

ETSI GS MEC 012 V2.2.1 (2022-02)



**Multi-access Edge Computing (MEC);
Radio Network Information API**
(standards.iteh.ai)

[ETSI GS MEC 012 V2.2.1 \(2022-02\)](https://standards.iteh.ai/catalog/standards/sist/d96e740e-9dd0-4d8c-a9fa-7cf3c833254e/etsi-gs-mec-012-v2-2-1-2022-02)
<https://standards.iteh.ai/catalog/standards/sist/d96e740e-9dd0-4d8c-a9fa-7cf3c833254e/etsi-gs-mec-012-v2-2-1-2022-02>

Disclaimer

The present document has been produced and approved by the Multi-access Edge Computing (MEC) ETSI Industry Specification Group (ISG) and represents the views of those members who participated in this ISG. It does not necessarily represent the views of the entire ETSI membership.

Reference

RGS/MEC-0012v221RnisApi

Keywords

API, MEC, RNIS

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

Important notice

The present document can be downloaded from:

<http://www.etsi.org/standards-search>

The present document may be made available in electronic versions and/or in print. The content of any electronic and/or print versions of the present document shall not be modified without the prior written authorization of ETSI. In case of any existing or perceived difference in contents between such versions and/or in print, the prevailing version of an ETSI deliverable is the one made publicly available in PDF format at www.etsi.org/deliver.

Users of the present document should be aware that the document may be subject to revision or change of status.

Information on the current status of this and other ETSI documents is available at

<https://portal.etsi.org/TB/ETSIDeliverableStatus.aspx>

If you find errors in the present document, please send your comment to one of the following services:

<https://portal.etsi.org/People/CommitteeSupportStaff.aspx><https://standards.iteh.ai/catalog/standards/sist/d96e740e-9dd0-4d81-9000-000000000000/etsi-gs-mec-012-v221-2022-02>**Notice of disclaimer & limitation of liability**

The information provided in the present deliverable is directed solely to professionals who have the appropriate degree of experience to understand and interpret its content in accordance with generally accepted engineering or other professional standard and applicable regulations.

No recommendation as to products and services or vendors is made or should be implied.

No representation or warranty is made that this deliverable is technically accurate or sufficient or conforms to any law and/or governmental rule and/or regulation and further, no representation or warranty is made of merchantability or fitness for any particular purpose or against infringement of intellectual property rights.

In no event shall ETSI be held liable for loss of profits or any other incidental or consequential damages.

Any software contained in this deliverable is provided "AS IS" with no warranties, express or implied, including but not limited to, the warranties of merchantability, fitness for a particular purpose and non-infringement of intellectual property rights and ETSI shall not be held liable in any event for any damages whatsoever (including, without limitation, damages for loss of profits, business interruption, loss of information, or any other pecuniary loss) arising out of or related to the use of or inability to use the software.

Copyright Notification

No part may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm except as authorized by written permission of ETSI.

The content of the PDF version shall not be modified without the written authorization of ETSI.

The copyright and the foregoing restriction extend to reproduction in all media.

© ETSI 2022.
All rights reserved.

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

Intellectual Property Rights

Essential patents

IPRs essential or potentially essential to normative deliverables may have been declared to ETSI. The declarations pertaining to these essential IPRs, if any, are publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: "*Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards*", which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (<https://ipr.etsi.org/>).

Pursuant to the ETSI Directives including the ETSI IPR Policy, no investigation regarding the essentiality of IPRs, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Trademarks

The present document may include trademarks and/or tradenames which are asserted and/or registered by their owners. ETSI claims no ownership of these except for any which are indicated as being the property of ETSI, and conveys no right to use or reproduce any trademark and/or tradename. Mention of those trademarks in the present document does not constitute an endorsement by ETSI of products, services or organizations associated with those trademarks.

DECT™, **PLUGTESTS™**, **UMTS™** and the ETSI logo are trademarks of ETSI registered for the benefit of its Members. **3GPP™** and **LTE™** are trademarks of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners. **oneM2M™** logo is a trademark of ETSI registered for the benefit of its Members and of the oneM2M Partners. **GSM®** and the GSM logo are trademarks registered and owned by the GSM Association.

Foreword

(standards.iteh.ai)

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

<https://standards.iteh.ai/catalog/standards/sist/d96e740e-9dd0-4d8c-a9fa-7cf3c833254e/etsi-gs-mec-012-v2-2-1-2022-02>

Modal verbs terminology

2022-02

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the [ETSI Drafting Rules](#) (Verbal forms for the expression of provisions).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

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/>.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

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.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

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	3 rd 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 (Standard 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.

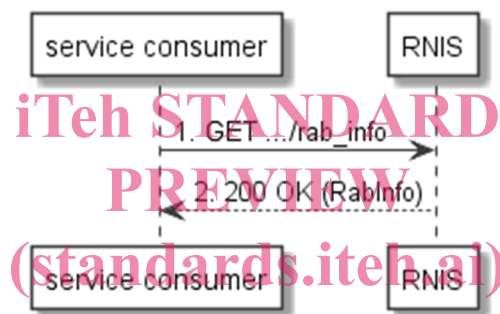


Figure 5.2.2-1: Flow of service consumer requesting Radio Access Bearer information

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).

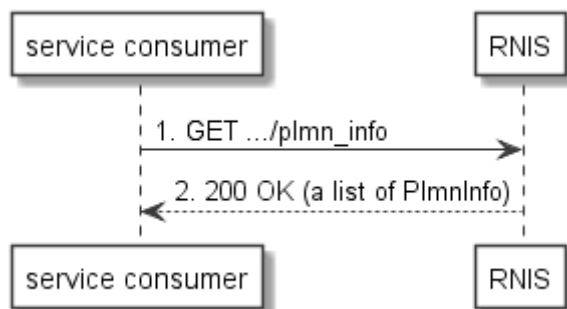


Figure 5.2.3-1: Flow of service consumer requesting PLMN information

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.

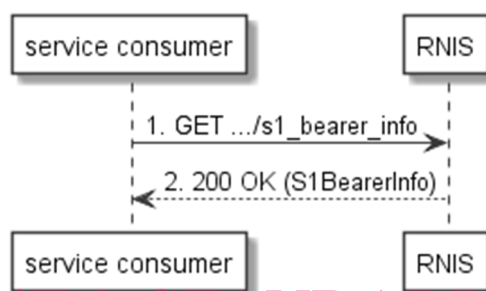


Figure 5.2.4-1: Flow of service consumer requesting S1 bearer information

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.

ETSI GS MEC 012 V2.2.1 (2022-02)

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.

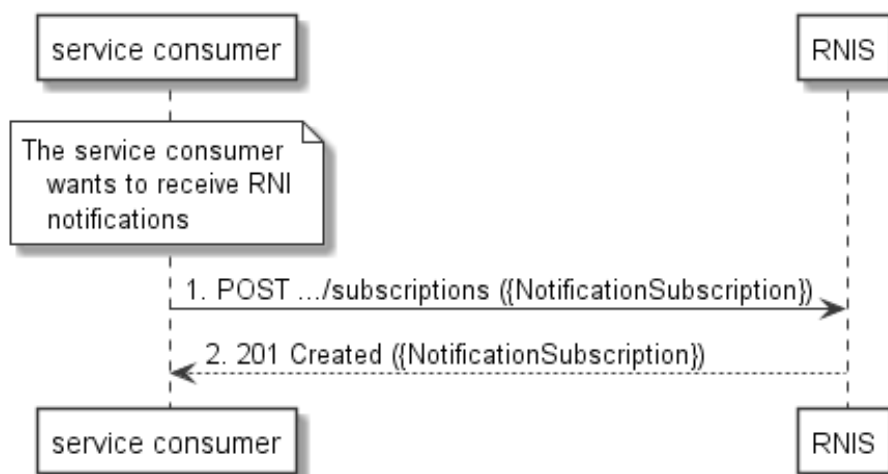


Figure 5.2.5.1-1: Flow of subscribing to the RNI event notifications

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.

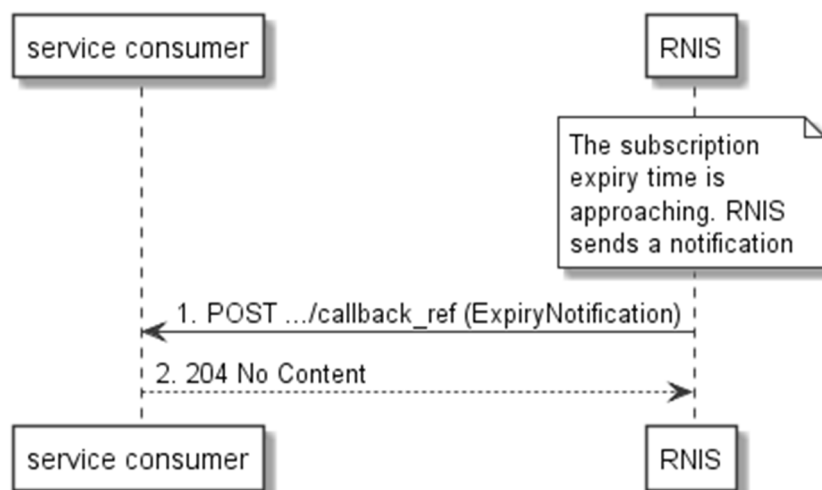


Figure 5.2.5.2-1: Flow of RNIS sending a notification on expiry of the subscription

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.

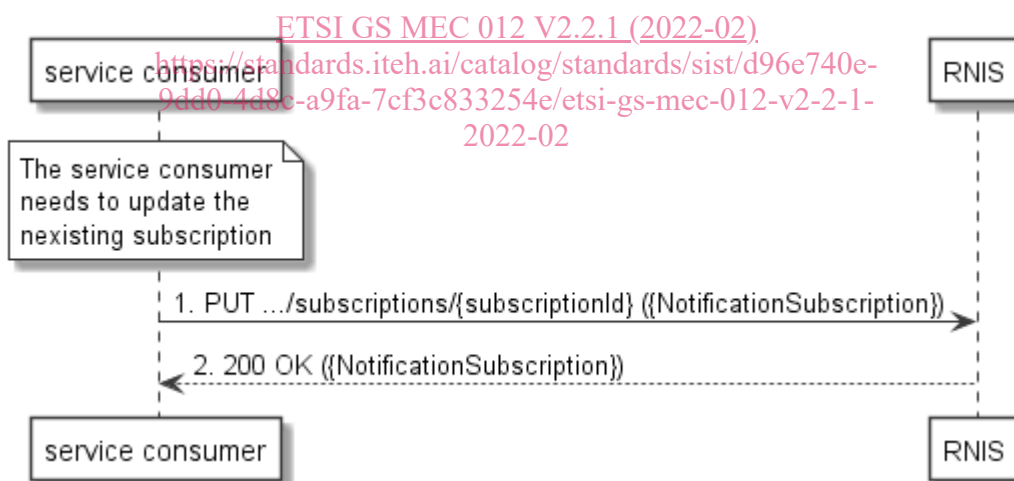


Figure 5.2.5.3-1: Flow of service consumer updating subscription for RNI event notifications

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.

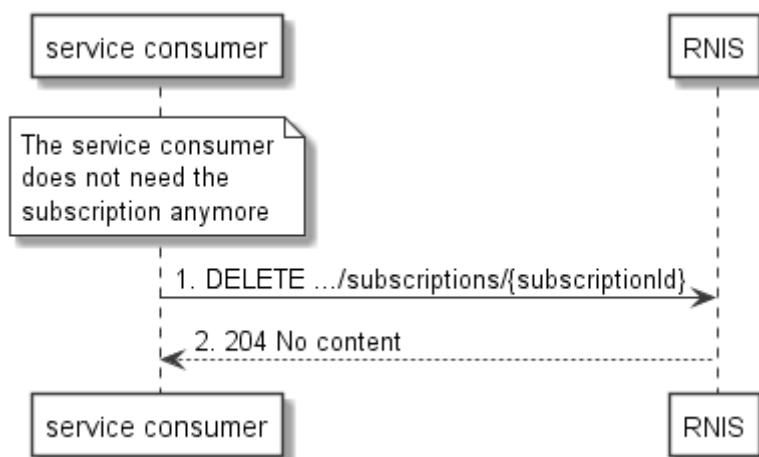


Figure 5.2.5.4-1: Flow of unsubscribing from the RNI event notifications

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.