**3GPP TSG-RAN WG3 Meeting #118R3-22XXXX**

Toulouse, France, 14th – 18th Nov 2022

**Agenda item: 12.2.2.1**

**Source: Samsung**

**Title: TP to TS 38.423 for predicted resource status reporting procedure** **for AI/ML for NG-RAN**

**Document for: Discussion & Decision**

# Introduction

This paper contains TP for predicted resource status reporting procedure.

# TP to TS 38.423

<<<<<<<<<<<<<<<<<<<< Start of the Change >>>>>>>>>>>>>>>>>>>>

*Editor’s note: FFS on the names of new introduced procedures and messages.*

## 8.1 Elementary procedures

In the following tables, all EPs are divided into Class 1 and Class 2 EPs.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* skip unchanged part \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

|  |  |  |  |
| --- | --- | --- | --- |
| Resource Status Reporting Initiation | RESOURCE STATUS REQUEST | RESOURCE STATUS RESPONSE | RESOURCE STATUS FAILURE |
| Mobility Settings Change | MOBILITY CHANGE REQUEST | MOBILITY CHANGE ACKNOWLEDGE | MOBILITY CHANGE FAILURE |
| IAB Transport Migration Management | IAB TRANSPORT MIGRATION MANAGEMENT REQUEST | IAB TRANSPORT MIGRATION MANAGEMENT RESPONSE | IAB TRANSPORT MIGRATION MANAGEMENT REJECT |
| IAB Transport Migration Modification | IAB TRANSPORT MIGRATION MODIFICATION REQUEST | IAB TRANSPORT MIGRATION MODIFICATION RESPONSE |  |
| IAB Resource Coordination | IAB RESOURCE COORDINATION REQUEST | IAB RESOURCE COORDINATION RESPONSE |  |
| Partial UE Context Transfer | PARTIAL UE CONTEXT TRANSFER | PARTIAL UE CONTEXT TRANSFER ACKNOWLEDGE | PARTIAL UE CONTEXT TRANSFER FAILURE |
| AI/ML Information Reporting Initiation (FFS on the name) | AI/ML INFORMATION REQUEST (FFS on the name) | AI/ML INFORMATION RESPONSE (FFS on the name) | AI/ML INFORMATION FAILURE (FFS on the name) |

Table 8.1-2: Class 2 Elementary Procedures

| Elementary Procedure | Initiating Message |
| --- | --- |
| Handover Cancel | HANDOVER CANCEL |
| SN Status Transfer | SN STATUS TRANSFER |
| RAN Paging | RAN PAGING |
| Xn-U Address Indication | XN-U ADDRESS INDICATION |
| S-NG-RAN node Reconfiguration Completion | S-NODE RECONFIGURATION COMPLETE |
| S-NG-RAN node Counter Check | S-NODE COUNTER CHECK REQUEST |
| UE Context Release | UE CONTEXT RELEASE |
| RRC Transfer | RRC TRANSFER |
| Error Indication | ERROR INDICATION |
| Notification Control Indication | NOTIFICATION CONTROL INDICATION |
| Activity Notification | ACTIVITY NOTIFICATION |
| Secondary RAT Data Usage Report | SECONDARY RAT DATA USAGE REPORT |
| Trace Start | TRACE START |
| Deactivate Trace | DEACTIVATE TRACE |
| Handover Success | HANDOVER SUCCESS |
| Conditional Handover Cancel | CONDITIONAL HANDOVER CANCEL |
| Early Status Transfer | EARLY STATUS TRANSFER |
| Failure Indication | FAILURE INDICATION |
| Handover Report | HANDOVER REPORT |
| Resource Status Reporting | RESOURCE STATUS UPDATE |
| Access And Mobility Indication | ACCESS AND MOBILITY INDICATION |
| Cell Traffic Trace | CELL TRAFFIC TRACE |
| RAN Multicast Group Paging | RAN MULTICAST GROUP PAGING |
| SCG Failure Information Report | SCG FAILURE INFORMATION REPORT |
| SCG Failure Transfer | SCG FAILURE TRANSFER |
| F1-C Traffic Transfer | F1-C TRAFFIC TRANSFER |
| Retrieve UE Context Confirm | RETRIEVE UE CONTEXT CONFIRM |
| Conditional PSCell Change Cancel | CONDITIONAL PSCELL CHANGE CANCEL |
| AI/ML Information Reporting (FFS on the name) | AI/ML INFORMATION UPDATE (FFS on the name) |

### 8.4.AA AI/ML Information Reporting Initiation (FFS on the name)

#### 8.4.AA.1 General

This procedure is used by an NG-RAN node to request the reporting of AI/ML related information to another NG-RAN node.

The procedure uses non UE-associated signalling.

*Editor’s Note: FFS other information that can be requested using this procedure.*

*Editor’s Note: FFS content of AL/ML related information.*

#### 8.4.AA.2 Successful Operation



Figure 8.4.AA.2-1: AI/ML Information Reporting Initiation, successful operation

NG-RAN node1 initiates the procedure by sending the AI/ML INFORMATION REQUEST message to NG-RAN node2 to start AI/ML related information reporting, stop AI/ML related information reporting or add cells to report AI/ML related information. Upon receipt, NG-RAN node2:

- shall initiate the requested AI/ML related information reporting according to the parameters given in the request in case the *Registration Request* IE set to "start"; or

- shall stop all cells AI/ML related information reporting and terminate the reporting in case the *Registration Request* IE is set to "stop"; or

- shall add cells indicated in the *Cell To Report List* IE to the AI/ML related information reporting initiated before for the given Measurement IDs (FFS on the name), in case the *Registration Request* IE is set to "add". If AI/ML related information reporting is already initiated for a cell indicated in the *Cell To Report* *List* IE, this information shall be ignored.

If the *Registration Request* IE is set to "start" in the AI/ML INFORMATION REQUEST message and the *Report Characteristics* IE indicates cell specific AI/ML related information reporting, the *Cell To Report List* IE shall be included.

If *Registration Request* IE is set to "add" in the AI/ML INFORMATION REQUEST message, the *Cell To Report* *List* IE shall be included.

If NG-RAN node2 is capable to provide all requested information, it shall initiate the AI/ML related information reporting as requested by NG-RAN node1 and respond with the AI/ML INFORMATION RESPONSE message.

If the *Reporting Periodicity* IE in the AI/ML INFORMATION REQUEST is present, this indicates the periodicity for the reporting of periodic AI/ML related information reporting. The NG-RAN node2 shall report only once, unless otherwise requested within the *Reporting Periodicity* IE.

#### 8.4.AA.3 Unsuccessful Operation



Figure 8.4.AA.3-1: AI/ML Information Reporting Initiation, unsuccessful operation

If any of the requested AI/ML related information reporting cannot be initiated, NG-RAN node2 shall send the AI/ML INFORMATION FAILURE message with an appropriate cause value.

#### 8.4.AA.4 Abnormal Conditions

FFS

### 8.4.BB AI/ML Information Reporting (FFS on the name)

#### 8.4.BB.1 General

This procedure is initiated by an NG-RAN node to report the result of AI/ML related information reporting admitted by the NG-RAN node following a successful AI/ML Information Reporting Initiation procedure.

The procedure uses non UE-associated signalling.

*Editor’s Note: FFS other information that can be reported using this procedure.*

*Editor’s Note: FFS content of AL/ML related information.*

#### 8.4.BB.2 Successful Operation



Figure 8.4.11.2-1: AI/ML Information Reporting, successful operation

NG-RAN node2 shall report the results of the admitted AI/ML related information in AI/ML INFORMATION UPDATE message. The admitted AI/ML related information are the information that were successfully initiated during the preceding AI/ML Information Reporting Initiation procedure.

#### 8.4.BB.3 Unsuccessful Operation

Not applicable.

#### 8.4.BB.4 Abnormal Conditions

Void

#### 9.1.3.CC AI/ML INFORMATION REQUEST (FFS on the name)

This message is sent by NG-RAN node1 to NG-RAN node2 to initiate the requested AI/ML related information reporting according to the parameters given in the message.

Direction: NG-RAN node1 → NG-RAN node2.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M |  | 9.2.3.1 |  | YES | reject |
| NG-RAN node1 Measurement ID (FFS on the name) | M |  | INTEGER (1..4095,...) | Allocated by NG-RAN node1 | YES | reject |
| NG-RAN node2 Measurement ID (FFS on the name) | C-ifRegistrationRequestStoporAdd |  | INTEGER (1..4095,...) | Allocated by NG-RAN node2 | YES | ignore |
| Registration Request | M |  | ENUMERATED(start, stop,  add, …) | Type of request for which the AI/ML related information is required. | YES | reject |
| Report Characteristics | C-ifRegistrationRequestStart |  | BITSTRING  (SIZE(32)) | Each position in the bitmap indicates the object the NG-RAN node2 is requested to report.  FFS on the coding | YES | reject |
| **Cell To Report List** |  | *0..1* |  | Cell ID list to which the request applies. | YES | ignore |
| >**Cell To Report Item** |  | *1 .. <maxnoofCellsinNG-RANnode>* |  |  | – |  |
| >>Cell ID | M |  | Global NG-RAN Cell Identity  9.2.2.27 |  | – |  |
| Reporting Periodicity | O |  | ENUMERATED(500ms, 1000ms, 2000ms, 5000ms, 10000ms, …) | Periodicity that can be used for reporting of requested objects. Also used as the averaging window length for all prediction object if supported. | YES | ignore |

|  |  |
| --- | --- |
| Condition | Explanation |
| ifRegistrationRequestStoporAdd | This IE shall be present if the *Registration Request* IE is set to the value "stop" or "add". |
| ifRegistrationRequestStart | This IE shall be present if the Registration Request IE is set to the value "start". |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoofCellsinNG-RANnode | Maximum no. cells that can be served by a NG-RAN node. Value is 16384. |

#### 9.1.3.DD AI/ML INFORMATION RESPONSE (FFS on the name)

This message is sent by NG-RAN node2 to NG-RAN node1 to indicate that the requested AI/ML related information, for all or parts of the objects included in the reporting is successfully initiated.

Direction: NG-RAN node2 → NG-RAN node1

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M |  | 9.2.3.1 |  | YES | reject |
| NG-RAN node1 Measurement ID (FFS on the name) | M |  | INTEGER (1..4095,...) | Allocated by NG-RAN node1 | YES | reject |
| NG-RAN node2 Measurement ID (FFS on the name) | M |  | INTEGER (1..4095,...) | Allocated by NG-RAN node2 | YES | reject |
| Reporting Characteristics | M |  | BITSTRING  (SIZE(32)) | Each position in the bitmap indicates the object the NG-RAN node2 is able to report.  FFS on the coding | YES | reject |
| Criticality Diagnostics | O |  | 9.2.3.3 |  | YES | ignore |

#### 9.1.3.EE AI/ML INFORMATION FAILURE (FFS on the name)

This message is sent by the NG-RAN node2 to NG-RAN node1 to indicate that for any of the requested objects the reporting cannot be initiated.

Direction: NG-RAN node2 → NG-RAN node1.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M |  | 9.2.3.1 |  | YES | reject |
| NG-RAN node1 Measurement ID (FFS on the name) | M |  | INTEGER (1..4095,...) | Allocated by NG-RAN node1 | YES | reject |
| NG-RAN node2 Measurement ID (FFS on the name) | M |  | INTEGER (1..4095,...) | Allocated by NG-RAN node2 | YES | reject |
| Cause | M |  | 9.2.3.2 |  | YES | ignore |
| Criticality Diagnostics | O |  | 9.2.3.3 |  | YES | ignore |

#### 9.1.3.FF AI/ML INFORMATION UPDATE (FFS on the name)

This message is sent by NG-RAN node2 to NG-RAN node1 to report the results of the requested AI/ML related information reporting.

Direction: NG-RAN node2 → NG-RAN node1.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M |  | 9.2.3.1 |  | YES | ignore |
| NG-RAN node1 Measurement ID (FFS on the name) | M |  | INTEGER (1..4095,...) | Allocated by NG-RAN node1 | YES | reject |
| NG-RAN node2 Measurement ID (FFS on the name) | M |  | INTEGER (1..4095,...) | Allocated by NG-RAN node2 | YES | reject |
| **Cell AI/ML Info Result** |  | *1* |  |  | YES | ignore |
| **>Cell AI/ML Info Result Item** |  | *1 .. < maxnoofCellsinNG-RANnode >* |  |  |  |  |
| >>Cell ID | M |  | Global NG-RAN Cell Identity  9.2.2.27 |  | – |  |
| >>Predicted Radio Resources Status | O |  | 9.2.2.50 |  | – |  |
| >>Predicted Number of Active UEs | O |  | 9.2.2.62 |  | –- |  |
| >>Predicted RRC Connections | O |  | 9.2.2.56 |  | – |  |
| >>FFS | O |  |  |  | - | - |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoofCellsinNG-RANnode | Maximum no. cells that can be served by a NG-RAN node. Value is 16384. |

<<<<<<<<<<<<<<<<<<<< End of the Change >>>>>>>>>>>>>>>>>>>>