Layer Information Pair List  9.3.2.11 | NG-RAN node endpoint of the NG-U transport bearer corresponding to the modified UPF endpoint received in the *PDU Session Resource Modify Request Transfer* IE in case of PDU session split. | YES | ignore |
| Redundant DL NG-U UP TNL Information | O |  | UP Transport Layer Information  9.3.2.2 | NG-RAN node endpoint of the NG-U transport bearer, for delivery of DL PDUs for the redundant transmission. | YES | ignore |
| Redundant UL NG-U UP TNL Information | O |  | UP Transport Layer Information  9.3.2.2 | Identifies the NG-U transport bearer at the 5GC node for the redundant transmission. | YES | ignore |
| Additional Redundant DL QoS Flow per TNL Information | O |  | QoS Flow per TNL Information List  9.3.2.1 | NG-RAN node endpoint of the additional NG-U transport bearer(s) for delivery of redundant DL PDUs for split PDU session, together with associated QoS flows. | YES | ignore |
| Additional Redundant NG-U UP TNL Information | O |  | UP Transport Layer Information Pair List  9.3.2.11 | NG-RAN node endpoint of the NG-U transport bearer for delivery of redundant DL PDUs corresponding to the modified UPF endpoint(s) received in the *UL NG-U UP TNL Modify List* IE of the *PDU Session Resource Modify Request Transfer* IE in case of PDU session split. | YES | ignore |
| Secondary RAT Usage Information | O |  | 9.3.1.114 |  | YES | ignore |
| MBS Support Indicator | O |  | 9.3.1.210 |  | YES | ignore |
| MBS Session Setup or Modify Response List | O |  | MBS Session Setup Response List  9.3.1.213 |  | YES | ignore |
| MBS Session Failed to Setup or Modify List | O |  | MBS Session Failed to Setup List  9.3.1.214 |  | YES | ignore |

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

#### 9.3.4.5 PDU Session Resource Notify Transfer

This IE is transparent to the AMF.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| **QoS Flow Notify List** |  | *0..1* |  |  | - |  |
| **>QoS Flow Notify Item** |  | *1..<maxnoofQoSFlows>* |  |  | - |  |
| >>QoS Flow Identifier | M |  | 9.3.1.51 |  | - |  |
| >>Notification Cause | M |  | ENUMERATED (fullfilled, not fulfilled, …) |  | - |  |
| >>Current QoS Parameters Set Index | O |  | Alternative QoS Parameters Set Notify Index  9.3.1.153 | Index to the currently fulfilled alternative QoS parameters set. Value 0 indicates that NG-RAN cannot even fulfil the lowest alternative parameters set. | YES | Ignore |
| >>TSC Traffic Characteristics Feedback | O |  | 9.3.1.z4 | Applicable when the *Notification Cause* IE is set to “not fulfilled”. | YES | ignore |
| QoS Flow Released List | O |  | QoS Flow List with Cause  9.3.1.13 |  | - |  |
| Secondary RAT Usage Information | O |  | 9.3.1.114 |  | YES | ignore |
| **QoS Flow Feedback List** |  | *0..1* |  |  | YES | ignore |
| **>QoS Flow Feedback Item** |  | *1..<maxnoofQoSFlows>* |  |  | - |  |
| >>QoS Flow Identifier | M |  | 9.3.1.51 |  | - |  |
| >>Update Feedback | O |  | BIT STRING {  CN PDB DL(0),  CN PDB UL(1)}  (SIZE(8, …)) | Each position in the bitmap represents a QoS parameter.  If a bit is set to "1", the respective parameter was not updated.  If a bit is set to "0", the respective parameter was successfully updated.  Bits 2-7 reserved for future use. | - |  |
| >>CN Packet Delay Budget Downlink | O |  | Extended Packet Delay Budget  9.3.1.135 | Indicates when the packet delay budget downlink was not updated in path switch that NG-RAN can offer this value | - |  |
| >>CN Packet Delay Budget Uplink | O |  | Extended Packet Delay Budget  9.3.1.135 | Indicates when the packet delay budget uplink was not updated in path switch that NG-RAN can offer this value | - |  |

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

*End Modification*