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Multi-access Edge Computing (MEC);

Radio Network Information API

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**Group Specification**

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***ETSI***

650 Route des Lucioles

F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - APE 7112B

Association à but non lucratif enregistrée à la

Sous-Préfecture de Grasse (06) N° w061004871

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Contents

Intellectual Property Rights 6

Foreword 6

Modal verbs terminology 6

1 Scope 7

2 References 7

2.1 Normative references 7

2.2 Informative references 7

3 Definition of terms, symbols and abbreviations 8

3.1 Terms 8

3.2 Symbols 8

3.3 Abbreviations 9

4 Overview 9

5 Description of the service (informative) 10

5.1 RNIS service introduction 10

5.2 Sequence diagrams 11

5.2.1 Introduction 11

5.2.2 Sending a request for RAB information 11

5.2.3 Sending a request for PLMN information 11

5.2.4 Sending a request for S1 bearer information 12

5.2.4a Sending a request for Layer 2 measurements information 12

5.2.5 REST based subscribe-notify model 13

5.2.5.1 Subscribing to RNI event notifications 13

5.2.5.2 Receiving notification on expiry of RNI event subscription 13

5.2.5.3 Updating subscription for RNI event notifications 14

5.2.5.4 Unsubscribing from RNI event notifications 15

5.2.6 Receiving RNI event notifications about cell changes 15

5.2.7 Receiving RNI event notifications about Radio Access Bearer establishment 16

5.2.8 Receiving RNI event notifications about Radio Access Bearer modification 17

5.2.9 Receiving RNI event notifications about Radio Access Bearer release 18

5.2.10 Receiving RNI event notifications about UE measurement reports 19

5.2.11 Receiving RNI event notifications about UE timing advance 20

5.2.12 Receiving RNI event notifications about carrier aggregation reconfiguration 20

5.2.13 Receiving RNI event notifications about S1 bearer 21

5.2.14 Receiving RNI event notifications about 5G UE measurement reports 22

6 Data model 23

6.1 Introduction 23

6.2 Resource data types 23

6.2.1 Introduction 23

6.2.2 Type: PlmnInfo 23

6.2.3 Type: RabInfo 24

6.2.4 Type: S1BearerInfo 24

6.2.4a Type: L2Meas 25

6.3 Subscription data types 27

6.3.1 Introduction 27

6.3.2 Type: CellChangeSubscription 27

6.3.3 Type: RabEstSubscription 28

6.3.4 Type: RabModSubscription 29

6.3.5 Type: RabRelSubscription 30

6.3.6 Type: MeasRepUeSubscription 30

6.3.7 Type: MeasTaSubscription 31

6.3.8 Type: CaReconfSubscription 31

6.3.9 Type: S1BearerSubscription 32

6.3.10 Type: SubscriptionLinkList 33

6.3.11 Type: NrMeasRepUeSubscription 33

6.4 Notification data types 34

6.4.1 Introduction 34

6.4.2 Type: CellChangeNotification 34

6.4.3 Type: RabEstNotification 35

6.4.4 Type: RabModNotification 36

6.4.5 Type: RabRelNotification 36

6.4.6 Type: MeasRepUeNotification 36

6.4.7 Type: MeasTaNotification 38

6.4.8 Type: CaReconfNotification 39

6.4.9 Type: ExpiryNotification 39

6.4.10 Type: S1BearerNotification 40

6.4.11 Type: NrMeasRepUeNotification 40

6.4.12 Type: TestNotification 41

6.5 Referenced structured data types 42

6.5.1 Introduction 42

6.5.2 Type: LinkType 42

6.5.3 Type: TimeStamp 42

6.5.4 Type: AssociateId 42

6.5.5 Type: Plmn 42

6.5.6 Type: Ecgi 43

6.5.7 Type: Nrcgi 43

6.5.8 Type: RsIndexResults 43

6.5.9 Type: ResultsPerSsbIndexList 43

6.5.10 Type: ResultsPerCsiRsIndexList 44

6.5.11 Type: MeasQuantityResultsNr 44

6.6 Referenced simple data types and enumerations 44

6.6.1 Introduction 44

6.6.2 Simple data types 44

6.6.3 Enumeration: Trigger 44

6.6.4 Enumeration: TriggerNr 45

7 API definition 46

7.1 Introduction 46

7.2 Global definitions and resource structure 46

7.3 Resource: rab\_info 47

7.3.1 Description 47

7.3.2 Resource definition 48

7.3.3 Resource methods 48

7.3.3.1 GET 48

7.3.3.2 PUT 49

7.3.3.3 PATCH 49

7.3.3.4 POST 49

7.3.3.5 DELETE 49

7.4 Resource: plmn\_info 50

7.4.1 Description 50

7.4.2 Resource definition 50

7.4.3 Resource methods 50

7.4.3.1 GET 50

7.4.3.2 PUT 51

7.4.3.3 PATCH 51

7.4.3.4 POST 51

7.4.3.5 DELETE 51

7.5 Resource: s1\_bearer\_info 52

7.5.1 Description 52

7.5.2 Resource definition 52

7.5.3 Resource methods 52

7.5.3.1 GET 52

7.5.3.2 PUT 53

7.5.3.3 PATCH 53

7.5.3.4 POST 53

7.5.3.5 DELETE 53

7.5a Resource: layer2\_meas 54

7.5a.1 Description 54

7.5a.2 Resource definition 54

7.5a.3 Resource methods 54

7.5a.3.1 GET 54

7.5a.3.2 PUT 56

7.5a.3.3 PATCH 56

7.5a.3.4 POST 56

7.5a.3.5 DELETE 56

7.6 Resource: subscriptions 57

7.6.1 Description 57

7.6.2 Resource definition 57

7.6.3 Resource methods 57

7.6.3.1 GET 57

7.6.3.2 PUT 58

7.6.3.3 PATCH 58

7.6.3.4 POST 58

7.6.3.5 DELETE 60

7.7 Void 60

7.8 Resource: existing subscription 60

7.8.1 Description 60

7.8.2 Resource definition 60

7.8.3 Resource methods 61

7.8.3.1 GET 61

7.8.3.2 PUT 62

7.8.3.3 PATCH 63

7.8.3.4 POST 64

7.8.3.5 DELETE 64

Annex A (informative): Mapping of permissions for RESTful API and topic based alternative transport 65

A.1 Overview 65

A.2 Mapping of permissions - RESTful and topic based alternative transport 65

Annex B (informative): Complementary material for API utilization 67

History 68

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# Foreword

This Group Specification (GS) has been produced by ETSI Industry Specification Group (ISG) Multi-access Edge Computing (MEC).

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# 1 Scope

The present document focuses on the Radio Network Information MEC service. It describes the message flows and the required information. The present document also specifies the RESTful API with the data model.

# 2 References

## 2.1 Normative references

References are either specific (identified by date of publication and/or edition number or version number) or non‑specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

Referenced documents which are not found to be publicly available in the expected location might be found at <https://docbox.etsi.org/Reference/>.

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The following referenced documents are necessary for the application of the present document.

[1] ETSI GS MEC 001: "Multi-access Edge Computing (MEC) Terminology".

[2] IETF RFC 6749: "The OAuth 2.0 Authorization Framework".

NOTE: Available at <https://tools.ietf.org/html/rfc6749>.

[3] IETF RFC 6750: "The OAuth 2.0 Authorization Framework: Bearer Token Usage".

NOTE: Available at <https://tools.ietf.org/html/rfc6750>.

[4] IETF RFC 5246: "The Transport Layer Security (TLS) Protocol Version 1.2".

NOTE: Available at <https://tools.ietf.org/html/rfc5246>.

[5] Void.

[6] ETSI GS MEC 009: "Multi-access Edge Computing (MEC); General principles, patterns and common aspects of MEC Service APIs".

[7] IETF RFC 8446: "The Transport Layer Security (TLS) Protocol Version 1.3".

NOTE: Available at <https://tools.ietf.org/html/rfc8446>.

## 2.2 Informative references

References are either specific (identified by date of publication and/or edition number or version number) or non‑specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

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The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

[i.1] ETSI GS MEC 002: "Multi-access Edge Computing (MEC); Phase 2: Use Cases and Requirements".

[i.2] ETSI GS MEC 003: "Multi-access Edge Computing (MEC) Framework and reference architecture".

[i.3] ETSI TS 136 413:"LTE; Evolved Universal Terrestrial Radio Access Network (E-UTRAN); S1 Application Protocol (S1AP) (3GPP TS 36 413)".

[i.4] ETSI TS 123 401: "LTE; General Packet Radio Service (GPRS) enhancements for Evolved Universal Terrestrial Radio Access Network (E-UTRAN) access (3GPP TS 23.401)".

[i.5] ETSI TS 136 214: "LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); Physical layer; Measurements (3GPP TS 36 214)".

[i.6] ETSI GS MEC 011: "Multi-access Edge Computing (MEC); Edge Platform Application Enablement".

[i.7] ETSI TS 136 331:"LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification (3GPP TS 36.331)".

[i.8] Void.

[i.9] OpenAPI Specification.

NOTE: Available at <https://github.com/OAI/OpenAPI-Specification>.

[i.10] Protocol Buffers Language Specification.

NOTE 1: Available at <https://developers.google.com/protocol-buffers/>.

NOTE 2: Protocol Buffers Version 3 Language Specification is recommended as it is the official release at the time of publication.

[i.11] ETSI TS 136 314: "Evolved Universal Terrestrial Radio Access (E-UTRA); Layer 2 - Measurements (3GPP TS 36.314)".

[i.12] ETSI TS 136 423: "Evolved Universal Terrestrial Radio Access (E-UTRA); X2 application protocol (X2AP) (3GPP TS 36.423)".

[i.13] ETSI TS 138 331: "5G; NR; Radio Resource Control (RRC); Protocol specification (3GPP TS 38.331)".

[i.14] ETSI TS 138 133: "5G; NR; Requirements for support of radio resource management (3GPP TS 38.133)".

[i.15] ETSI TS 138 101 (all parts): "5G; NR; User Equipment (UE) radio transmission and reception; (3GPP TS 38.101)".

[i.16] ETSI TS 136 133: "Evolved Universal Terrestrial Radio Access (E-UTRA); Requirements for support of radio resource management (3GPP TS 36.133)".

[i.17] ETSI TS 138 423: "5G; NG-RAN; Xn Application Protocol (XnAP) (3GPP TS 38.423)".

# 3 Definition of terms, symbols and abbreviations

## 3.1 Terms

For the purposes of the present document, the terms given in ETSI GS MEC 001 [1] apply.

## 3.2 Symbols

Void.

## 3.3 Abbreviations

For the purposes of the present document, the abbreviations given in ETSI GS MEC 001 [1] and the following apply:

3GPP 3rd Generation Partnership Project

API Application Programming Interface

DL DownLink

ECGI E-UTRAN Cell Global Identifier

E-RAB E-UTRAN Radio Access Bearer

E-UTRAN Evolved Universal Terrestrial Radio Access Network

GBR Guaranteed Bit Rate

GTP GPRS Tunnelling Protocol

GTP-U GPRS Tunnelling Protocol - User plane

GW GateWay

HTTP HyperText Transfer Protocol

HTTPS HTTP over TLS

IE Information Element

IP Internet Protocol

JSON JavaScript Object Notation

MCC Mobile Country Code

MMEC MME Code

MNC Mobile Network Code

OAI Open API Initiative

PLMN Public Land Mobile Network

PRB Physical Resource Block

QCI Quality Class Indicator

QoS Quality of Service

RAB Radio Access Bearer

REST REpresentational State Transfer

RFC Request For Comments

RNI Radio Network Information

RNIS Radio Network Information Service

RSRP Reference Signal Received Power

RSRQ Reference Signal Received Quality

SGW Serving Gateway

TEID Tunnel End Point Identifier

TLS Transport Layer Security

TMSI Temporary Mobile Subscriber Entity

UE User Equipment

UL Uplink

URI Uniform Resource Indicator

UTC Coordinated Universal Time

# 4 Overview

The present document specifies the Radio Network Information API to support the requirements defined for Multi‑access Edge Computing in ETSI GS MEC 002 [i.1].

Clause 5 introduces how Radio Network Information Service (RNIS) may be used by the MEC applications and by the MEC platform. It describes the information flows used for RNI.

The information that can be exchanged over the RNI API is described in clause 6 which provides detailed description on all information elements that are used for RNI.

Clause 7 describes the actual RNI API providing detailed information how information elements are mapped into a RESTful API design.

# 5 Description of the service (informative)

## 5.1 RNIS service introduction

Multi-access Edge Computing allows running the MEC applications at the edge of the network where the environment is characterized by low latency, proximity, high bandwidth and exposure to location and up-to-date radio network information. The information on current radio conditions are shared via the MEC platform over Radio Network Information Service.

Radio Network Information Service (RNIS) is a service that provides radio network related information to MEC applications and to MEC platforms. The Radio Network Information Service is available for authorized MEC applications and is discovered over the Mp1 reference point [i.2]. The granularity of the radio network information may be adjusted based on parameters such as information per cell, per User Equipment, per QCI class or it may be requested over period of time. Typical information that may be provided is listed as follows:

* up-to-date radio network information regarding radio network conditions;
* measurement information related to the user plane based on 3GPP specifications;
* information about UEs connected to the radio node(s) associated with the MEC host, their UE context and the related radio access bearers;
* changes on information related to UEs connected to the radio node(s) associated with the MEC host, their UE context and the related radio access bearers.

The Radio Network Information may be used by the MEC applications and MEC platform to optimize the existing services and to provide new type of services that are based on up to date information on radio conditions. An example of MEC application that uses radio network information to optimize current services is video throughput guidance. Throughput guidance radio analytics MEC application uses services of Multi-access Edge Computing to provide the backend video server with a near real-time indication on the throughput estimated to be available at the radio downlink interface in the next time instant. The throughput guidance radio analytics MEC application computes throughput guidance based on the required radio network information it obtains from a MEC service running on the MEC host ETSI GS MEC 002 [i.1].

Radio Network Information may be also used by the MEC platform to optimize the mobility procedures required to support service continuity.

Radio Network Information may cater for a wide range of use cases, where certain MEC application requests a single piece of information using a simple request-response model while other MEC applications subscribe to multiple different notifications regarding information changes. It is reasonable to assume that for simple queries the RESTful methods are used. However there may be cases where the frequency of updates is so high and the amount of information is so large that RESTful methods do not scale anymore. In addition, there may be aspects of one-to-many communications, which cannot be efficiently addressed by RESTful interfaces. For those cases, the Radio Network Information may be provided over the message broker of the MEC platform. The present document does not specify the actual protocol for a message broker but rather addresses the interoperability aspects by defining stage 2 level definitions to different message types of RNI and by defining the message types in JSON and Protobuf format together with the present document. A MEC application queries information on a message broker via the transport information query procedure as defined in ETSI GS MEC 011 [i.6]. In addition, the transport information may be pre-provisioned to the MEC application via configuration.

The following clauses describe how the service consumers interact with the Radio Network Information Service over RNI API to obtain contextual information from the radio access network. The sequence diagrams that are relevant for Radio Network Information are presented.

## 5.2 Sequence diagrams

### 5.2.1 Introduction

The service consumers communicate with the Radio Network Information Service over RNI API to get contextual information from the radio access network. Both the MEC application and MEC platform may be service consumers. Radio Network Information may be provided by both the MEC platform and the MEC application.

The Radio Network Information API supports both queries and subscriptions (pub/sub mechanism) that are used over the RESTful API or over the message broker of the MEC platform. A message broker is not specified in detail in the present document, but the sequence diagrams and message types that are used over a message broker are defined. For RESTful architectural style, the present document defines the HTTP protocol bindings.

### 5.2.2 Sending a request for RAB information

Figure 5.2.2-1 shows a scenario where the service consumer (e.g. a MEC application or a MEC platform) sends a request to receive a cell level Radio Access Bearer information from the cells that are associated with the requested MEC application instance. The response contains information on users in the cells such as the identifiers of the cells, the identifiers associated to UEs in the cells and information on their E-RABs, consisting of the QCI and QoS information.

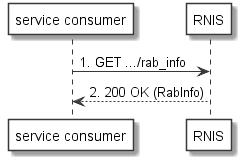


Figure 5.2.2-1: Flow of service consumer requesting Radio Access Bearer information

A service consumer requesting Radio Access Bearer information, as illustrated in figure 5.2.2-1, consists of the following steps:

1. Service consumer sends a GET request to the resource representing the RAB information. The request contains a MEC application instance identifier as an input parameter.
2. RNIS responds with "200 OK" with the message body containing the RabInfo.

### 5.2.3 Sending a request for PLMN information

Figure 5.2.3-1 shows a scenario where the service consumer (e.g. MEC application or MEC platform) sends a query to receive cell level PLMN information related to specific MEC application instance(s). The response contains information on cells that are associated with the requested MEC application instance(s).

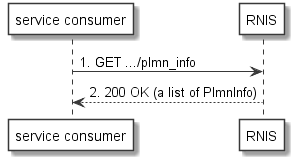


Figure 5.2.3-1: Flow of service consumer requesting PLMN information

A service consumer requesting PLMN information, as illustrated in figure 5.2.3-1, consists of the following steps:

1. Service consumer sends a GET request to the resource representing the PLMN information. The request contains MEC application instance identifier(s) as an input parameter.
2. RNIS responds with "200 OK" with the message body containing the list of PlmnInfo associated with the requested MEC application instance(s).

### 5.2.4 Sending a request for S1 bearer information

With the S1 bearer information acquired from the RNIS, the service consumer (e.g. the MEC application or the MEC platform) for example optimizes the relocation of MEC applications, or uses the acquired information for managing the traffic rules for the related application instances. Figure 5.2.4-1 shows a scenario where the MEC application or the MEC platform sends a query to receive the S1 bearer information.

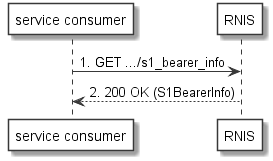


Figure 5.2.4-1: Flow of service consumer requesting S1 bearer information

Requesting S1 bearer information, as illustrated in figure 5.2.4-1, consists of the following steps:

1. Service consumer sends a GET request to the resource representing the S1 bearer information.
2. RNIS responds with "200 OK" with the message body containing the S1 bearer information.

### 5.2.4a Sending a request for Layer 2 measurements information

Figure 5.2.4a-1 shows a scenario where the service consumer (e.g. a MEC application or a MEC platform) sends a request to receive the Layer 2 measurements information from one or more eNBs that are associated with the requested MEC application instance. The response contains information of the Layer 2 measurements performed by the eNBs and/or the UEs as specified in ETSI TS 136 314 [i.11].

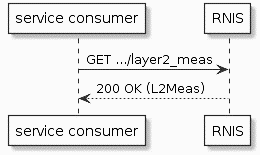


Figure 5.2.4a-1: Flow of service consumer requesting Layer 2 measurements information

A service consumer requesting Layer 2 measurements information, as illustrated in figure 5.2.4a-1, consists of the following steps:

1. Service consumer sends a GET request to the resource representing the Layer 2 measurements information.
2. RNIS responds with "200 OK" with the message body containing the Layer 2 measurement information.

### 5.2.5 REST based subscribe-notify model

#### 5.2.5.1 Subscribing to RNI event notifications

To receive notifications on selected RNI events, the service consumer creates a subscription to certain specific RNI event that is available at RNIS. Figure 5.2.5.1-1 shows a scenario where the service consumer uses REST based procedures to create a subscription for RNI event notifications.

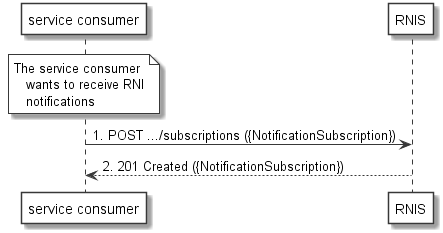


Figure 5.2.5.1-1: Flow of subscribing to the RNI event notifications

Subscribing to the RNI event notifications, as illustrated in figure 5.2.5.1-1, consists of the following steps.

When the service consumer wants to receive notifications about the RNI events, it creates a subscription to the RNI event notifications:

1. The service consumer sends a POST request with the message body containing the {NotificationSubscription} data structure to the resource representing RNI subscription. The variable {NotificationSubscription} is replaced with the data type specified for different RNI event subscriptions as specified in clauses 6.3.2 through 6.3.9 and in clause 6.3.11, and it defines the subscribed event, the filtering criteria and the address where the service consumer wishes to receive the RNI event notifications.
2. RNIS sends "201 Created" response with the message body containing the data structure specific to that RNI event subscription. The data structure contains the address of the resource created and the subscribed RNI event type.

#### 5.2.5.2 Receiving notification on expiry of RNI event subscription

RNIS may define an expiry time for the RNI event subscription. In case expiry time is used, the time will be included in the {NotificationSubscription} data structure that is included in the response message to the subscription. Prior the expiry, RNIS will also send a notification to the service consumer that owns the subscription.

Figure 5.2.5.2-1 shows a scenario where the service consumer receives a subscription expiry notification for the existing subscription.

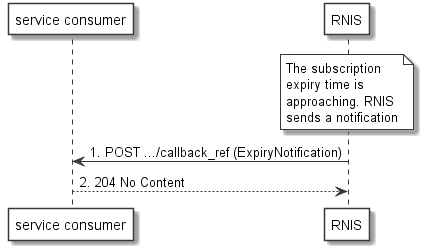


Figure 5.2.5.2-1: Flow of RNIS sending a notification on expiry of the subscription

Sending a notification on expiry of the subscription, as illustrated in figure 5.2.5.2-1 consists of the following steps. If RNIS has defined an expiry time for the subscription, RNIS will send a notification prior the expiry:

1. RNIS sends a POST request to the callback reference address included by the service consumer in the subscription request. The POST request contains a data structure ExpiryNotification.
2. Service consumer sends a "204 No Content" response.

#### 5.2.5.3 Updating subscription for RNI event notifications

Figure 5.2.5.3-1 shows a scenario where the service consumer needs to update an existing subscription for a RNI event notification. The subscription update is triggered e.g. by the need to change the existing subscription, or due to the expiry of the subscription.

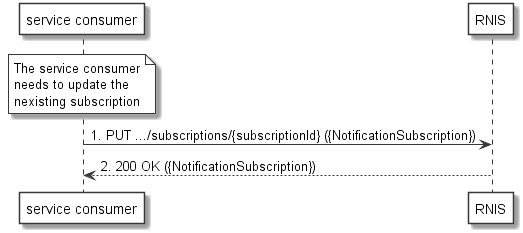


Figure 5.2.5.3-1: Flow of service consumer updating subscription for RNI event notifications

Updating subscription for RNI event notifications, as illustrated in figure 5.2.5.3-1, consists of the following steps.

When the service consumer needs to modify an existing subscription for RNI event notifications, it can update the corresponding subscription as follows:

1. Service consumer updates the subscription resource by sending a PUT request to the resource representing the RNI event subscription that was created with the modified data structure specific to that RNI event subscription.
2. RNIS returns "200 OK" with the message body containing the accepted data structure specific to that RNI event subscription.

#### 5.2.5.4 Unsubscribing from RNI event notifications

When the service consumer does not want to receive notifications anymore after subscribing to RNI events, the service consumer unsubscribes from the RNI event notifications. Figure 5.2.5.4-1 shows a scenario where the service consumer uses REST based procedures to delete the subscription for RNI event notifications.

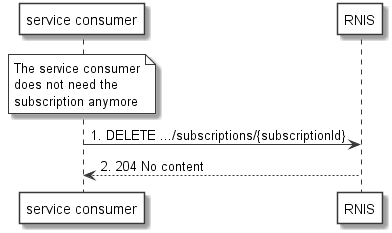


Figure 5.2.5.4-1: Flow of unsubscribing from the RNI event notifications

Unsubscribing from the RNI event notifications, as illustrated in figure 5.2.5.4-1, consists of the following steps.

When the service consumer does not want to receive the notifications anymore, it can unsubscribe from the RNI notification events by deleting the subscription:

1. Service consumer sends a DELETE request to the resource representing the RNI event subscription that was created.
2. RNIS sends "204 No content" response.

### 5.2.6 Receiving RNI event notifications about cell changes

Figure 5.2.6-1 presents the scenario where the RNIS sends RNI event notification on cell changes to the service consumer. The notification contains the identifiers related to the UE and both the source and target cells.

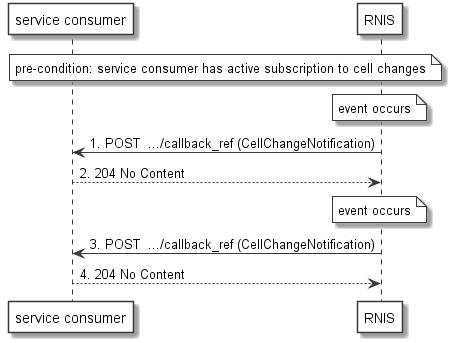


Figure 5.2.6-1: Flow of receiving RNI event notifications on cell changes

Receiving RNI event notifications on cell changes, as illustrated in figure 5.2.6-1, consists of the following steps:

1. RNIS sends a POST request with the message body containing the CellChangeNotification data structure to the callback reference address included by the service consumer in the RNI cell change event subscription.
2. Service consumer sends a "204 No Content" response to the RNIS.

### 5.2.7 Receiving RNI event notifications about Radio Access Bearer establishment

Figure 5.2.7-1 presents the scenario where the RNIS sends RNI event notification on RAB establishment to the service consumer.

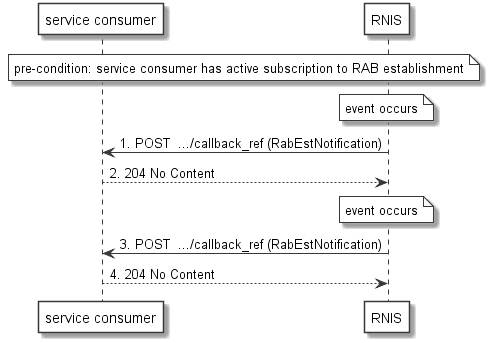


Figure 5.2.7-1: Flow of receiving RNI event notifications on RAB establishment

Receiving RNI event notifications on RAB establishment, as illustrated in figure 5.2.7-1, consists of the following steps:

1. RNIS sends a POST request with the message body containing the RabEstNotification data structure to the callback reference address included by the service consumer in the RNI RAB establishment event subscription.
2. Service consumer sends a "204 No Content" response to the RNIS.

### 5.2.8 Receiving RNI event notifications about Radio Access Bearer modification

Figure 5.2.8-1 presents the scenario where the RNIS sends RNI event notification on RAB modification to the service consumer.

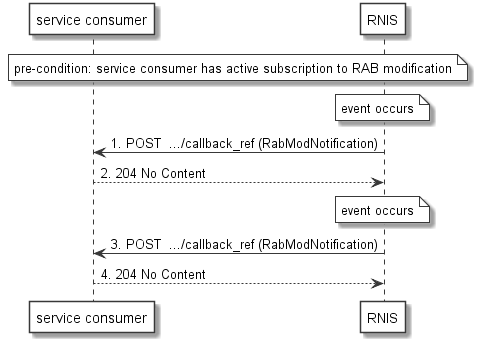


Figure 5.2.8-1: Flow of receiving RNI event notifications on RAB modification

Receiving RNI event notifications on RAB establishment, as illustrated in figure 5.2.8-1, consists of the following steps:

1. RNIS sends a POST request with the message body containing the RabModNotification data structure to the callback reference address included by the service consumer in the RNI RAB modification event subscription.
2. Service consumer sends a "204 No Content" response to the RNIS.

### 5.2.9 Receiving RNI event notifications about Radio Access Bearer release

Figure 5.2.9-1 presents the scenario where the RNIS sends RNI event notification on RAB release to the service consumer.

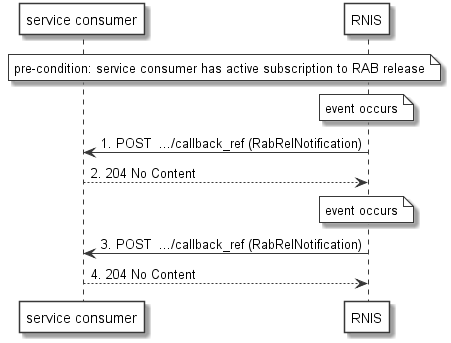


Figure 5.2.9-1: Flow of receiving RNI event notifications on RAB release

Receiving RNI event notifications on RAB release, as illustrated in figure 5.2.9-1, consists of the following steps:

1. RNIS sends a POST request with the message body containing the RabRelNotification data structure to the callback reference address included by the service consumer in the RNI RAB release event subscription.
2. Service consumer sends a "204 No Content" response to the RNIS.

### 5.2.10 Receiving RNI event notifications about UE measurement reports

Figure 5.2.10-1 presents the scenario where the RNIS sends RNI event notification on UE measurement report to the service consumer.

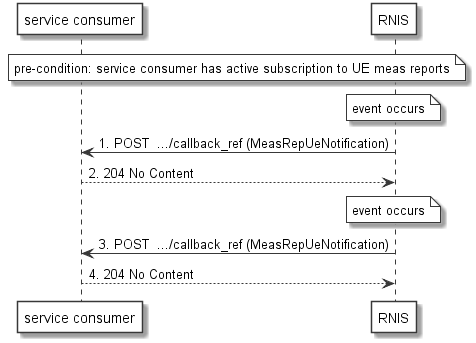


Figure 5.2.10-1: Flow of receiving RNI event notifications on UE measurement reports

Receiving RNI event notifications on UE measurement reports, as illustrated in figure 5.2.10-1, consists of the following steps:

1. RNIS sends a POST request with the message body containing the MeasRepUeNotification data structure to the callback reference address included by the service consumer in the RNI UE measurement report event subscription.
2. Service consumer sends a "204 No Content" response to the RNIS.

### 5.2.11 Receiving RNI event notifications about UE timing advance

Figure 5.2.11-1 presents the scenario where the RNIS sends RNI event notification on UE timing advance to the service consumer.

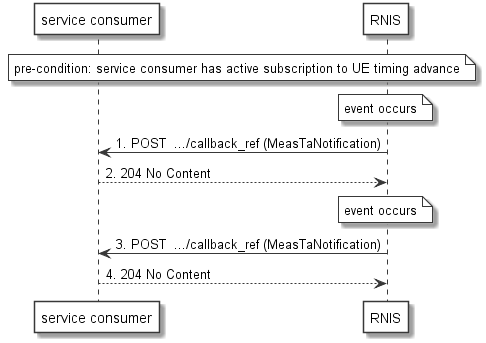


Figure 5.2.11-1: Flow of receiving RNI event notifications on UE timing advance

Receiving RNI event notifications on UE timing advance, as illustrated in figure 5.2.11-1, consists of the following steps:

1. RNIS sends a POST request with the message body containing the MeasTaNotification data structure to the callback reference address included by the service consumer in the RNI UE timing advance event subscription.
2. Service consumer sends a "204 No Content" response to the RNIS.

### 5.2.12 Receiving RNI event notifications about carrier aggregation reconfiguration

Figure 5.2.12-1 presents the scenario where the RNIS sends RNI event notification on carrier aggregation reconfiguration to the service consumer.

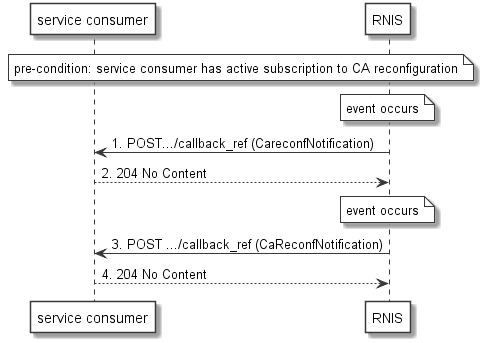


Figure 5.2.12-1: Flow of receiving RNI event notifications on carrier aggregation reconfiguration

Receiving RNI event notifications on carrier aggregation reconfiguration, as illustrated in figure 5.2.12-1, consists of the following steps:

1. RNIS sends a POST request with the message body containing the CaReconfNotification data structure to the callback reference address included by the service consumer in the RNI carrier aggregation reconfiguration event subscription.
2. Service consumer sends a "204 No Content" response to the RNIS.

### 5.2.13 Receiving RNI event notifications about S1 bearer

Figure 5.2.13-1 presents the scenario where the RNIS sends RNI event notification on S1 bearer to the service consumer.

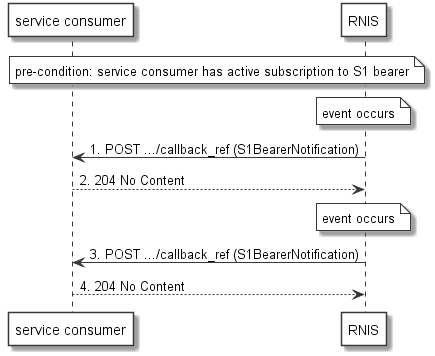


Figure 5.2.13-1: Flow of receiving RNI event notifications on S1 bearer

Receiving RNI event notifications on S1 bearer, as illustrated in figure 5.2.13-1, consists of the following steps:

1) RNIS sends a POST request with the message body containing the S1BearerNotification data structure to the callback reference address included by the service consumer in the RNI UE S1 bearer event subscription.

2) Service consumer sends a "204 No Content" response to the RNIS.

### 5.2.14 Receiving RNI event notifications about 5G UE measurement reports

Figure 5.2.14-1 presents the scenario where the RNIS sends RNI event notification on 5G UE measurement report to the service consumer.

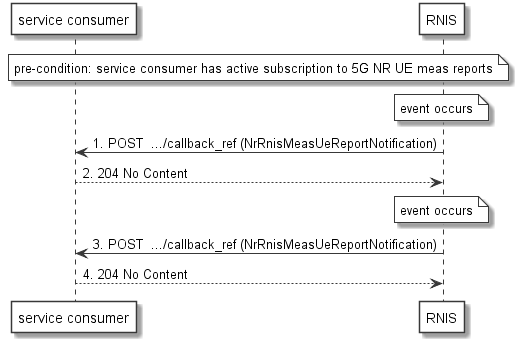


Figure 5.2.14-1: Flow of receiving RNI event notifications on 5G UE measurement reports

Receiving RNI event notifications on 5G UE measurement reports, as illustrated in figure 5.2.14-1, consists of the following steps:

1. RNIS sends a POST request with the message body containing the NrMeasRepUeNotification data structure to the callback reference address included by the service consumer in the RNI 5G UE measurement report event subscription.
2. Service consumer sends a "204 No Content" response to the RNIS.

# 6 Data model

## 6.1 Introduction

The following clauses provide the description of the data model.

## 6.2 Resource data types

### 6.2.1 Introduction

This clause defines data structures that shall be used in the resource representations.

### 6.2.2 Type: PlmnInfo

This type represents the information on Mobile Network(s), which a MEC application instance is associated to.

The attributes of the PlmnInfo shall follow the notations provided in table 6.2.2-1.

Table 6.2.2-1: Attributes of the PlmnInfo

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| timeStamp | TimeStamp | 0..1 | Time stamp. |
| appInstanceId | String | 1 | Unique identifier for the MEC application instance. |
| plmn | Plmn | 1..N | Public Land Mobile Network Identity. |

### 6.2.3 Type: RabInfo

This type represents the information on existing E-RABs that are associated with a specific MEC application instance.

The attributes of the RabInfo shall follow the notations provided in table 6.2.3-1.

Table 6.2.3-1: Attributes of the RabInfo

| Attribute name | Data type | Cardinality | Description |
| --- | --- | --- | --- |
| timeStamp | TimeStamp | 0..1 | Time stamp. |
| appInstanceId | String | 1 | Unique identifier for the MEC application instance. |
| requestId | String | 1 | Unique identifier allocated by the service consumer for the RAB Information request. |
| cellUserInfo | Structure (inlined) | 0..N | The information on users per cell as defined below. |
| >ecgi | Ecgi | 1 | E-UTRAN Cell Global Identifier. |
| >ueInfo | Structure (inlined) | 1..N | Information on UEs in the specific cell as defined below. |
| >>associateId | AssociateId | 0..N | 0 to N identifiers to associate the event for a specific UE or flow. |
| >>erabInfo | Structure (inlined) | 1..N | Information on E-RAB as defined below. |
| >>>erabId | Integer | 1 | The attribute that uniquely identifies a Radio Access bearer for specific UE as defined in ETSI TS 136 413 [i.3]. |
| >>>erabQosParameters | Structure (inlined) | 0..1 | QoS parameters for the E-RAB as defined below. |
| >>>>qci | Integer | 1 | QoS Class Identifier as defined in ETSI TS 123 401 [i.4]. |
| >>>>qosInformation | Structure (inlined) | 0..1 | The QoS information for the E-RAB. |
| >>>>>erabMbrDl | Integer | 1 | This attribute indicates the maximum downlink E‑RAB Bit Rate as defined in ETSI TS 123 401 [i.4] for this bearer. |
| >>>>>erabMbrUl | Integer | 1 | This attribute indicates the maximum uplink E-RAB Bit Rate as defined in ETSI TS 123 401 [i.4] for this bearer. |
| >>>>>erabGbrDl | Integer | 1 | This attribute indicates the guaranteed downlink E‑RAB Bit Rate as defined in ETSI TS 123 401 [i.4] for this bearer. |
| >>>>>erabGbrUl | Integer | 1 | This attribute indicates the guaranteed uplink E‑RAB Bit Rate as defined in ETSI TS 123 401 [i.4] for this bearer. |

### 6.2.4 Type: S1BearerInfo

This type represents the information on S1-U bearer.

The attributes of the S1BearerInfo shall follow the notations provided in table 6.2.4-1.

Table 6.2.4-1: Attributes of the S1BearerInfo

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| timeStamp | TimeStamp | 0..1 | Time stamp. |
| s1UeInfo | Structure (inlined) | 1..N | Information on a specific UE as defined below. |
| >tempUeId | Structure (inlined) | 0..1 | The temporary identifier allocated for the specific UE as defined below. |
| >>mmec | String | 1 | MMEC as defined in ETSI TS 136 413 [i.3]. |
| >>mtmsi | String | 1 | M-TMSI as defined in ETSI TS 136 413 [i.3]. |
| >associateId | AssociateId | 1..N | 1 to N identifiers to associate the information for a specific UE or flow. |
| >ecgi | Ecgi | 1..N | E-UTRAN Cell Global Identifier. |
| >s1BearerInfoDetailed | Structure (inlined) | 1..N | S1 bearer information as defined below. |
| >>erabId | Integer | 1 | The attribute that uniquely identifies a S1 bearer for a specific UE, as defined in ETSI TS 136 413 [i.3]. |
| >>enbInfo | Structure (inlined) | 1 | S1 bearer information on eNB side as defined below. |
| >>>ipAddress | String | 1 | eNB transport layer address of this S1 bearer. |
| >>>tunnelId | String | 1 | eNB GTP-U TEID of this S1 bearer. |
| >>sGwInfo | Structure (inlined) | 1 | S1 bearer information on GW side as defined below. |
| >>>ipAddress | String | 1 | SGW transport layer address of this S1 bearer. |
| >>>tunnelId | String | 1 | SGW GTP-U TEID of this S1 bearer. |

### 6.2.4a Type: L2Meas

This type represents the information on the Layer 2 measurements information from one or more eNBs that are associated with the requested MEC application instance.

The attributes of the L2Meas shall follow the notations provided in table 6.2.4a-1.

**Table 6.2.4a-1: Attributes of the L2Meas**

| Attribute name | Data type | Cardinality | Description |
| --- | --- | --- | --- |
| timeStamp | TimeStamp | 0..1 | Time stamp. |
| cellInfo | Structure (inlined) | 0..N | The per cell measurement information as defined below. |
| >ecgi | Ecgi | 1 | E-UTRAN Cell Global Identifier. |
| >dl\_gbr\_prb\_usage\_cell | Integer (0..100) | 0..1 | It indicates the PRB usage for downlink GBR traffic, as defined in ETSI TS 136 314 [i.11] and ETSI TS 136 423 [i.12]. |
| >ul\_gbr\_prb\_usage\_cell | Integer (0..100) | 0..1 | It indicates (in percentage) the PRB usage for uplink GBR traffic, as defined in ETSI TS 136 314 [i.11] and ETSI TS 136 423 [i.12]. |
| >dl\_nongbr\_prb\_usage\_cell | Integer (0..100) | 0..1 | It indicates (in percentage) the PRB usage for downlink non-GBR traffic, as defined in ETSI TS 136 314 [i.11] and ETSI TS 136 423 [i.12]. |
| >ul\_nongbr\_prb\_usage\_cell | Integer (0..100) | 0..1 | It indicates (in percentage) the PRB usage for uplink non-GBR traffic, as defined in ETSI TS 136 314 [i.11] and ETSI TS 136 423 [i.12]. |
| >dl\_total\_prb\_usage\_cell | Integer (0..100) | 0..1 | It indicates (in percentage) the PRB usage for total downlink traffic, as defined in ETSI TS 136 314 [i.11] and ETSI TS 136 423 [i.12]. |
| >ul\_total\_prb\_usage\_cell | Integer (0..100) | 0..1 | It indicates (in percentage) the PRB usage for total uplink traffic, as defined in ETSI TS 136 314 [i.11] and ETSI TS 136 423 [i.12]. |
| >received\_dedicated\_preambles\_cell | Integer (0..100) | 0..1 | It indicates (in percentage) the received dedicated preambles, as defined in ETSI TS 136 314 [i.11]. |
| >received\_randomly\_selected \_preambles\_low\_range\_cell | Integer (0..100) | 0..1 | It indicates (in percentage) the received randomly selected preambles in the low range, as defined in ETSI TS 136 314 [i.11]. |
| >received\_randomly\_selected \_preambles\_high\_range\_cell | Integer (0..100) | 0..1 | It indicates (in percentage) the received randomly selected preambles in the high range, as defined in ETSI TS 136 314 [i.11]. |
| >number\_of\_active\_ue\_dl\_gbr\_cell | Integer | 0..1 | It indicates the number of active UEs with downlink GBR traffic, as defined in ETSI TS 136 314 [i.11]. |
| >number\_of\_active\_ue\_ul\_gbr\_cell | Integer | 0..1 | It indicates the number of active UEs with uplink GBR traffic, as defined in ETSI TS 136 314 [i.11]. |
| >number\_of\_active\_ue\_dl\_nongbr\_cell | Integer | 0..1 | It indicates the number of active UEs with downlink non-GBR traffic, as defined in ETSI TS 136 314 [i.11]. |
| >number\_of\_active\_ue\_ul\_nongbr\_cell | Integer | 0..1 | It indicates the number of active UEs with uplink non-GBR traffic, as defined in ETSI TS 136 314 [i.11]. |
| >dl\_gbr\_pdr\_cell | Integer (0..100) | 0..1 | It indicates the packet discard rate in percentage of the downlink GBR traffic in a cell, as defined in ETSI TS 136 314 [i.11]. |
| >ul\_gbr\_pdr\_cell | Integer (0..100) | 0..1 | It indicates the packet discard rate in percentage of the uplink GBR traffic in a cell, as defined in ETSI TS 136 314 [i.11]. |
| >dl\_nongbr\_pdr\_cell | Integer (0..100) | 0..1 | It indicates the packet discard rate in percentage of the downlink non‑GBR traffic in a cell, as defined in ETSI TS 136 314 [i.11]. |
| >ul\_nongbr\_pdr\_cell | Integer (0..100) | 0..1 | It indicates the packet discard rate in percentage of the uplink non‑GBR traffic in a cell, as defined in ETSI TS 136 314 [i.11]. |
| cellUEInfo | Structure (inlined) | 0..N | The per cell per UE layer 2 measurements information as defined below. |
| >ecgi | Ecgi | 1 | E-UTRAN Cell Global Identifier. |
| >associateId | AssociateId | 1 | Identifier to associate the information for a specific UE or flow. |
| >dl\_gbr\_delay\_ue | Integer | 0..1 | It indicates the packet delay of the downlink GBR traffic of a UE, as defined in ETSI TS 136 314 [i.11]. |
| >ul\_gbr\_delay\_ue | Integer | 0..1 | It indicates the packet delay of the uplink GBR traffic of a UE, as defined in ETSI TS 136 314 [i.11]. |
| >dl\_nongbr\_delay\_ue | Integer | 0..1 | It indicates the packet delay of the downlink non-GBR traffic of a UE, as defined in ETSI TS 136 314 [i.11]. |
| >ul\_nongbr\_delay\_ue | Integer | 0..1 | It indicates the packet delay of the uplink non-GBR traffic of a UE, as defined in ETSI TS 136 314 [i.11]. |
| >dl\_gbr\_pdr\_ue | Integer (0..100) | 0..1 | It indicates the packet discard rate in percentage of the downlink GBR traffic of a UE, as defined in ETSI TS 136 314 [i.11]. |
| >ul\_gbr\_pdr\_ue | Integer (0..100) | 0..1 | It indicates the packet discard rate in percentage of the uplink GBR traffic of a UE, as defined in ETSI TS 136 314 [i.11]. |
| >dl\_nongbr\_pdr\_ue | Integer (0..100) | 0..1 | It indicates the packet discard rate in percentage of the downlink non‑GBR traffic of a UE, as defined in ETSI TS 136 314 [i.11]. |
| >ul\_nongbr\_pdr\_ue | Integer (0..100) | 0..1 | It indicates the packet discard rate in percentage of the uplink non‑GBR traffic of a UE, as defined in ETSI TS 136 314 [i.11]. |
| >dl\_gbr\_throughput\_ue | Integer | 0..1 | It indicates the scheduled throughput of the downlink GBR traffic of a UE, as defined in ETSI TS 136 314 [i.11]. |
| >ul\_gbr\_throughput\_ue | Integer | 0..1 | It indicates the scheduled throughput of the uplink GBR traffic of a UE, as defined in ETSI TS 136 314 [i.11]. |
| >dl\_nongbr\_throughput\_ue | Integer | 0..1 | It indicates the scheduled throughput of the downlink non‑GBR traffic of a UE, as defined in ETSI TS 136 314 [i.11]. |
| >ul\_nongbr\_throughput\_ue | Integer | 0..1 | It indicates the scheduled throughput of the uplink non-GBR traffic of a UE, as defined in ETSI TS 136 314 [i.11]. |
| >dl\_gbr\_data\_volume\_ue | Integer | 0..1 | It indicates the data volume of the downlink GBR traffic of a UE, as defined in ETSI TS 136 314 [i.11]. |
| >ul\_gbr\_data\_volume\_ue | Integer | 0..1 | It indicates the data volume of the uplink GBR traffic of a UE, as defined in ETSI TS 136 314 [i.11]. |
| >dl\_nongbr\_data\_volume\_ue | Integer | 0..1 | It indicates the data volume of the downlink non-GBR traffic of a UE, as defined in ETSI TS 136 314 [i.11]. |
| >ul\_nongbr\_data\_volume\_ue | Integer | 0..1 | It indicates the data volume of the uplink non-GBR traffic of a UE, as defined in ETSI TS 136 314 [i.11]. |

## 6.3 Subscription data types

### 6.3.1 Introduction

This clause defines data structures for subscriptions.

### 6.3.2 Type: CellChangeSubscription

This type represents a subscription to cell change notifications from Radio Network Information Service.

Table 6.3.2-1: Attributes of the CellChangeSubscription

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| subscriptionType | String | 1 | Shall be set to "CellChangeSubscription". |
| callbackReference | Uri | 0..1 | URI exposed by the client on which to receive notifications via HTTP. See note. |
| requestTestNotification | Boolean | 0..1 | Shall be set to TRUE by the service consumer to request a test notification via HTTP on the callbackReference URI, specified in ETSI GS MEC 009 [6], as described in clause 6.12a. |
| websockNotifConfig | WebsockNotifConfig | 0..1 | Provides details to negotiate and signal the use of a Websocket connection between RNIS and the service consumer for notifications. See note. |
| \_links | Structure (inlined) | 0..1 | Hyperlink related to the resource. This shall be only included in the HTTP responses and in HTTP PUT requests. |
| >self | LinkType | 1 | Self-referring URI. The URI shall be unique within the RNI API as it acts as an ID for the subscription. |
| filterCriteriaAssocHo | Structure (inlined) | 1 | List of filtering criteria for the subscription. Any filtering criteria from below, which is included in the request, shall also be included in the response. |
| >appInstanceId | String | 0..1 | Unique identifier for the MEC application instance. |
| >associateId | AssociateId | 0..N | 0 to N identifiers to associate the information for a specific UE or flow. |
| >ecgi | Ecgi | 0..N | E-UTRAN Cell Global Identifier. |
| >hoStatus | Enum | 0..N | In case hoStatus is not included in the subscription request, the default value 3 = COMPLETED shall be used and included in the response:  1 = IN\_PREPARATION.  2 = IN\_EXECUTION.  3 = COMPLETED.  4 = REJECTED.  5 = CANCELLED. |
| expiryDeadline | TimeStamp | 0..1 | Time stamp. |
| NOTE: At least one of callbackReference and websockNotifConfig shall be provided by the service consumer. If both are provided, it is up to RNIS to choose an alternative and return only that alternative in the response, specified in ETSI GS MEC 009 [6], as described in clause 6.12a. | | | |

### 6.3.3 Type: RabEstSubscription

This type represents a subscription to RAB establishment notifications from Radio Network Information Service.

Table 6.3.3-1: Attributes of the RabEstSubscription

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| subscriptionType | String | 1 | Shall be set to "RabEstSubscription". |
| callbackReference | Uri | 0..1 | URI exposed by the client on which to receive notifications via HTTP. See note. |
| requestTestNotification | Boolean | 0..1 | Shall be set to TRUE by the service consumer to request a test notification via HTTP on the callbackReference URI, specified in ETSI GS MEC 009 [6], as described in clause 6.12a. |
| websockNotifConfig | WebsockNotifConfig | 0..1 | Provides details to negotiate and signal the use of a Websocket connection between RNIS and the service consumer for notifications. See note. |
| \_links | Structure (inlined) | 0..1 | Hyperlink related to the resource. This shall be only included in the HTTP responses and in HTTP PUT requests. |
| >self | LinkType | 1 | Self-referring URI. The URI shall be unique within the RNI API as it acts as an ID for the subscription. |
| filterCriteriaQci | Structure (inlined) | 1 | List of filtering criteria for the subscription. Any filtering criteria from below, which is included in the request, shall also be included in the response. |
| >appInstanceId | String | 0..1 | Unique identifier for the MEC application instance. |
| >ecgi | Ecgi | 0..N | E-UTRAN Cell Global Identifier. |
| >qci | Integer | 1 | QoS Class Identifier as defined in ETSI TS 123 401 [i.4]. |
| expiryDeadline | TimeStamp | 0..1 | Time stamp. |
| NOTE: At least one of callbackReference and websockNotifConfig shall be provided by the service consumer. If both are provided, it is up to RNIS to choose an alternative and return only that alternative in the response, specified in ETSI GS MEC 009 [6], as described in clause 6.12a. | | | |

### 6.3.4 Type: RabModSubscription

This type represents a subscription to RAB modification notifications from Radio Network Information Service.

Table 6.3.4-1: Attributes of the RabModSubscription

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| subscriptionType | String | 1 | Shall be set to "RabModSubscription". |
| callbackReference | Uri | 0..1 | URI exposed by the client on which to receive notifications via HTTP. See note. |
| requestTestNotification | Boolean | 0..1 | Shall be set to TRUE by the service consumer to request a test notification via HTTP on the callbackReference URI, specified in ETSI GS MEC 009 [6], as described in clause 6.12a. |
| websockNotifConfig | WebsockNotifConfig | 0..1 | Provides details to negotiate and signal the use of a Websocket connection between RNIS and the service consumer for notifications. See note. |
| \_links | Structure (inlined) | 0..1 | Hyperlink related to the resource. This shall be only included in the HTTP responses and in HTTP PUT requests. |
| >self | LinkType | 1 | Self-referring URI. The URI shall be unique within the RNI API as it acts as an ID for the subscription. |
| filterCriteriaQci | Structure (inlined) | 1 | List of filtering criteria for the subscription. Any filtering criteria from below, which is included in the request, shall also be included in the response. |
| >appInstanceId | String | 0..1 | Unique identifier for the MEC application instance. |
| >erabId | Integer | 1 | The attribute that uniquely identifies a Radio Access bearer for specific UE as defined in ETSI TS 136 413 [i.3]. |
| >ecgi | Ecgi | 0..N | E-UTRAN Cell Global Identifier. |
| >qci | Integer | 1 | QoS Class Identifier as defined in ETSI TS 123 401 [i.4]. |
| expiryDeadline | TimeStamp | 0..1 | Time stamp. |
| NOTE: At least one of callbackReference and websockNotifConfig shall be provided by the service consumer. If both are provided, it is up to RNIS to choose an alternative and return only that alternative in the response, specified in ETSI GS MEC 009 [6], as described in clause 6.12a. | | | |

### 6.3.5 Type: RabRelSubscription

This type represents a subscription to RAB release notifications from Radio Network Information Service.

Table 6.3.5-1: Attributes of the RabRelSubscription

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| subscriptionType | String | 1 | Shall be set to "RabRelSubscription". |
| callbackReference | Uri | 0..1 | URI selected by the service consumer to receive notifications on the subscribed RNIS information. This shall be included both in the request and in response. If not present, the service consumer is requesting the use of a Websocket for notifications. See note. |
| requestTestNotification | Boolean | 0..1 | Set to TRUE by the service consumer to request a test notification on the callbackReference URI to determine if it is reachable by RNIS for notifications. |
| websockNotifConfig | WebsockNotifConfig | 0..1 | Provides details to negotiate and signal the use of a Websocket connection between RNIS and the service consumer for notifications, either in place of the callbackReference URI or if it is not reachable via the test notification. |
| \_links | Structure (inlined) | 0..1 | Hyperlink related to the resource. This shall be only included in the HTTP responses and in HTTP PUT requests. |
| >self | LinkType | 1 | Self-referring URI. The URI shall be unique within the RNI API as it acts as an ID for the subscription. |
| filterCriteriaQci | Structure (inlined) | 1 | List of filtering criteria for the subscription. Any filtering criteria from below, which is included in the request, shall also be included in the response. |
| >appInstanceId | String | 0..1 | Unique identifier for the MEC application instance. |
| >erabId | Integer | 1 | The attribute that uniquely identifies a Radio Access bearer for specific UE as defined in ETSI TS 136 413 [i.3]. |
| >ecgi | Ecgi | 0..N | E-UTRAN Cell Global Identifier. |
| >qci | Integer | 1 | QoS Class Identifier as defined in ETSI TS 123 401 [i.4]. |
| expiryDeadline | TimeStamp | 0..1 | Time stamp. |
| NOTE: At least one of callbackReference and websockNotifConfig shall be provided by the service consumer. If both are provided, it is up to RNIS to select the method to be used for notifications and to return only that method in the response. | | | |

### 6.3.6 Type: MeasRepUeSubscription

This type represents a subscription to UE measurement report notifications from Radio Network Information Service for UEs served by E-UTRA Cells.

Table 6.3.6-1: Attributes of the MeasRepUeSubscription

| Attribute name | Data type | Cardinality | Description |
| --- | --- | --- | --- |
| subscriptionType | String | 1 | Shall be set to "MeasRepUeSubscription". |
| callbackReference | Uri | 0..1 | URI selected by the service consumer to receive notifications on the subscribed RNIS information. This shall be included both in the request and in response. If not present, the service consumer is requesting the use of a Websocket for notifications. See note. |
| requestTestNotification | Boolean | 0..1 | Set to TRUE by the service consumer to request a test notification on the callbackReference URI to determine if it is reachable by RNIS for notifications. |
| websockNotifConfig | WebsockNotifConfig | 0..1 | Provides details to negotiate and signal the use of a Websocket connection between RNIS and the service consumer for notifications, either in place of the callbackReference URI or if it is not reachable via the test notification. |
| \_links | Structure (inlined) | 0..1 | Hyperlink related to the resource. This shall be only included in the HTTP responses and in HTTP PUT requests. |
| >self | LinkType | 1 | Self-referring URI. The URI shall be unique within the RNI API as it acts as an ID for the subscription. |
| filterCriteriaAssocTri | Structure (inlined) | 1 | List of filtering criteria for the subscription. Any filtering criteria from below, which is included in the request, shall also be included in the response. |
| >appInstanceId | String | 0..1 | Unique identifier for the MEC application instance. |
| >associateId | AssociateId | 0..N | 0 to N identifiers to associate the information for a specific UE or flow. |
| >ecgi | Ecgi | 0..N | E-UTRAN Cell Global Identifier. |
| >trigger | Trigger | 0..N | Corresponds to a specific E-UTRAN UE Measurement Report trigger. |
| expiryDeadline | TimeStamp | 0..1 | Time stamp. |
| NOTE: At least one of callbackReference and websockNotifConfig shall be provided by the service consumer. If both are provided, it is up to RNIS to select the method to be used for notifications and to return only that method in the response. | | | |

### 6.3.7 Type: MeasTaSubscription

This type represents a subscription to UE timing advance notifications from Radio Network Information Service.

Table 6.3.7-1: Attributes of the MeasTaSubscription

| Attribute name | Data type | Cardinality | Description |
| --- | --- | --- | --- |
| subscriptionType | String | 1 | Shall be set to "MeasTaSubscription". |
| callbackReference | Uri | 0..1 | URI exposed by the client on which to receive notifications via HTTP. See note. |
| requestTestNotification | Boolean | 0..1 | Shall be set to TRUE by the service consumer to request a test notification via HTTP on the callbackReference URI, specified in ETSI GS MEC 009 [6], as described in clause 6.12a. |
| websockNotifConfig | WebsockNotifConfig | 0..1 | Provides details to negotiate and signal the use of a Websocket connection between RNIS and the service consumer for notifications. See note. |
| \_links | Structure (inlined) | 0..1 | Hyperlink related to the resource. This shall be only included in the HTTP responses and in HTTP PUT requests. |
| >self | LinkType | 1 | Self-referring URI. The URI shall be unique within the RNI API as it acts as an ID for the subscription. |
| filterCriteriaAssoc | Structure (inlined) | 1 | List of filtering criteria for the subscription. Any filtering criteria from below, which is included in the request, shall also be included in the response. |
| >appInstanceId | String | 0..1 | Unique identifier for the MEC application instance. |
| >associateId | AssociateId | 0..N | 0 to N identifiers to associate the information for a specific UE or flow. |
| >ecgi | Ecgi | 0..N | E-UTRAN Cell Global Identifier. |
| expiryDeadline | TimeStamp | 0..1 | Time stamp. |
| NOTE: At least one of callbackReference and websockNotifConfig shall be provided by the service consumer. If both are provided, it is up to RNIS to choose an alternative and return only that alternative in the response, specified in ETSI GS MEC 009 [6], as described in clause 6.12a. | | | |

### 6.3.8 Type: CaReconfSubscription

This type represents a subscription to UE carrier aggregation reconfiguration notifications from Radio Network Information Service.

Table 6.3.8-1: Attributes of the CaReconfSubscription

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| subscriptionType | String | 1 | Shall be set to "CaReconfSubscription". |
| callbackReference | Uri | 0..1 | URI exposed by the client on which to receive notifications via HTTP. See note. |
| requestTestNotification | Boolean | 0..1 | Shall be set to TRUE by the service consumer to request a test notification via HTTP on the callbackReference URI, specified in ETSI GS MEC 009 [6], as described in clause 6.12a. |
| websockNotifConfig | WebsockNotifConfig | 0..1 | Provides details to negotiate and signal the use of a Websocket connection between RNIS and the service consumer for notifications. See note. |
| \_links | Structure (inlined) | 0..1 | Hyperlink related to the resource. This shall be only included in the HTTP responses and in HTTP PUT requests. |
| >self | LinkType | 1 | Self-referring URI. The URI shall be unique within the RNI API as it acts as an ID for the subscription. |
| filterCriteriaAssoc | Structure (inlined) | 1 | List of filtering criteria for the subscription. Any filtering criteria from below, which is included in the request, shall also be included in the response. |
| >appInstanceId | String | 0..1 | Unique identifier for the MEC application instance. |
| >associateId | AssociateId | 0..N | 0 to N identifiers to associate the information for a specific UE or flow. |
| >ecgi | Ecgi | 0..N | E-UTRAN Cell Global Identifier. |
| expiryDeadline | TimeStamp | 0..1 | Time stamp. |
| NOTE: At least one of callbackReference and websockNotifConfig shall be provided by the service consumer. If both are provided, it is up to RNIS to choose an alternative and return only that alternative in the response, specified in ETSI GS MEC 009 [6], as described in clause 6.12a. | | | |

### 6.3.9 Type: S1BearerSubscription

This type represents a subscription to S1-U bearer information notification from Radio Network Information Service.

Table 6.3.9-1: Attributes of the S1BearerSubscription

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| subscriptionType | String | 1 | Shall be set to "S1BearerSubscription". |
| callbackReference | Uri | 0..1 | URI exposed by the client on which to receive notifications via HTTP. See note. |
| requestTestNotification | Boolean | 0..1 | Shall be set to TRUE by the service consumer to request a test notification via HTTP on the callbackReference URI, specified in ETSI GS MEC 009 [6], as described in clause 6.12a. |
| websockNotifConfig | WebsockNotifConfig | 0..1 | Provides details to negotiate and signal the use of a Websocket connection between RNIS and the service consumer for notifications. See note. |
| \_links | Structure (inlined) | 0..1 | Hyperlink related to the resource. This shall be only included in the HTTP responses and in HTTP PUT requests. |
| >self | LinkType | 1 | Self-referring URI. The URI shall be unique within the RNI API as it acts as an ID for the subscription. |
| eventType | Enum | 1..N | Description of the subscribed event. The event is included both in the request and in the response.  For the eventType, the following values are currently defined:  0 = RESERVED.  1 = S1\_BEARER\_ESTABLISH.  2 = S1\_BEARER\_MODIFY.  3 = S1\_BEARER\_RELEASE. |
| S1BearerSubscriptionCriteria | Structure (inlined) | 1 | As defined below. |
| >associateId | AssociateId | 0..N | 0 to N identifiers to associate the events for a specific UE or a flow. |
| >ecgi | Ecgi | 0..N | E-UTRAN Cell Global Identifier. |
| >erabId | Integer | 0..N | The attribute that uniquely identifies a S1 bearer for a specific UE, as defined in ETSI TS 136 413 [i.3]. |
| expiryDeadline | TimeStamp | 0..1 | Time stamp. |
| NOTE: At least one of callbackReference and websockNotifConfig shall be provided by the service consumer. If both are provided, it is up to RNIS to choose an alternative and return only that alternative in the response, specified in ETSI GS MEC 009 [6], as described in clause 6.12a. | | | |

### 6.3.10 Type: SubscriptionLinkList

This type represents a list of links related to currently existing subscriptions for the service consumer. This information is returned when sending a request to receive current subscriptions.

Table 6.3.10-1: Attributes of the SubscriptionLinkList

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| \_links | Structure (inlined) | 1 | List of hyperlinks related to the resource. |
| >self | LinkType | 1 |  |
| >subscription | Structure (inlined) | 0..N | A link to a subscription. |
| >>href | Uri | 1 | The URI referring to the subscription. |
| >>subscriptionType | String | 1 | Type of the subscription. The string shall be set according to the "subscriptionType" attribute of the associated subscription data type event defined in clause 6.3. |

### 6.3.11 Type: NrMeasRepUeSubscription

This type represents a subscription to 5G UE measurement report notifications from Radio Network Information Service for UEs served by NR Cells.

Table 6.3.11-1: Attributes of the NrMeasRepUeSubscription

| Attribute name | Data type | Cardinality | Description |
| --- | --- | --- | --- |
| subscriptionType | String | 1 | Shall be set to "NrMeasRepUeSubscription". |
| callbackReference | Uri | 0..1 | URI exposed by the client on which to receive notifications via HTTP. See note. |
| requestTestNotification | Boolean | 0..1 | Shall be set to TRUE by the service consumer to request a test notification via HTTP on the callbackReference URI, specified in ETSI GS MEC 009 [6], as described in clause 6.12a. |
| websockNotifConfig | WebsockNotifConfig | 0..1 | Provides details to negotiate and signal the use of a Websocket connection between RNIS and the service consumer for notifications. See note. |
| \_links | Structure (inlined) | 0..1 | Hyperlink related to the resource. This shall be only included in the HTTP responses and in HTTP PUT requests. |
| >self | LinkType | 1 | Self-referring URI. The URI shall be unique within the RNI API as it acts as an ID for the subscription. |
| filterCriteriaNrMrs | Structure (inlined) | 1 | List of filtering criteria for the subscription. Any filtering criteria from below, which is included in the request, shall also be included in the response. |
| >appInstanceId | String | 0..1 | Unique identifier for the MEC application instance. |
| >associateId | AssociateId | 0..N | 0 to N identifiers to associate the information for a specific UE or flow. |
| >nrcgi | NRcgi | 0..N | NR Cell Global Identifier. |
| >triggerNr | TriggerNr | 0..N | Corresponds to a specific 5G UE Measurement Report trigger. |
| expiryDeadline | TimeStamp | 0..1 | Time stamp. |
| NOTE: At least one of callbackReference and websockNotifConfig shall be provided by the service consumer. If both are provided, it is up to RNIS to choose an alternative and return only that alternative in the response, specified in ETSI GS MEC 009 [6], as described in clause 6.12a. | | | |

6.3.12 Type: WebsockNotifConfig

This type represents configuration for the delivery of subscription notifications over Websockets per the pattern defined in defined in clause 6.12a of ETSI GS MEC 009 [6].

**Table 6.3.12-1: Attributes of the WebsockNotifConfig**

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| websocketUri | Uri | 0..1 | Set by RNIS to indicate to the service consumer the Websocket URI to be used for delivering notifications. |
| requestWebsocketUri | Boolean | 0..1 | Set to true by the service consumer to indicate that Websocket delivery is requested. |

## 6.4 Notification data types

### 6.4.1 Introduction

This clause defines data structures that define notifications.

### 6.4.2 Type: CellChangeNotification

This type represents a notification from RNIS with regards to cell change procedure. The Notification is sent by the Radio Network Information Service to inform about the Cell Change of a UE.

The attributes of the CellChangeNotification shall follow the indications provided in table 6.4.2-1.

Table 6.4.2-1: Attributes of the CellChangeNotification

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| notificationType | String | 1 | Shall be set to "CellChangeNotification". |
| timeStamp | TimeStamp | 0..1 | Time stamp. |
| associateId | AssociateId | 0..N | 0 to N identifiers to associate the event for a specific UE or flow. |
| srcEcgi | Ecgi | 1 | E-UTRAN Cell Global Identifier of the source cell. |
| trgEcgi | Ecgi | 1..N | E-UTRAN Cell Global Identifier of the target cell. See note. |
| hoStatus | Enum | 1 | Indicate the status of the UE handover procedure. Values are defined as following:  1 = IN\_PREPARATION.  2 = IN\_EXECUTION.  3 = COMPLETED.  4 = REJECTED.  5 = CANCELLED. |
| tempUeId | Structure (inlined) | 0..1 | The temporary identifier allocated for the specific UE as defined below. |
| >mmec | String | 1 | MMEC as defined in ETSI TS 136 413 [i.3]. |
| >mtmsi | String | 1 | M-TMSI as defined in ETSI TS 136 413 [i.3]. |
| \_links | 1 | Structure (inlined) | Links to resources related to this notification. |
| >subscription | 1 | LinkType | A link to the related subscription. |
| NOTE: Cardinality N is valid only in case of statuses IN\_PREPARATION, REJECTED and CANCELLED. | | | |

### 6.4.3 Type: RabEstNotification

This type represents a notification from RNIS with regards to RAB establishment procedure. The Notification is sent by the Radio Network Information Service to inform about the Radio Access Bearer establishment.

The attributes of the RabEstNotification shall follow the indications provided in table 6.4.3-1.

Table 6.4.3-1: Attributes of the RabEstNotification

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| notificationType | String | 1 | Shall be set to "RabEstNotification". |
| timeStamp | TimeStamp | 0..1 | Time stamp. |
| ecgi | Ecgi | 1 | E-UTRAN Cell Global Identifier. |
| associateId | AssociateId | 0..N | 0 to N identifiers to bind the event for a specific UE or flow. |
| erabId | Integer | 1 | The attribute that uniquely identifies a Radio Access bearer for specific UE as defined in ETSI TS 136 413 [i.3]. |
| erabQosParameters | Structure (inlined) | 0..1 | QoS parameters for the E-RAB as defined below. |
| >qci | Integer | 1 | QoS Class Identifier as defined in ETSI TS 123 401 [i.4]. |
| >qosInformation | Structure (inlined) | 0..1 | The QoS information for the E-RAB. |
| >>erabMbrDl | Integer | 1 | This attribute indicates the maximum downlink E-RAB Bit Rate as defined in ETSI TS 123 401 [i.4] for this bearer. |
| >>erabMbrUl | Integer | 1 | This attribute indicates the maximum uplink E-RAB Bit Rate as defined in ETSI TS 123 401 [i.4] for this bearer. |
| >>erabGbrDl | Integer | 1 | This attribute indicates the guaranteed downlink E-RAB Bit Rate as defined in ETSI TS 123 401 [i.4] for this bearer. |
| >>erabGbrUl | Integer | 1 | This attribute indicates the guaranteed uplink E-RAB Bit Rate as defined in ETSI TS 123 401 [i.4] for this bearer. |
| tempUeId | Structure (inlined) | 0..1 | The temporary identifier allocated for the specific UE as defined below. |
| >mmec | String | 1 | MMEC as defined in ETSI TS 136 413 [i.3]. |
| >mtmsi | String | 1 | M-TMSI as defined in ETSI TS 136 413 [i.3]. |
| \_links | 1 | Structure (inlined) | Links to resources related to this notification. |
| >subscription | 1 | LinkType | A link to the related subscription. |

### 6.4.4 Type: RabModNotification

This type represents a notification from RNIS with regards to RAB modification procedure. The Notification is sent by the Radio Network Information Service to inform about the modification of a Radio Access Bearer.

The attributes of the RabModNotification shall follow the indications provided in table 6.4.4-1.

Table 6.4.4-1: Attributes of the RabModNotification

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| notificationType | String | 1 | Shall be set to "RabModNotification". |
| timeStamp | TimeStamp | 0..1 | Time stamp. |
| ecgi | Ecgi | 1 | E-UTRAN Cell Global Identifier. |
| associateId | AssociateId | 0..N | 0 to N identifiers to bind the event for a specific UE or flow. |
| erabId | Integer | 1 | The attribute that uniquely identifies a Radio Access bearer for specific UE as defined in ETSI TS 136 413 [i.3]. |
| erabQosParameters | Structure (inlined) | 0..1 | The QoS parameters for the E-RAB as defined below. |
| >qci | Integer | 1 | QoS Class Identifier as defined in ETSI TS 123 401 [i.4]. |
| >qosInformation | Structure (inlined) | 0..1 | The QoS Information for the E-RAB as defined below. |
| >>erabMbrDl | Integer | 1 | This attribute indicates the maximum downlink E-RAB Bit Rate as defined in ETSI TS 123 401 [i.4] for this bearer. |
| >>erabMbrUl | Integer | 1 | This attribute indicates the maximum uplink E-RAB Bit Rate as defined in ETSI TS 123 401 [i.4] for this bearer. |
| >>erabGbrDl | Integer | 1 | This attribute indicates the guaranteed downlink E-RAB Bit Rate as defined in ETSI TS 123 401 [i.4] for this bearer. |
| >>erabGbrUl | Integer | 1 | This attribute indicates the guaranteed uplink E-RAB Bit Rate as defined in ETSI TS 123 401 [i.4] for this bearer. |
| \_links | 1 | Structure (inlined) | Links to resources related to this notification. |
| >subscription | 1 | LinkType | A link to the related subscription. |

### 6.4.5 Type: RabRelNotification

This type represents a notification from RNIS with regards to RAB release procedure. The Notification is sent by the Radio Network Information Service to inform about the release of a Radio Access Bearer.

The attributes of the RabRelNotification shall follow the indications provided in table 6.4.5-1.

Table 6.4.5-1: Attributes of the RabRelNotification

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| notificationType | String | 1 | Shall be set to "RabRelNotification". |
| timeStamp | TimeStamp | 0..1 | Time stamp. |
| ecgi | Ecgi | 1 | E-UTRAN Cell Global Identifier. |
| associateId | AssociateId | 0..N | 0 to N identifiers to bind the event for a specific UE or flow as defined below. |
| erabReleaseInfo | Structure (inlined) | 1 | The release information for the E-RAB as defined below. |
| >erabId | Integer | 1 | The attribute that uniquely identifies a Radio Access bearer for specific UE as defined in ETSI TS 136 413 [i.3]. |
| \_links | 1 | Structure (inlined) | Links to resources related to this notification. |
| >subscription | 1 | LinkType | A link to the related subscription. |

### 6.4.6 Type: MeasRepUeNotification

This type represents a notification from RNIS with regards to UE measurement report.

The Notification is sent by the Radio Network Information Service to send information about the measurement report received from the UE.

The attributes of the MeasRepUeNotification shall follow the indications provided in table 6.4.6-1.

Table 6.4.6-1: Attributes of the MeasRepUeNotification

| Attribute name | Data type | Cardinality | Description |
| --- | --- | --- | --- |
| notificationType | String | 1 | Shall be set to "MeasRepUeNotification". |
| timeStamp | TimeStamp | 0..1 | Time stamp. |
| ecgi | Ecgi | 1 | E-UTRAN Cell Global Identifier of the Primary serving Cell (PCell), as defined in ETSI TS 136 331 [i.7]. |
| associateId | AssociateId | 0..N | 0 to N identifiers to associate the event for a specific UE or flow. |
| rsrp | Uint8 | 1 | Reference Signal Received Power as defined in ETSI TS 136 214 [i.5]. |
| rsrpEx | Uint8 | 0..1 | Extended Reference Signal Received Power, with value mapping defined in ETSI TS 136 133 [i.16]. |
| rsrq | Uint8 | 1 | Reference Signal Received Quality as defined in ETSI TS 136 214 [i.5]. |
| rsrqEx | Uint8 | 0..1 | Extended Reference Signal Received Quality, with value mapping defined in ETSI TS 136 133 [i.16]. |
| sinr | Uint8 | 0..1 | Reference Signal "Signal to Interference plus Noise Ratio", with value mapping defined in ETSI TS 136 133 [i.16]. |
| trigger | Trigger | 1 | Corresponds to a specific E-UTRAN UE Measurement Report trigger. |
| eutranNeighbourCellMeasInfo | Structure (inlined) | 0..N | This parameter can be repeated to contain information of all the neighbouring cells up to N. |
| >ecgi | Ecgi | 1 | E-UTRAN Cell Global Identifier. |
| >rsrp | Uint8 | 0..1 | Reference Signal Received Power as defined in ETSI TS 136 214 [i.5]. |
| >rsrpEx | Uint8 | 0..1 | Extended Reference Signal Received Power, with value mapping defined in ETSI TS 136 133 [i.16]. |
| >rsrq | Uint8 | 0..1 | Reference Signal Received Quality as defined in ETSI TS 136 214 [i.5]. |
| >rsrqEx | Uint8 | 0..1 | Extended Reference Signal Received Quality, with value mapping defined in ETSI TS 136 133 [i.16]. |
| >sinr | Uint8 | 0..1 | Reference Signal "Signal to Interference plus Noise Ratio", with value mapping defined in ETSI TS 136 133 [i.16]. |
| carrierAggregationMeasInfo | Structure (inlined) | 0..N | This parameter can be repeated to contain information of all the carriers assign for Carrier Aggregation up to N. |
| >cellIdSrv | CellId | 1 | E-UTRAN Cell Identity of a Secondary serving Cell (SCell), as defined in ETSI TS 136 331 [i.7]. |
| >rsrpSrv | Uint8 | 0..1 | Reference Signal Received Power as defined in ETSI TS 136 214 [i.5]. |
| >rsrpSrvEx | Uint8 | 0..1 | Extended Reference Signal Received Power, with value mapping defined in ETSI TS 136 133 [i.16]. |
| >rsrqSrv | Uint8 | 0..1 | Reference Signal Received Quality as defined in ETSI TS 136 214 [i.5]. |
| >rsrqSrvEx | Uint8 | 0..1 | Extended Reference Signal Received Quality, with value mapping defined in ETSI TS 136 133 [i.16]. |
| >sinrSrv | Uint8 | 0..1 | Reference Signal "Signal to Interference plus Noise Ratio", with value mapping defined in ETSI TS 136 133 [i.16]. |
| >cellIdNei | CellId | 0..1 | E-UTRAN Cell Identity of the best neighbouring cell (NCell) associated with the SCell, as defined in ETSI TS 136 331 [i.7]. |
| >rsrpNei | Uint8 | 0..1 | Reference Signal Received Power as defined in ETSI TS 136 214 [i.5]. |
| >rsrpNeiEx | Uint8 | 0..1 | Extended Reference Signal Received Power, with value mapping defined in ETSI TS 136 133 [i.16]. |
| >rsrqNei | Uint8 | 0..1 | Reference Signal Received Quality as defined in ETSI TS 136 214 [i.5]. |
| >rsrqNeiEx | Uint8 | 0..1 | Extended Reference Signal Received Quality, with value mapping defined in ETSI TS 136 133 [i.16]. |
| >sinrNei | Uint8 | 0..1 | Reference Signal "Signal to Interference plus Noise Ratio", with value mapping defined in ETSI TS 136 133 [i.16]. |
| heightUe | Int | 0..1 | Indicates height of the UE in meters relative to the sea level as defined in ETSI TS 136 331 [i.7]. |
| newRadioMeasInfo | Structure (inlined) | 0..N | 5G New Radio secondary serving cells measurement information. |
| >nrCarrierFreq | Uint32 | 1 | ARFCN applicable for a downlink, uplink or bi-directional (TDD) NR carrier frequency, as defined in ETSI TS 138 101 [i.15]. |
| >nrSCs | Structure (inlined) | 1 | Measurement quantities concerning the secondary serving cells. |
| >>nrSCellInfo | Structure (inlined) | 1..N | Secondary serving cell(s) info. |
| >>>nrSCellPlmn | Plmn | 1..N | Public land mobile network identities. |
| >>>nrSCellGId | NrCellId | 1 | Cell Global Identifier, as defined in ETSI TS 138 331 [i.13]. |
| >>nrSCellRsrp | Uint8 | 0..1 | Reference Signal Received Power measurement according to mapping table in ETSI TS 138 133 [i.14]. |
| >>nrSCellRsrq | Uint8 | 0..1 | Reference Signal Received Quality measurement according to mapping table in ETSI TS 138 133 [i.14]. |
| >>nrSCellRssi | Uint8 | 0..1 | Reference signal SINR measurement according to mapping table in ETSI TS 138 133 [i.14]. |
| >nrBNCs | Structure (inlined) | 0..1 | Measurement quantities concerning the best neighbours of the secondary serving cells. |
| >>nrBNCellInfo | Structure (inlined) | 1..N | Best neighbours of the secondary serving cell(s) info. |
| >>>nrBNCellPlmn | Plmn | 1..N | Public land mobile network identities. |
| >>>nrBNCellGId | NrCellId | 1 | Cell Global Identifier, as defined in ETSI TS 138 331 [i.13]. |
| >>nrBNCellRsrp | Uint8 | 0..1 | Reference Signal Received Power measurement according to mapping table in ETSI TS 138 133 [i.14]. |
| >>nrBNCellRsrq | Uint8 | 0..1 | Reference Signal Received Quality measurement according to mapping table in ETSI TS 138 133 [i.14]. |
| >>nrBNCellRssi | Uint8 | 0..1 | Reference signal SINR measurement according to mapping table in ETSI TS 138 133 [i.14]. |
| newRadioMeasNeiInfo | Structure (inlined) | 0..N | Measurement quantities concerning the 5G NR neighbours. |
| >nrNCellInfo | Structure (inlined) | 1..N | 5G NR neighbour cell info. |
| >>nrNCellPlmn | Plmn | 1..N | Public land mobile network identities. |
| >>nrNCellGId | NrCellId | 1 | Cell Global Identifier, as defined in ETSI TS 138 331 [i.13]. |
| >nrNCellRsrp | Uint8 | 0..1 | Reference Signal Received Power measurement according to mapping table in ETSI TS 138 133 [i.14]. |
| >nrNCellRsrq | Uint8 | 0..1 | Reference Signal Received Quality measurement according to mapping table in ETSI TS 138 133 [i.14]. |
| >nrNCellRssi | Uint8 | 0..1 | Reference signal SINR measurement according to mapping table in ETSI TS 138 133 [i.14]. |
| >rsIndexResults | RsIndexResults | 0..1 | Beam level measurements results of a NR cell. |
| \_links | 1 | Structure (inlined) | Links to resources related to this notification. |
| >subscription | 1 | LinkType | A link to the related subscription. |

### 6.4.7 Type: MeasTaNotification

This type represents a notification from RNIS with regards to UE Timing Advance measurements.

The Notification is sent by the Radio Network Information Service to send information about the Timing Advance value received from the UE.

The attributes of the MeasTaNotification shall follow the indications provided in table 6.4.7-1.

Table 6.4.7-1: Attributes of the MeasTaNotification

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| notificationType | String | 1 | Shall be set to "MeasTaNotification". |
| timeStamp | TimeStamp | 0..1 | Time stamp. |
| ecgi | Ecgi | 1 | E-UTRAN Cell Global Identifier. |
| associateId | AssociateId | 0..N | 0 to N identifiers to associate the event for a specific UE or flow. |
| timingAdvance | Uint32 | 1 | The timing advance as defined in ETSI TS 136 214 [i.5]. |
| \_links | 1 | Structure (inlined) | Links to resources related to this notification. |
| >subscription | 1 | LinkType | A link to the related subscription. |

### 6.4.8 Type: CaReconfNotification

This type represents a notification from RNIS with regards to UE carrier aggregation reconfigurations.

The Notification is sent by the Radio Network Information Service to send information about the changes in the carrier aggregation configuration for a UE.

The attributes of the CaReconfNotification shall follow the indications provided in table 6.4.8-1.

Table 6.4.8-1: Attributes of the CaReconfNotification

| Attribute name | Data type | Cardinality | Description |
| --- | --- | --- | --- |
| notificationType | String | 1 | Shall be set to "CaReconfNotification". |
| timeStamp | TimeStamp | 0..1 | Time stamp. |
| ecgi | Ecgi | 1 | E-UTRAN Cell Global Identifier. |
| associateId | AssociateId | 0..N | 0 to N identifiers to associate the event for a specific UE or flow. |
| secondaryCellAdd | Structure (inlined) | 0..N |  |
| >ecgi | Ecgi | 1 | E-UTRAN Cell Global Identifier. |
| secondaryCellRemove | Structure (inlined) | 0..N |  |
| >ecgi | Ecgi | 1 | E-UTRAN Cell Global Identifier. |
| carrierAggregationMeasInfo | Structure (inlined) | 0..N | This parameter can be repeated to contain information of all the carriers assign for Carrier Aggregation up to N. |
| >cellIdSrv | CellId | 1 | E-UTRAN Cell Identity of a Carrier Aggregation serving cell. |
| >rsrpSrv | Uint32 | 0..1 | Reference Signal Received Power as defined in ETSI TS 136 214 [i.5]. |
| >rsrqSrv | Uint32 | 0..1 | Reference Signal Received Quality as defined in ETSI TS 136 214 [i.5]. |
| >cellIdNei | CellId | 1 | E-UTRAN Cell Identity of the best neighbouring cell associated with the Carrier Aggregation serving cell. |
| >rsrpNei | Uint32 | 0..1 | Reference Signal Received Power as defined in ETSI TS 136 214 [i.5]. |
| >rsrqNei | Uint32 | 0..1 | Reference Signal Received Quality as defined in ETSI TS 136 214 [i.5]. |
| \_links | 1 | Structure (inlined) | Links to resources related to this notification. |
| >subscription | 1 | LinkType | A link to the related subscription. |

### 6.4.9 Type: ExpiryNotification

This type represents a notification from RNIS with regards to expiry of the existing subscription.

The Notification is sent by the Radio Network Information Service to send information about expiry of a subscription.

Table 6.4.9-1: Attributes of the ExpiryNotification

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| notificationType | String | 1 | Shall be set to "ExpiryNotification" |
| timeStamp | TimeStamp | 0..1 | Time stamp of the notification. |
| \_links | Structure (inlined) | 1 | List of hyperlinks related to the resource. |
| >subscription | LinkType | 1 | URI identifying the subscription which has expired. |
| expiryDeadline | TimeStamp | 1 | Time stamp of the notification expiry. |

### 6.4.10 Type: S1BearerNotification

This type represents a notification from RNIS. The notification is sent by the Radio Network Information Service to inform about the S1 bearer information of specific UEs.

The attributes of the S1BearerNotification shall follow the indications provided in table 6.4.10-1.

Table 6.4.10-1 Attributes of the S1BearerNotification

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| notificationType | String | 1 | Shall be set to "S1BearerNotification". |
| timeStamp | TimeStamp | 0..1 | Time stamp. |
| s1Event | Enum | 1 | The subscribed event that triggered this notification in S1BearerSubscription. |
| s1UeInfo | Structure (inlined) | 1 | Information on specific UE that matches the criteria in S1BearerSubscription as defined below. |
| >tempUeId | Structure (inlined) | 0..1 | The temporary identifier allocated for the specific UE as defined below. |
| >>mmec | String | 1 | MMEC as defined in ETSI TS 136 413 [i.3]. |
| >>mtmsi | String | 1 | M-TMSI as defined in ETSI TS 136 413 [i.3]. |
| >associateId | AssociateId | 0..N | 0 to N identifiers to associate the information for a specific UE or flow. |
| >ecgi | Ecgi | 1..N | E-UTRAN Cell Global Identifier. |
| >s1BearerInfo | Structure (inlined) | 1..N | S1 bearer information as defined below. |
| >>erabId | Integer | 1 | The attribute that uniquely identifies a S1 bearer for a specific UE, as defined in ETSI TS 136 413 [i.3]. |
| >>enbInfo | Structure (inlined) | 1 | S1 bearer information on eNB side as defined below. |
| >>>ipAddress | String | 1 | eNB transport layer address of this S1 bearer. |
| >>>tunnelId | String | 1 | eNB GTP-U TEID of this S1 bearer. |
| >>sGwInfo | Structure (inlined) | 1 | S1 bearer information on GW side as defined below. |
| >>>ipAddress | String | 1 | SGW transport layer address of this S1 bearer. |
| >>>tunnelId | String | 1 | SGW GTP-U TEID of this S1 bearer. |
| \_links | 1 | Structure (inlined) | Links to resources related to this notification. |
| >subscription | 1 | LinkType | A link to the related subscription. |

### 6.4.11 Type: NrMeasRepUeNotification

This type represents a notification from RNIS with regards to 5G UE measurement report for UEs.

The Notification is sent by the Radio Network Information Service to send information about the 5G UE measurement report received from the UE.

The attributes of the NrMeasRepUeNotification shall follow the indications provided in table 6.4.11-1.

Table 6.4.11-1: Attributes of the NrMeasRepUeNotification

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| notificationType | String | 1 | Shall be set to "NrMeasRepUeNotification". |
| timeStamp | TimeStamp | 0..1 | Time stamp. |
| associateId | AssociateId | 0..N | 0 to N identifiers to associate the event for a specific UE or flow. |
| triggerNr | TriggerNr | 1 | Corresponds to a specific 5G UE Measurement Report trigger. |
| servCellMeasInfo | Structure (inlined) | 0..N | This parameter can be repeated to contain information of all the serving cells up to N. |
| >nrcgi | Nrcgi | 1 | NR Cell Global Identifier. |
| >sCell | Structure (inlined) | 1 | Measurement information relating to this serving cell. |
| >>measQuantityResultsSsbCell | MeasQuantityResultsNr | 0..1 | Measurement quantity results relating to the Synchronization Signal Block. |
| >>measQuantityResultsCsiRsCell | MeasQuantityResultsNr | 0..1 | Measurement quantity results relating to the Channel State Information Reference Signal. |
| >>rsIndexResults | RsIndexResults | 0..1 | Beam level measurement information |
| >nCell | Structure (inlined) | 0..1 | Measurement information relating to the best neighbour of this serving cell. |
| >>measQuantityResultsSsbCell | MeasQuantityResultsNr | 0..1 | Measurement quantity results relating to the Synchronization Signal Block. |
| >>measQuantityResultsCsiRsCell | MeasQuantityResultsNr | 0..1 | Measurement quantity results relating to the Channel State Information Reference Signal. |
| >>rsIndexResults | RsIndexResults | 0..1 | Beam level measurement information |
| nrNeighCellMeasInfo | Structure (inlined) | 0..N | This parameter can be repeated to contain measurement information of all the neighbouring cells up to N. It shall not be included if eutraNeighCellMeasInfo is included. |
| >nrcgi | Nrcgi | 1 | NR Cell Global Identifier. |
| >measQuantityResultsSsbCell | MeasQuantityResultsNr | 0..1 | Measurement quantity results relating to the Synchronization Signal Block of the neighbouring cells. |
| >measQuantityResultsCsiRsCell | MeasQuantityResultsNr | 0..1 | Measurement quantity results relating to the Channel State Information Reference Signal of the neighbouring cells. |
| >rsIndexResults | RsIndexResults | 0..1 | Beam level measurement information. |
| eutraNeighCellMeasInfo | Structure (inlined) | 0..N | This parameter can be repeated to contain measurement information of all the neighbouring cells up to N. It shall not be included if nrNeighCellMeasInfo is included. |
| >ecgi | Ecgi | 1 | E-UTRAN Cell Global Identifier. |
| >rsrp | Uint8 | 0..1 | Reference Signal Received Power as defined in ETSI TS 138 331 [i.13]. |
| >rsrq | Uint8 | 0..1 | Reference Signal Received Quality as defined in ETSI TS 138 331 [i.13]. |
| >sinr | Uint8 | 0..1 | Reference Signal plus Interference Noise Ratio as defined in ETSI TS 138 331 [i.13]. |
| \_links | 1 | Structure (inlined) | Links to resources related to this notification. |
| >subscription | 1 | LinkType | A link to the related subscription. |

### 6.4.12 Type: TestNotification

This type represents a test notification from a Radio Network Information service to determine if the Websocket method is to be utilized for the RNIS to issue notifications for a subscription, as defined in clause 6.12a of ETSI GS MEC 009 [6].

Table 6.4.12-1: Attributes of the TestNotification

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| notificationType | String | 1 | Shall be set to "TestNotification". |
| \_links | Structure (inlined) | 1 | Hyperlink related to the resource. |
| >subscription | LinkType | 1 | URI identifying the subscription for the test notification. |

## 6.5 Referenced structured data types

### 6.5.1 Introduction

This clause defines data structures that are referenced from data structures defined in the previous clauses, but are neither resource representations nor bound to any pub/sub mechanism.

### 6.5.2 Type: LinkType

This type represents a type of link.

Table 6.5.2-1: Attributes of the LinkType

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| href | Uri | 1 | URI referring to a resource |

### 6.5.3 Type: TimeStamp

This type represents a time stamp.

Table 6.5.3-1: Attributes of the TimeStamp

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| seconds | Uint32 | 1 | The seconds part of the time. Time is defined as Unix‑time since January 1, 1970, 00:00:00 UTC. |
| nanoSeconds | Uint32 | 1 | The nanoseconds part of the time. Time is defined as Unix-time since January 1, 1970, 00:00:00 UTC. |

### 6.5.4 Type: AssociateId

This type represents an associated identifier for a UE or flow that can be referenced from the data structures.

Table 6.5.4-1: Attributes of the AssociateId

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute | Data type | Cardinality | Description |
| type | Enum | 1 | Numeric value (0-255) corresponding to specified type of identifier as following:  0 = reserved.  1= UE\_IPv4\_ADDRESS.  2 = UE\_IPV6\_ADDRESS.  3 = NATED\_IP\_ADDRESS.  4 = GTP\_TEID. |
| value | String | 1 | Value for the identifier. |

### 6.5.5 Type: Plmn

This type represents an Public Land Mobile Network Identity as defined in ETSI TS 136 413 [i.3] that can be referenced from the data structures.

Table 6.5.5-1: Attributes of the Plmn

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute | Data type | Cardinality | Description |
| mcc | String | 1 | The Mobile Country Code part of PLMN Identity as defined in ETSI TS 136 413 [i.3]. |
| mnc | String | 1 | The Mobile Network Code part of PLMN Identity as defined in ETSI TS 136 413 [i.3]. |

### 6.5.6 Type: Ecgi

This type represents an E-UTRAN Cell Global Identifier as defined in ETSI TS 136 413 [i.3] that can be referenced from the data structures.

Table 6.5.6-1: Attributes of the Ecgi

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute | Data type | Cardinality | Description |
| plmn | Plmn | 1 | Public Land Mobile Network Identity. |
| cellId | CellId | 1 | E-UTRAN Cell Global Identifier. |

### 6.5.7 Type: Nrcgi

This type represents an New Radio Cell Global Identifier as defined in ETSI TS 138 423 [i.17] that can be referenced from the data structures.

Table 6.5.7-1: Attributes of the Nrcgi

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute | Data type | Cardinality | Description |
| plmn | Plmn | 1 | Public Land Mobile Network Identity. |
| nrCellId | NrCellId | 1 | NR Cell Global Identifier. |

### 6.5.8 Type: RsIndexResults

This type represents an Beam level measurement results for a NR cell as defined in ETSI TS 138 331 [i.13] that can be referenced from the data structures.

Table 6.5.8-1: Attributes of the RsIndexResults

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute | Data type | Cardinality | Description |
| resultsSsbIndexes | ResultsPerSsbIndexList | 1 | Beam level measurement results based on SS/PBCH related measurements. |
| resultsCsiRsIndexes | ResultsPerCsiRsIndexList | 1 | Beam level measurement results based on CSI-RS related measurements. |

### 6.5.9 Type: ResultsPerSsbIndexList

This type represents an Beam level measurement results for a NR cell as defined in ETSI TS 138 331 [i.13] that can be referenced from the data structures.

Table 6.5.9-1: Attributes of the ResultsPerSsbIndexList

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute | Data type | Cardinality | Description |
| resultsPerSsbIndex | Structure (inline) | 0..N |  |
| >ssbIndex | Uint8 | 1 |  |
| >ssbResults | MeasQuantityResultsNr | 0..1 |  |

### 6.5.10 Type: ResultsPerCsiRsIndexList

This type represents an Beam level measurement results for a NR cell as defined in ETSI TS 138 331 [i.13] that can be referenced from the data structures.

Table 6.5.10-1: Attributes of the ResultsPerCsiRsIndexList

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute | Data type | Cardinality | Description |
| resultsPerCsiRsIndex | Structure (inline) | 0..N |  |
| >csiRsIndex | Uint8 | 1 |  |
| >csiRsResults | MeasQuantityResultsNr | 0..1 |  |

### 6.5.11 Type: MeasQuantityResultsNr

This type represents the collection of UE reported NR measurement quantity results as defined in ETSI TS 138 331 [i.13] that can be referenced from the data structures.

Table 6.5.11-1: Attributes of the MeasQuantityResultsNr

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute | Data type | Cardinality | Description |
| rsrp | Uint8 | 0..1 | Reference Signal Received Power as defined in ETSI TS 138 331 [i.13]. |
| rsrq | Uint8 | 0..1 | Reference Signal Received Quality as defined in ETSI TS 138 331 [i.13]. |
| sinr | Uint8 | 0..1 | Reference Signal to Interference & Noise Ratio as defined in ETSI TS 138 331 [i.13]. |

## 6.6 Referenced simple data types and enumerations

### 6.6.1 Introduction

This clause defines simple data types that are referenced from data structures defined in the previous clauses, but are neither resource representations nor bound to any pub/sub mechanism.

### 6.6.2 Simple data types

The simple data types defined in table 6.6.2-1 shall be supported.

Table 6.6.2-1: CellId

|  |  |
| --- | --- |
| Type name | Description |
| CellId | String representing the E-UTRAN Cell Identity. Encoded as a bit string (size (28)) as defined in ETSI TS 136 413 [i.3]. |
| NrCellId | String representing the NR Cell Identity. Encoded as a bit string (size (36)) as defined in ETSI TS 138 423 [i.17]. |

### 6.6.3 Enumeration: Trigger

The enumeration Trigger represents specified triggers for a UE Measurement Report. Full details can be found in ETSI TS 136 331 [i.7]). It shall comply with the provisions defined in table 6.6.3-1 and has a numeric value (0-255).

There are two main groupings:

* Intra Radio Access Technology: A1, A2, A3, A4, A5, A6, C1, C2, V1, V2, H1, H2, periodical (reportStrongestCells, reportCGI)
* Inter Radio Access Technology: B1, B2, W1, W2, W3, periodical (reportStrongestCells, reportStrongestCellsForSON, reportCGI)

Table 6.6.3-1: Enumeration Trigger

|  |  |
| --- | --- |
| Type name | Description |
| 0 = NOT\_AVAILABLE |  |
| 1 = PERIODICAL\_REPORT\_STRONGEST\_CELLS | Ref ETSI TS 136 331 [i.7] |
| 2 = PERIODICAL\_REPORT\_STRONGEST\_CELLS\_FOR\_SON | Ref ETSI TS 136 331 [i.7] |
| 3 = PERIODICAL\_REPORT\_CGI | Ref ETSI TS 136 331 [i.7] |
| 4 = INTRA\_PERIODICAL\_REPORT\_STRONGEST\_CELLS | Ref ETSI TS 136 331 [i.7] |
| 5 = INTRA\_PERIODICAL\_REPORT\_CGI | Ref ETSI TS 136 331 [i.7] |
| 10 = EVENT\_A1 | Ref ETSI TS 136 331 [i.7] |
| 11 = EVENT\_A2 | Ref ETSI TS 136 331 [i.7] |
| 12 = EVENT\_A3 | Ref ETSI TS 136 331 [i.7] |
| 13 = EVENT\_A4 | Ref ETSI TS 136 331 [i.7] |
| 14 = EVENT\_A5 | Ref ETSI TS 136 331 [i.7] |
| 15 = EVENT\_A6 | Ref ETSI TS 136 331 [i.7] |
| 20 = EVENT\_B1 | Ref ETSI TS 136 331 [i.7] |
| 21 = EVENT\_B2 | Ref ETSI TS 136 331 [i.7] |
| 20 = EVENT\_B1-NR | Ref ETSI TS 136 331 [i.7] |
| 21 = EVENT\_B2-NR | Ref ETSI TS 136 331 [i.7] |
| 30 = EVENT\_C1 | Ref ETSI TS 136 331 [i.7] |
| 31 = EVENT\_C2 | Ref ETSI TS 136 331 [i.7] |
| 40 = EVENT\_W1 | Ref ETSI TS 136 331 [i.7] |
| 41 = EVENT\_W2 | Ref ETSI TS 136 331 [i.7] |
| 42 = EVENT\_W3 | Ref ETSI TS 136 331 [i.7] |
| 50 = EVENT\_V1 | Ref ETSI TS 136 331 [i.7] |
| 51 = EVENT\_V2 | Ref ETSI TS 136 331 [i.7] |
| 60 = EVENT\_H1 | Ref ETSI TS 136 331 [i.7] |
| 61 = EVENT\_H2 | Ref ETSI TS 136 331 [i.7] |

### 6.6.4 Enumeration: TriggerNr

The enumeration Trigger represents specified triggers for a 5G UE Measurement Report. Full details can be found in ETSI TS 138 331 [i.13]). It shall comply with the provisions defined in table 6.6.4-1 and has a numeric value (0-255).

Table 6.6.4-1: Enumeration TriggerNr

|  |  |
| --- | --- |
| Type name | Description |
| 0 = NOT\_AVAILABLE |  |
| 1 = NR\_PERIODICAL | Ref ETSI TS 138 331 [i.13] |
| 2 = NR\_CGI | Ref ETSI TS 138 331 [i.13] |
| 10 = EVENT\_A1 | Ref ETSI TS 138 331 [i.13] |
| 11 = EVENT\_A2 | Ref ETSI TS 138 331 [i.13] |
| 12 = EVENT\_A3 | Ref ETSI TS 138 331 [i.13] |
| 13 = EVENT\_A4 | Ref ETSI TS 138 331 [i.13] |
| 14 = EVENT\_A5 | Ref ETSI TS 138 331 [i.13] |
| 15 = EVENT\_A6 | Ref ETSI TS 138 331 [i.13] |
| 20 = INTER\_RAT\_PERIODICAL | Ref ETSI TS 138 331 [i.13] |
| 21 = INTER\_RAT\_CGI | Ref ETSI TS 138 331 [i.13] |
| 30 = EVENT\_B1 | Ref ETSI TS 138 331 [i.13] |
| 31 = EVENT\_B2 | Ref ETSI TS 138 331 [i.13] |

# 7 API definition

## 7.1 Introduction

This clause defines the resources and operations of the Radio Network Information API (RNI API).

## 7.2 Global definitions and resource structure

All resource URIs of this API shall have the following root:

**{apiRoot}/{apiName}/{apiVersion}/**

"apiRoot" and "apiName" are discovered using the service registry. It includes the scheme ("https"), host and optional port, and an optional prefix string. The "apiName" shall be set to "rni" and "apiVersion" shall be set to "v2" for the current version of the specification. All resource URIs in the clauses below are defined relative to the above root URI.

The content format of JSON shall be supported.

The JSON format is signalled by the content type "application/json".

This API shall support HTTP over TLS (also known as HTTPS) using TLS version 1.2 as defined by IETF RFC 5246 [4]). TLS 1.3 (including the new specific requirements for TLS 1.2 implementations) defined by IETF RFC 8446 [7] should be supported. HTTP without TLS shall not be used. Versions of TLS earlier than 1.2 shall neither be supported nor used.

This API shall require the use of the OAuth 2.0 client credentials grant type according to IETF RFC 6749 [2] with bearer tokens according to IETF RFC 6750 [3]. See clause 6.16 of ETSI GS MEC 009 [6] for more information. The token endpoint can be discovered as part of the service availability query procedure defined in ETSI GS MEC 011 [i.6]. How the client credentials are provisioned into the MEC application is out of scope of the present document.

This API supports additional application-related error information to be provided in the HTTP response when an error occurs. See clause 6.15 of ETSI GS MEC 009 [6] for more information.

Figure 7.2-1 illustrates the resource URI structure of this API. Table 7.2-1 provides an overview of the resources defined by the present document, and the applicable HTTP methods.

//{apiRoot}/rni/v2

/queries

/subscriptions

/{subscriptionId}

/rab\_info

/plmn\_info

/s1\_bearer\_info

/layer2\_meas

Figure 7.2-1: Resource URI structure of the RNI API

Table 7.2-1: Resources and methods overview

|  |  |  |  |
| --- | --- | --- | --- |
| Resource name | Resource URI | HTTP method | Meaning |
| RAB information | /queries/rab\_info | GET | Retrieve current status of Radio Access Bearer information |
| PLMN information | /queries/plmn\_info | GET | Retrieve current status of PLMN information |
| S1 Bearer information | /queries/s1\_bearer\_info | GET | Retrieve current status of S1 bearer information |
| Layer 2 measurements | /queries/layer2\_meas | GET | Retrieve current status of layer 2 measurements information |
| All subscriptions for a subscriber | /subscriptions | GET | Retrieve a list of active subscriptions for this subscriber |
| POST | Create a new subscription |
| Existing subscription | /subscriptions/{subscriptionId} | GET | Retrieve information on current specific subscription |
| PUT | Modify existing subscription by sending a new data structure |
| DELETE | Cancel the existing subscription |
| Notification callback | Client provided callback reference | POST | Send a notification |

## 7.3 Resource: rab\_info

### 7.3.1 Description

This resource is queried to retrieve information on Radio Access Bearers.

### 7.3.2 Resource definition

Resource URI: **{apiRoot}/rni/v2/queries/rab\_info**

This resource shall support the resource URI variables defined in table 7.3.2-1.

Table 7.3.2-1: Resource URI variables for resource "rab\_info"

|  |  |
| --- | --- |
| Name | Definition |
| apiRoot | See clause 7.2 |

### 7.3.3 Resource methods

#### 7.3.3.1 GET

The GET method is used to query information about the Radio Access Bearers.

This method shall support the URI query parameters, request and response data structures, and response codes, as specified in tables 7.3.3.1-1 and 7.3.3.1-2.

Table 7.3.3.1-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Data type | Cardinality | Remarks |
| app\_ins\_id | String | 0..1 | Comma separated list of application instance identifiers |
| cell\_id | CellId | 0..N | Comma separated list of E-UTRAN Cell Identities |
| ue\_ipv4\_address | String | 0..N | Comma separated list of IE IPv4 addresses as defined for the type for AssociateId in clause 6.5.4 |
| ue\_ipv6\_address | String | 0..N | Comma separated list of IE IPv6 addresses as defined for the type for AssociateId in clause 6.5.4 |
| nated\_ip\_address | String | 0..N | Comma separated list of NATed IP addresses as defined for the type for AssociateId in clause 6.5.4 |
| gtp\_teid | String | 0..N | Comma separated list of GTP TEID addresses as defined for the type for AssociateId in clause 6.5.4 |
| erab\_id | Integer | 0..1 | E-RAB identifier |
| qci | Integer | 0..1 | QoS Class Identifier as defined in ETSI TS 123 401 [i.4] |
| erab\_mbr\_dl | Integer | 0..1 | Maximum downlink E-RAB Bit Rate as defined in ETSI TS 123 401 [i.4] |
| erab\_mbr\_ul | Integer | 0..1 | Maximum uplink E-RAB Bit Rate as defined in ETSI TS 123 401 [i.4] |
| erab\_gbr\_dl | Integer | 0..1 | Guaranteed downlink E-RAB Bit Rate as defined in ETSI TS 123 401 [i.4] |
| erab\_gbr\_ul | Integer | 0..1 | Guaranteed uplink E-RAB Bit Rate as defined in ETSI TS 123 401 [i.4] |

Table 7.3.3.1-2: Data structures supported by the GET request/response on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| n/a |  |  | |
| Response body | Data type | Cardinality | Response  Codes | Remarks |
| RabInfo | 1 | 200 OK | Upon success, a response body containing the Radio Access Bearer information is returned. |
| ProblemDetails | 0..1 | 400 Bad Request | It is used to indicate that incorrect parameters were passed in the request. This error condition can also occur if the target area for the request is considered too large.  In the returned ProblemDetails structure, the "detail" attribute should convey more information about the error. |
| ProblemDetails | 0..1 | 401 Unauthorized | It is used when the client did not submit credentials.  In the returned ProblemDetails structure, the "detail" attribute should convey more information about the error. |
| ProblemDetails | 1 | 403 Forbidden | The operation is not allowed given the current status of the resource.  More information shall be provided in the "detail" attribute of the "ProblemDetails" structure. |
| ProblemDetails | 0..1 | 404 Not Found | It is used when a client provided a URI that cannot be mapped to a valid resource URI.  In the returned ProblemDetails structure, the "detail" attribute should convey more information about the error. |
| ProblemDetails | 0..1 | 406 Not Acceptable | It is used to indicate that the server cannot provide the any of the content formats supported by the client.  In the returned ProblemDetails structure, the "detail" attribute should convey more information about the error. |
| ProblemDetails | 0..1 | 429 Too Many Requests | It is used when a rate limiter has triggered.  In the returned ProblemDetails structure, the "detail" attribute should convey more information about the error. |

#### 7.3.3.2 PUT

Not applicable.

#### 7.3.3.3 PATCH

Not applicable.

#### 7.3.3.4 POST

Not applicable.

#### 7.3.3.5 DELETE

Not applicable.

## 7.4 Resource: plmn\_info

### 7.4.1 Description

This resource is queried to retrieve information on the underlying Mobile Network that the MEC application is associated to.

### 7.4.2 Resource definition

Resource URI: **{apiRoot}/rni/v2/queries/plmn\_info**

This resource shall support the resource URI variables defined in table 7.4.2-1.

Table 7.4.2-1: Resource URI variables for resource "plmn\_info"

|  |  |
| --- | --- |
| Name | Definition |
| apiRoot | See clause 7.2 |

### 7.4.3 Resource methods

#### 7.4.3.1 GET

The GET method is used to query information about the Mobile Network.

This method shall support the URI query parameters, request and response data structures, and response codes, as specified in tables 7.4.3.1-1 and 7.4.3.1-2.

Table 7.4.3.1-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Data type | Cardinality | Remarks |
| app\_ins\_id | String | 1..N | Comma separated list of application instance identifiers |

Table 7.4.3.1-2: Data structures supported by the GET request/response on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| n/a |  |  | |
| Response body | Data type | Cardinality | Response  Codes | Remarks |
| PlmnInfo | 0..N | 200 OK | Upon success, a response body containing the array of Mobile Network information is returned. |
| ProblemDetails | 0..1 | 400 Bad Request | It is used to indicate that incorrect parameters were passed to the request.  In the returned ProblemDetails structure, the "detail" attribute should convey more information about the error. |
| ProblemDetails | 0..1 | 401 Unauthorized | It is used when the client did not submit credentials.  In the returned ProblemDetails structure, the "detail" attribute should convey more information about the error. |
| ProblemDetails | 1 | 403 Forbidden | The operation is not allowed given the current status of the resource.  More information shall be provided in the "detail" attribute of the "ProblemDetails" structure. |
| ProblemDetails | 0..1 | 404 Not Found | It is used when a client provided a URI that cannot be mapped to a valid resource URI.  In the returned ProblemDetails structure, the "detail" attribute should convey more information about the error. |
| ProblemDetails | 0..1 | 406 Not Acceptable | It is used to indicate that the server cannot provide the any of the content formats supported by the client.  In the returned ProblemDetails structure, the "detail" attribute should convey more information about the error. |
| ProblemDetails | 0..1 | 429 Too Many Requests | It is used when a rate limiter has triggered.  In the returned ProblemDetails structure, the "detail" attribute should convey more information about the error. |

#### 7.4.3.2 PUT

Not applicable.

#### 7.4.3.3 PATCH

Not applicable.

#### 7.4.3.4 POST

Not applicable.

#### 7.4.3.5 DELETE

Not applicable.

## 7.5 Resource: s1\_bearer\_info

### 7.5.1 Description

This resource is queried to retrieve S1-U bearer information related to specific UE(s).

### 7.5.2 Resource definition

Resource URI: **{apiRoot}/rni/v2/queries/s1\_bearer\_info**

This resource shall support the resource URI variables defined in table 7.5.2-1.

Table 7.5.2-1: Resource URI variables for resource "s1\_bearer\_info"

|  |  |
| --- | --- |
| Name | Definition |
| apiRoot | See clause 7.2 |

### 7.5.3 Resource methods

#### 7.5.3.1 GET

The GET method is used to query information about the S1 bearer(s).

This method shall support the URI query parameters, request and response data structures, and response codes, as specified in tables 7.5.3.1-1 and 7.5.3.1-2.

Table 7.5.3.1-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Data type | Cardinality | Remarks |
| temp\_ue\_id | String | 0..N | Comma separated list of temporary identifiers allocated for the specific UEs as defined in ETSI TS 136 413 [i.3]. |
| ue\_ipv4\_address | String | 0..N | Comma separated list of IE IPv4 addresses as defined for the type for AssociateId in clause 6.5.4. |
| ue\_ipv6\_address | String | 0..N | Comma separated list of IE IPv6 addresses as defined for the type for AssociateId in clause 6.5.4. |
| nated\_ip\_address | String | 0..N | Comma separated list of NATed IP addresses as defined for the type for AssociateId in clause 6.5.4. |
| gtp\_teid | String | 0..N | Comma separated list of GTP TEID addresses as defined for the type for AssociateId in clause 6.5.4. |
| cell\_id | CellId | 0..N | Comma separated list of E-UTRAN Cell Identities. |
| erab\_id | Integer | 0..N | Comma separated list of E-RAB identifiers. |

Table 7.5.3.1-2: Data structures supported by the GET request/response on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| n/a |  |  | |
| Response body | Data type | Cardinality | Response  Codes | Remarks |
| S1BearerInfo | 1 | 200 OK | Upon success, a response body containing the UE S1-U bearer information is returned. |
| ProblemDetails | 0..1 | 400 Bad Request | It is used to indicate that incorrect parameters were passed to the request.  In the returned ProblemDetails structure, the "detail" attribute should convey more information about the error. |
| ProblemDetails | 0..1 | 401 Unauthorized | It is used when the client did not submit credentials.  In the returned ProblemDetails structure, the "detail" attribute should convey more information about the error. |
| ProblemDetails | 1 | 403 Forbidden | The operation is not allowed given the current status of the resource.  More information shall be provided in the "detail" attribute of the "ProblemDetails" structure. |
| ProblemDetails | 0..1 | 404 Not Found | It is used when a client provided a URI that cannot be mapped to a valid resource URI.  In the returned ProblemDetails structure, the "detail" attribute should convey more information about the error. |
| ProblemDetails | 0..1 | 406 Not Acceptable | It is used to indicate that the server cannot provide the any of the content formats supported by the client.  In the returned ProblemDetails structure, the "detail" attribute should convey more information about the error. |
| ProblemDetails | 0..1 | 429 Too Many Requests | It is used when a rate limiter has triggered.  In the returned ProblemDetails structure, the "detail" attribute should convey more information about the error. |

#### 7.5.3.2 PUT

Not applicable.

#### 7.5.3.3 PATCH

Not applicable.

#### 7.5.3.4 POST

Not applicable.

#### 7.5.3.5 DELETE

Not applicable.

## 7.5a Resource: layer2\_meas

### 7.5a.1 Description

This resource is queried to retrieve information on layer 2 measurements.

### 7.5a.2 Resource definition

Resource URI: **{apiRoot}/rni/v2/queries/layer2\_meas**

This resource shall support the resource URI variables defined in table 7.5a.2-1.

**Table 7.5a.2-1: Resource URI variables for resource "layer2\_meas"**

|  |  |
| --- | --- |
| Name | Definition |
| apiRoot | See clause 7.2 |

### 7.5a.3 Resource methods

#### 7.5a.3.1 GET

The GET method is used to query information about the layer 2 measurements.

This method shall support the URI query parameters, request and response data structures, and response codes, as specified in tables 7.5a.3.1-1 and 7.5a.3.1-2.

**Table 7.5a.3.1-1: URI query parameters supported by the GET method on this resource**

| Name | Data type | Cardinality | Remarks |
| --- | --- | --- | --- |
| app\_ins\_id | String | 0..1 | Comma separated list of application instance identifiers. |
| cell\_id | String | 0..N | Comma separated list of E-UTRAN Cell Identities each defined as a bit string (size (28)), as defined in ETSI TS 136 413 [i.3]. |
| ue\_ipv4\_address | String | 0..N | Comma separated list of IE IPv4 addresses as defined for the type for AssociateId in clause 6.5.4. |
| ue\_ipv6\_address | String | 0..N | Comma separated list of IE IPv6 addresses as defined for the type for AssociateId in clause 6.5.4. |
| nated\_ip\_address | String | 0..N | Comma separated list of NATed IP addresses as defined for the type for AssociateId in clause 6.5.4. |
| gtp\_teid | String | 0..N | Comma separated list of GTP TEID addresses as defined for the type for AssociateId in clause 6.5.4. |
| dl\_gbr\_prb\_usage\_cell | Integer (0..100) | 0..1 | It indicates the PRB usage for downlink GBR traffic, as defined in ETSI TS 136 314 [i.11] and ETSI TS 136 423 [i.12]. |
| ul\_gbr\_prb\_usage\_cell | Integer (0..100) | 0..1 | It indicates (in percentage) the PRB usage for uplink GBR traffic, as defined in ETSI TS 136 314 [i.11] and ETSI TS 136 423 [i.12]. |
| dl\_nongbr\_prb\_usage\_cell | Integer (0..100) | 0..1 | It indicates (in percentage) the PRB usage for downlink non‑GBR traffic, as defined in ETSI TS 136 314 [i.11] and ETSI TS 136 423 [i.12]. |
| ul\_nongbr\_prb\_usage\_cell | Integer (0..100) | 0..1 | It indicates (in percentage) the PRB usage for uplink non‑GBR traffic, as defined in ETSI TS 136 314 [i.11] and ETSI TS 136 423 [i.12]. |
| dl\_total\_prb\_usage\_cell | Integer (0..100) | 0..1 | It indicates (in percentage) the PRB usage for total downlink traffic, as defined in ETSI TS 136 314 [i.11] and ETSI TS 136 423 [i.12]. |
| ul\_total\_prb\_usage\_cell | Integer (0..100) | 0..1 | It indicates (in percentage) the PRB usage for total uplink traffic, as defined in ETSI TS 136 314 [i.11] and  ETSI TS 136 423 [i.12]. |
| received\_dedicated\_preambles\_cell | Integer (0..100) | 0..1 | It indicates (in percentage) the received dedicated preamples, as defined in ETSI TS 136 314 [i.11]. |
| received\_ randomly\_selecte \_preambles\_low\_range\_cell | Integer (0..100) | 0..1 | It indicates (in percentage) the received randomly selected preambles in the low range, as defined in ETSI TS 136 314 [i.11]. |
| received\_ randomly\_selected\_preambles\_high\_range\_cell | Integer (0..100) | 0..1 | It indicates (in percentage) the received randomly selected preambles in the high range, as defined in ETSI TS 136 314 [i.11]. |
| number\_of\_active\_ue\_dl\_gbr\_cell | Integer | 0..1 | It indicates the number of active UEs with downlink GBR traffic, as defined in ETSI TS 136 314 [i.11]. |
| number\_of\_active\_ue\_ul\_gbr\_cell | Integer | 0..1 | It indicates the number of active UEs with uplink GBR traffic, as defined in ETSI TS 136 314 [i.11]. |
| number\_of\_active\_ue\_dl\_nongbr\_cell | Integer | 0..1 | It indicates the number of active UEs with downlink non-GBR traffic, as defined in ETSI TS 136 314 [i.11]. |
| number\_of\_active\_ue\_ul\_nongbr\_cell | Integer | 0..1 | It indicates the number of active UEs with uplink non-GBR traffic, as defined in ETSI TS 136 314 [i.11]. |
| dl\_gbr\_pdr\_cell | Integer (0..100) | 0..1 | It indicates the packet discard rate in percentage of the downlink GBR traffic in a cell, as defined in ETSI TS 136 314 [i.11]. |
| ul\_gbr\_pdr\_cell | Integer (0..100) | 0..1 | It indicates the packet discard rate in percentage of the uplink GBR traffic in a cell, as defined in ETSI TS 136 314 [i.11]. |
| dl\_nongbr\_pdr\_cell | Integer (0..100) | 0..1 | It indicates the packet discard rate in percentage of the downlink non-GBR traffic in a cell, as defined in ETSI TS 136 314 [i.11]. |
| ul\_nongbr\_pdr\_cell | Integer (0..100) | 0..1 | It indicates the packet discard rate in percentage of the uplink non-GBR traffic in a cell, as defined in ETSI TS 136 314 [i.11]. |
| dl\_gbr\_delay\_ue | Integer | 0..1 | It indicates the packet delay of the downlink GBR traffic of a UE, as defined in ETSI TS 136 314 [i.11]. |
| ul\_gbr\_delay\_ue | Integer | 0..1 | It indicates the packet delay of the uplink GBR traffic of a UE, as defined in ETSI TS 136 314 [i.11]. |
| dl\_nongbr\_delay\_ue | Integer | 0..1 | It indicates the packet delay of the downlink non-GBR traffic of a UE, as defined in ETSI TS 136 314 [i.11]. |
| ul\_nongbr\_delay\_ue | Integer | 0..1 | It indicates the packet delay of the uplink non-GBR traffic of a UE, as defined in ETSI TS 136 314 [i.11]. |
| dl\_gbr\_pdr\_ue | Integer (0..100) | 0..1 | It indicates the packet discard rate in percentage of the downlink GBR traffic of a UE, as defined in ETSI TS 136 314 [i.11]. |
| ul\_gbr\_pdr\_ue | Integer (0..100) | 0..1 | It indicates the packet discard rate in percentage of the uplink GBR traffic of a UE, as defined in ETSI TS 136 314 [i.11]. |
| dl\_nongbr\_pdr\_ue | Integer (0..100) | 0..1 | It indicates the packet discard rate in percentage of the downlink non-GBR traffic of a UE, as defined in ETSI TS 136 314 [i.11]. |
| ul\_nongbr\_pdr\_ue | Integer (0..100) | 0..1 | It indicates the packet discard rate in percentage of the uplink non-GBR traffic of a UE, as defined in ETSI TS 136 314 [i.11]. |
| dl\_gbr\_throughput\_ue | Integer | 0..1 | It indicates the scheduled throughput of the downlink GBR traffic of a UE, as defined in ETSI TS 136 314 [i.11]. |
| ul\_gbr\_throughput\_ue | Integer | 0..1 | It indicates the scheduled throughput of the uplink GBR traffic of a UE, as defined in ETSI TS 136 314 [i.11]. |
| dl\_nongbr\_throughput\_ue | Integer | 0..1 | It indicates the scheduled throughput of the downlink non-GBR traffic of a UE, as defined in ETSI TS 136 314 [i.11]. |
| ul\_nongbr\_throughput\_ue | Integer | 0..1 | It indicates the scheduled throughput of the uplink non-GBR traffic of a UE, as defined in ETSI TS 136 314 [i.11]. |
| dl\_gbr\_data\_volume\_ue | Integer | 0..1 | It indicates the data volume of the downlink GBR traffic of a UE, as defined in ETSI TS 136 314 [i.11]. |
| ul\_gbr\_data\_volume\_ue | Integer | 0..1 | It indicates the data volume of the uplink GBR traffic of a UE, as defined in ETSI TS 136 314 [i.11]. |
| dl\_nongbr\_data\_volume\_ue | Integer | 0..1 | It indicates the data volume of the downlink non-GBR traffic of a UE, as defined in ETSI TS 136 314 [i.11]. |
| ul\_nongbr\_data\_volume\_ue | Integer | 0..1 | It indicates the data volume of the uplink non-GBR traffic of a UE, as defined in ETSI TS 136 314 [i.11]. |

**Table 7.5a.3.1-2: Data structures supported by the GET request/response on this resource**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| n/a |  |  | |
| Response body | Data type | Cardinality | Response  Codes | Remarks |
| L2Meas | 1 | 200 OK | Upon success, a response body containing the layer 2 measurements information is returned. |
| ProblemDetails | 0..1 | 400 Bad Request | It is used to indicate that incorrect parameters were passed in the request. This error condition can also occur if the target area for the request is considered too large.  In the returned ProblemDetails structure, the "detail" attribute should convey more information about the error. |
| ProblemDetails | 0..1 | 401 Unauthorized | It is used when the client did not submit credentials.  In the returned ProblemDetails structure, the "detail" attribute should convey more information about the error. |
| ProblemDetails | 1 | 403 Forbidden | The operation is not allowed given the current status of the resource.  More information shall be provided in the "detail" attribute of the "ProblemDetails" structure. |
| ProblemDetails | 0..1 | 404 Not Found | It is used when a client provided a URI that cannot be mapped to a valid resource URI.  In the returned ProblemDetails structure, the "detail" attribute should convey more information about the error. |
| ProblemDetails | 0..1 | 406 Not Acceptable | It is used to indicate that the server cannot provide the any of the content formats supported by the client.  In the returned ProblemDetails structure, the "detail" attribute should convey more information about the error. |
| ProblemDetails | 0..1 | 414 URI Too Long | It is used to indicate that the server is refusing to process the request because the request URI is longer than the server is willing or able to process. |
| ProblemDetails | 0..1 | 429 Too Many Requests | It is used when a rate limiter has triggered.  In the returned ProblemDetails structure, the "detail" attribute should convey more information about the error. |

#### 7.5a.3.2 PUT

Not applicable.

#### 7.5a.3.3 PATCH

Not applicable.

#### 7.5a.3.4 POST

Not applicable.

#### 7.5a.3.5 DELETE

Not applicable.

## 7.6 Resource: subscriptions

### 7.6.1 Description

This resource contains various resources related to subscriptions for notifications.

### 7.6.2 Resource definition

Resource URI: **{apiRoot}/rni/v2/subscriptions**

This resource shall support the resource URI variables defined in table 7.6.2-1.

Table 7.6.2-1: Resource URI variables for resource "subscriptions"

|  |  |
| --- | --- |
| Name | Definition |
| apiRoot | See clause 7.2 |

### 7.6.3 Resource methods

#### 7.6.3.1 GET

The GET method is used to request information about the subscriptions for this requestor. Upon success, the response contains entity body with the list of links to the subscriptions that are present for the requestor.

This method shall support the URI query parameters, request and response data structures, and response codes, as specified in tables 7.6.3.1-1 and 7.6.3.1-2.

Table 7.6.3.1-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Data type | Cardinality | Remarks |
| subscription\_type | String | 0..1 | Query parameter to filter on a specific subscription type. Permitted values:   * cell\_change Cell Change * rab\_est RAB Establishment * rab\_mod RAB Modification * rab\_rel RAB Release * meas\_rep\_ue UE Measurement Report * nr\_meas\_rep\_ue 5G UE Measurement Report * timing\_advance\_ue UE Timing Advance * ca\_reconf Carrier Aggregation Reconfig * s1\_bearer S1 Bearer Notification |

Table 7.6.3.1-2: Data structures supported by the GET request/response on this resource

| Request body | Data type | Cardinality | Remarks | |
| --- | --- | --- | --- | --- |
| n/a |  |  | |
| Response body | Data type | Cardinality | Response  Codes | Remarks |
| SubscriptionLinkList | 1 | 200 OK | Upon success, a response body containing the list of links to requestor's subscriptions is returned. |
| ProblemDetails | 0..1 | 400 Bad Request | It is used to indicate that incorrect parameters were passed to the request.  In the returned ProblemDetails structure, the "detail" attribute should convey more information about the error. |
| ProblemDetails | 0..1 | 401 Unauthorized | It is used when the client did not submit credentials.  In the returned ProblemDetails structure, the "detail" attribute should convey more information about the error. |
| ProblemDetails | 1 | 403 Forbidden | The operation is not allowed given the current status of the resource.  More information shall be provided in the "detail" attribute of the "ProblemDetails" structure. |
| ProblemDetails | 0..1 | 404 Not Found | It is used when a client provided a URI that cannot be mapped to a valid resource URI.  In the returned ProblemDetails structure, the "detail" attribute should convey more information about the error. |
| ProblemDetails | 0..1 | 406 Not Acceptable | It is used to indicate that the server cannot provide the any of the content formats supported by the client.  In the returned ProblemDetails structure, the "detail" attribute should convey more information about the error. |
| ProblemDetails | 0..1 | 429 Too Many Requests | It is used when a rate limiter has triggered.  In the returned ProblemDetails structure, the "detail" attribute should convey more information about the error. |

#### 7.6.3.2 PUT

Not applicable.

#### 7.6.3.3 PATCH

Not applicable.

#### 7.6.3.4 POST

The POST method is used to create a new subscription to Radio Network Information notifications. Upon success, the response contains entity body describing the created subscription.

This method shall support the request and response data structures, and response codes, as specified in table 7.6.3.4-1.

Table 7.6.3.4-1: Data structures supported by the POST request/response on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| {NotificationSubscription} | 1 | The entity body in the request contains data type of the specific RNI event subscription that is to be created, where the data type options are listed below and defined in clauses 6.3.2 through 6.3.9 and in clause 6.3.11:   * CellChangeSubscription * RabEstSubscription * RabModSubscription * RabRelSubscription * MeasRepUeSubscription * NrMeasRepUeSubscription * MeasTaSubscription * CaReconfSubscription * S1BearerSubscription | |
| Response body | Data type | Cardinality | Response  Codes | Remarks |
| {NotificationSubscription} | 1 | 201 Created | Indicates successful resource creation, where the resource URI shall be returned in the HTTP Location header field.  In the returned NotificationSubscription structure, the created subscription is described using the appropriate data type from the list below and as defined in clauses 6.3.2 through 6.3.9 and in clause 6.3.11:   * CellChangeSubscription * RabEstSubscription * RabModSubscription * RabRelSubscription * MeasRepUeSubscription * NrMeasRepUeSubscription * MeasTaSubscription * CaReconfSubscription * S1BearerSubscription |
| ProblemDetails | 0..1 | 400 Bad Request | It is used to indicate that incorrect parameters were passed to the request.  In the returned ProblemDetails structure, the "detail" attribute should convey more information about the error. |
| ProblemDetails | 0..1 | 401 Unauthorized | It is used when the client did not submit credentials.  In the returned ProblemDetails structure, the "detail" attribute should convey more information about the error. |
| ProblemDetails | 1 | 403 Forbidden | The operation is not allowed given the current status of the resource.  More information shall be provided in the "detail" attribute of the "ProblemDetails" structure. |
| ProblemDetails | 0..1 | 404 Not Found | It is used when a client provided a URI that cannot be mapped to a valid resource URI.  In the returned ProblemDetails structure, the "detail" attribute should convey more information about the error. |
| ProblemDetails | 0..1 | 406 Not Acceptable | It is used to indicate that the server cannot provide the any of the content formats supported by the client.  In the returned ProblemDetails structure, the "detail" attribute should convey more information about the error. |
| Response Body | Data type | Cardinality | Response Codes | Remarks |
| ProblemDetails | 0..1 | 415 Unsupported Media Type | It is used to indicate that the server or the client does not support the content type of the entity body.  In the returned ProblemDetails structure, the "detail" attribute should convey more information about the error. |
| ProblemDetails | 0..1 | 422 Unprocessable Entity | It is used to indicate that the server understands the content type of the request entity and that the syntax of the request entity is correct but that the server is unable to process the contained instructions. This error condition can occur if an JSON request body is syntactically correct but semantically incorrect, for example if the target area for the request is considered too large. This error condition can also occur if the capabilities required by the request are not supported.  In the returned ProblemDetails structure, the "detail" attribute should convey more information about the error. |
| ProblemDetails | 0..1 | 429 Too Many Requests | It is used when a rate limiter has triggered.  In the returned ProblemDetails structure, the "detail" attribute should convey more information about the error. |

#### 7.6.3.5 DELETE

Not applicable.

## 7.7 Void

## 7.8 Resource: existing subscription

### 7.8.1 Description

This resource represents a subscription that the client has created to receive RNI event notifications.

### 7.8.2 Resource definition

Resource URI: **{apiRoot}/rni/v2/subscriptions/{subscriptionId}**

This resource shall support the resource URI variables defined in table 7.8.2-1.

Table 7.8.2-1: Resource URI variables for resource "existing subscription"

|  |  |
| --- | --- |
| Name | Definition |
| apiRoot | See clause 7.2. |
| subscriptionId | Refers to created subscription, where the RNI API allocates a unique resource name for this subscription. The resource name can be also used to identify the resource. |

### 7.8.3 Resource methods

#### 7.8.3.1 GET

The GET method is used to retrieve information about this subscription. Upon success, the response contains entity body with the data type describing the subscription.

This method shall support the URI query parameters, request and response data structures, and response codes, as specified in tables 7.8.3.1-1 and 7.8.3.1-2.

Table 7.8.3.1-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Data type | Cardinality | Remarks |
| n/a |  |  |  |

Table 7.8.3.1-2: Data structures supported by the GET request/response on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| n/a |  |  | |
| Response body | Data type | Cardinality | Response  Codes | Remarks |
| {NotificationSubscription} | 1 | 200 OK | Upon success, a response body containing data type describing the specific RNI event subscription is returned. The allowed data types for subscriptions are defined in clauses 6.3.2 through 6.3.9 and in clause 6.3.11 and are as follows:   * CellChangeSubscription * RabEstSubscription * RabModSubscription * RabRelSubscription * MeasRepUeSubscription * NrMeasRepUeSubscription * MeasTaSubscription * CaReconfSubscription * S1BearerSubscription |
| ProblemDetails | 0..1 | 400 Bad Request | It is used to indicate that incorrect parameters were passed to the request.  In the returned ProblemDetails structure, the "detail" attribute should convey more information about the error. |
| ProblemDetails | 0..1 | 401 Unauthorized | It is used when the client did not submit credentials.  In the returned ProblemDetails structure, the "detail" attribute should convey more information about the error. |
| ProblemDetails | 1 | 403 Forbidden | The operation is not allowed given the current status of the resource.  More information shall be provided in the "detail" attribute of the "ProblemDetails" structure. |
| ProblemDetails | 0..1 | 404 Not Found | It is used when a client provided a URI that cannot be mapped to a valid resource URI.  In the returned ProblemDetails structure, the "detail" attribute should convey more information about the error. |
| Response body | Data type | Cardinality | Response  Codes | Remarks |
| ProblemDetails | 0..1 | 406 Not Acceptable | It is used to indicate that the server cannot provide the any of the content formats supported by the client.  In the returned ProblemDetails structure, the "detail" attribute should convey more information about the error. |
| ProblemDetails | 0..1 | 429 Too Many Requests | It is used when a rate limiter has triggered.  In the returned ProblemDetails structure, the "detail" attribute should convey more information about the error. |

#### 7.8.3.2 PUT

The PUT method is used to update the existing subscription. PUT method in this case has "replace" semantics. Upon successful operation, the target resource is updated with new Data Type received within the message body of the PUT request.

This method shall support the URI query parameters, request and response data structures, and response codes, as specified in tables 7.8.3.2-1 and 7.8.3.2-2.

Table 7.8.3.2-1: URI query parameters supported by the PUT method on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Data type | Cardinality | Remarks |
| n/a |  |  |  |

Table 7.8.3.2-2: Data structures supported by the PUT request/response on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| {NotificationSubscription} | 1 | New NotificationSubscription is included as entity body of the request. The allowed data types for subscriptions are defined in clauses 6.3.2 through 6.3.9 and in clause 6.3.11 and are as follows:   * CellChangeSubscription * RabEstSubscription * RabModSubscription * RabRelSubscription * MeasRepUeSubscription * NrMeasRepUeSubscription * MeasTaSubscription * CaReconfSubscription * S1BearerSubscription | |
| Response body | Data type | Cardinality | Response  Codes | Remarks |
| {NotificationSubscription} | 1 | 200 OK | Upon success, a response body containing data type describing the updated subscription is returned. The allowed data types for subscriptions are defined in clauses 6.3.2 through 6.3.9 and in clause 6.3.11 and are as follows:   * CellChangeSubscription * RabEstSubscription * RabModSubscription * RabRelSubscription * MeasRepUeSubscription * NrMeasRepUeSubscription * MeasTaSubscription * CaReconfSubscription * S1BearerSubscription |
| Response body | Data type | Cardinality | Response  Codes | Remarks |
| ProblemDetails | 0..1 | 400 Bad Request | It is used to indicate that incorrect parameters were passed to the request.  In the returned ProblemDetails structure, the "detail" attribute should convey more information about the error. |
| ProblemDetails | 0..1 | 401 Unauthorized | It is used when the client did not submit credentials.  In the returned ProblemDetails structure, the "detail" attribute should convey more information about the error. |
| ProblemDetails | 1 | 403 Forbidden | The operation is not allowed given the current status of the resource.  More information shall be provided in the "detail" attribute of the "ProblemDetails" structure. |
| ProblemDetails | 0..1 | 404 Not Found | It is used when a client provided a URI that cannot be mapped to a valid resource URI.  In the returned ProblemDetails structure, the "detail" attribute should convey more information about the error. |
| ProblemDetails | 0..1 | 406 Not Acceptable | It is used to indicate that the server cannot provide the any of the content formats supported by the client.  In the returned ProblemDetails structure, the "detail" attribute should convey more information about the error. |
| ProblemDetails | 0..1 | 412 Precondition Failed | It is used when a condition has failed during conditional requests, e.g. when using ETags to avoid write conflicts when using PUT.  In the returned ProblemDetails structure, the "detail" attribute should convey more information about the error. |
| ProblemDetails | 0..1 | 422 Unprocessable Entity | It is used to indicate that the server understands the content type of the request entity and that the syntax of the request entity is correct but that the server is unable to process the contained instructions. This error condition can occur if an JSON request body is syntactically correct but semantically incorrect, for example if the target area for the request is considered too large. This error condition can also occur if the capabilities required by the request are not supported.  In the returned ProblemDetails structure, the "detail" attribute should convey more information about the error. |
| ProblemDetails | 0..1 | 429 Too Many Requests | It is used when a rate limiter has triggered.  In the returned ProblemDetails structure, the "detail" attribute should convey more information about the error. |

#### 7.8.3.3 PATCH

Not applicable.

#### 7.8.3.4 POST

Not applicable.

#### 7.8.3.5 DELETE

The DELETE method is used to cancel the existing subscription. Cancellation can be made by deleting the resource that represents existing subscription.

This method shall support the URI query parameters, request and response data structures, and response codes, as specified in tables 7.8.3.5-1 and 7.8.3.5-2.

Table 7.8.3.5-1: URI query parameters supported by the DELETE method on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Data type | Cardinality | Remarks |
| n/a |  |  |  |

Table 7.8.3.5-2: Data structures supported by the DELETE request/response on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Request body | Data type | Cardinality | Remarks | |
| n/a |  |  | |
| Response body | Data type | Cardinality | Response  Codes | Remarks |
| n/a |  | 204 No Content | Upon success, a response 204 No Content without any response body is returned. |
| ProblemDetails | 0..1 | 401 Unauthorized | It is used when the client did not submit credentials.  In the returned ProblemDetails structure, the "detail" attribute should convey more information about the error. |
| ProblemDetails | 1 | 403 Forbidden | The operation is not allowed given the current status of the resource.  More information shall be provided in the "detail" attribute of the "ProblemDetails" structure. |
| ProblemDetails | 0..1 | 404 Not Found | It is used when a client provided a URI that cannot be mapped to a valid resource URI.  In the returned ProblemDetails structure, the "detail" attribute should convey more information about the error. |
| ProblemDetails | 0..1 | 429 Too Many Requests | It is used when a rate limiter has triggered.  In the returned ProblemDetails structure, the "detail" attribute should convey more information about the error. |

Annex A (informative):  
Mapping of permissions for RESTful API and topic based alternative transport

# A.1 Overview

This annex provides mappings of permissions for topics between RESTful API and topic based alternative transport. ETSI GS MEC 009 [6] describes how permissions for topics between RESTful API and alternative transport can be mapped with each other. This annex uses the template for permissions mapping as defined in that group specification.

# A.2 Mapping of permissions - RESTful and topic based alternative transport

Table A.2-1 lists the permission categories for each topic currently included in RNIS API specification.

Table A.2-1: Definition of permissions for RNIS

|  |  |  |
| --- | --- | --- |
| Permission identifier | Display name | Remarks |
| rab\_info | RAB Info | Query |
| plmn\_info | PLMN Info | Query |
| s1\_bearer\_info | S1 Bearer Info | Query |
| cell\_change | Cell Change | Subscribe-Notify |
| rab\_est | RAB Establishment | Subscribe-Notify |
| rab\_mod | RAB Modification | Subscribe-Notify |
| rab\_rel | RAB Release | Subscribe-Notify |
| meas\_rep\_ue | UE Measurement Report | Subscribe-Notify |
| nr\_meas\_rep\_ue | 5G UE Measurement Report | Subscribe-Notify |
| timing\_advance\_ue | UE Timing Advance | Subscribe-Notify |
| ca\_reconf | Carrier Aggregation Reconfiguration | Subscribe-Notify |
| s1\_bearer | S1 Bearer Notification | Subscribe-Notify |

Table A.2-2 describes how permission identifiers can be mapped to resources in the RNIS RESTful API as defined in the present document.

Table A.2-2: Permission identifiers mapping for transport "REST"

|  |  |
| --- | --- |
| Permission identifier | Specification |
| rab\_info | Resource: …/rni/v2/queries/rab\_info |
| plmn\_info | Resource: …/rni/v2/queries/plmn\_info |
| s1\_bearer\_info | Resource: …/rni/v2/queries/s1\_bearer\_info |
| cell\_change | Resource: …/rni/v2/subscriptions/cell\_change |
| rab\_est | Resource: …/rni/v2/subscriptions/rab\_est |
| rab\_mod | Resource: …/rni/v2/subscriptions/rab\_mod |
| rab\_rel | Resource: …/rni/v2/subscriptions/rab\_rel |
| meas\_rep\_ue | Resource: …/rni/v2/subscriptions/meas\_rep\_ue |
| nr\_meas\_rep\_ue | Resource: …/rni/v2/subscriptions/nr\_meas\_rep\_ue |
| timing\_advance\_ue | Resource: …/rni/v2/subscriptions/ta |
| ca\_reconf | Resource: …/rni/v2/subscriptions/ca\_reconf |
| s1\_bearer | Resource: …/rni/v2/subscriptions/s1\_bearer |

Table A.2-3 describes how the permission identifiers can be mapped to topics offered over topic-based message bus.

Table A.2-3: Permission identifiers mapping for transport "Topic-based message bus"

|  |  |
| --- | --- |
| Permission identifier | Specification |
| rab\_info | Topic: /rni/enb/rab\_info |
| plmn\_info | Topic: /rni/enb/plmn\_info |
| s1\_bearer\_info | Topic: /rni/enb/s1\_bearer\_info |
| cell\_change | Topic: /rni/ue/mobility/cell\_change |
| rab\_est | Topic: /rni/ue/rab/establish |
| rab\_mod | Topic: /rni/ue/rab/modify |
| rab\_rel | Topic: /rni/ue/rab/release |
| meas\_rep\_ue | Topic: /rni/ue/meas/report |
| nr\_meas\_rep\_ue | Topic: /rni/ue/meas/nr\_report |
| timing\_advance\_ue | Topic: /rni/ue/meas/ta |
| ca\_reconf | Topic: /rni/ue/ca\_reconf |
| s1\_bearer | Topic: /rni/ue/s1\_bearer |

Annex B (informative):  
Complementary material for API utilization

To complement the definitions for each method and resource defined in the interface clauses of the present document, ETSI MEC ISG is providing for the Radio Network Information API a supplementary description file compliant to the OpenAPI Specification [i.9].

In addition, a further supplementary file defining the data types in protocol buffers format, as defined in the Protocol Buffers Language Specification [i.10], is provided.

In case of discrepancies between the supplementary files and the related data structure definitions in the present document, the data structure definitions take precedence.

The supplementary files, relating to the present document, are located at <https://forge.etsi.org/rep/mec/gs012-rnis-api>.

# History

|  |  |  |
| --- | --- | --- |
| **Document history** | | |
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