

# ETSI GS MEC 026 V2.1.1 (2019-01)



## **Multi-access Edge Computing (MEC); Support for regulatory requirements**

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**Reference**

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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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## Modal verbs terminology

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).

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# 1 Scope

The present document focuses on the support of regulatory requirements for Lawful Interception (LI) and Retained Data (RD) when implementing MEC into the network. It describes the problems, constraints, interfaces and additional capabilities needed for the different deployment scenarios, to ensure full support of LI & RD regulatory requirements when implementing MEC.

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## 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.

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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] ETSI GS MEC 002: "Multi-access Edge Computing (MEC); Phase 2: Use Cases and Requirements".
- [3] ETSI GS MEC 009: "Multi-access Edge Computing (MEC); General principles for MEC Service APIs".
- [4] IETF RFC 2818: "HTTP Over TLS".

NOTE: Available at <https://tools.ietf.org/html/rfc2818>.

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

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

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

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

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

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

### 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 TS 133 107: "Universal Mobile Telecommunications System (UMTS); LTE; Digital cellular telecommunications system (Phase 2+) (GSM); 3G security; Lawful interception architecture and functions (3GPP TS 33.107)".

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## 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:

API	Application Programming Interface
CN	Core Network
CUPS	Control and User Plane Separation
EPC	Evolved Packet Core
HTTP	Hypertext Transfer Protocol
HTTPS	HTTP Secure
IMSI	International Mobile Subscriber Identity
IP	Internet Protocol
LEMF	Law Enforcement Monitoring Facility
LI	Lawful Interception
LIG	LI Gateway
MEC	Multi-access Edge Computing
MSISDN	Mobile Station International Subscriber Directory Number
RD	Retained Data
TLS	Transport Layer Security
UE	User Equipement
URI	Uniform Resource Indicator

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## 4 LI & RD in MEC

In the current mobile networks, LI solutions (including RD) are part of the network topology. All data that pass through the mobile core network (e.g. EPC) is supported by these LI solutions. When implementing MEC, some traffic may be generated or manipulated inside the MEC system or may come from a local breakout connection, thus not passing through the core network and not supported by the existing LI solution in the network.

The deployment scenario of MEC on the SGi is standardized by 3GPP, for which the LI & RD support does not need to be handled by MEC standard.

However, the deployment scenario of MEC on the S1 (either by the eNB or at aggregation points) may require an alternative solution to ensure full LI and RD support when implementing MEC in the network.

Clause 5 refers to the different supported MEC deployments and presents a short analysis on the need for additional support from MEC for each of these deployments.

Clause 6 presents what is needed from MEC to comply with the regulatory requirements in the deployment scenarios that need something to be done.

For MEC deployment scenarios where the underlying network does not handle LI & RD regulatory requirements, namely the deployment scenarios on the S1 without CUPS support, the following additions are required:

- Interface with the LI Gateway (LIG) via standard X1, X2, X3 interfaces. The details of how these interfaces are supported are out of the scope of the present document.
- A capability to receive LI targets information and save/manage an up to date list. The details of how this information is managed is out of the scope of the present document.
- A function to duplicate traffic of LI targets towards the LIG. The details of how this is supported is out of the scope of the present document.

## 5 LI support in different MEC deployment scenarios (informative)

### 5.1 Introduction

In the current mobile networks, LI solutions (including RD) are part of the network topology. All data that pass through the mobile core network (e.g. EPC) is supported by these LI solutions. When implementing MEC, some traffic may be generated or manipulated inside the MEC system or may come from a local breakout connection, thus not passing through the core network and not supported by the existing LI solutions in the network.

As stated in ETSI GS MEC 002 [2], for reasons of performance, costs, scalability, operator preferred deployments, etc., different deployment scenarios need to be supported:

- deployment at the radio node;
- deployment at an aggregation point;
- deployment at the edge of the Core Network (e.g. in a distributed data centre, at a gateway) The support for regulatory requirements are analysed for the above deployment scenarios. Two basic traffic scenarios are considered:
  - data transparently passing through the MEC host;
  - data generated inside the MEC host by a MEC application, or manipulated inside the MEC host, and data coming from a local breakout connection.

### 5.2 MEC deployed over S1 interface

Figure 5.2-1 illustrated an example MEC deployment on S1 interface, where both deployment options either at the radio node or at an aggregation point can be considered in this scenario.

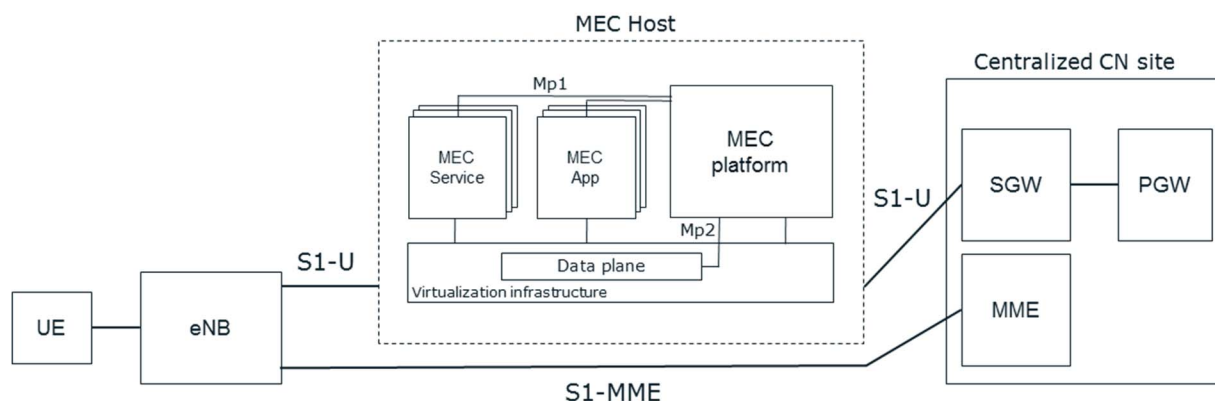


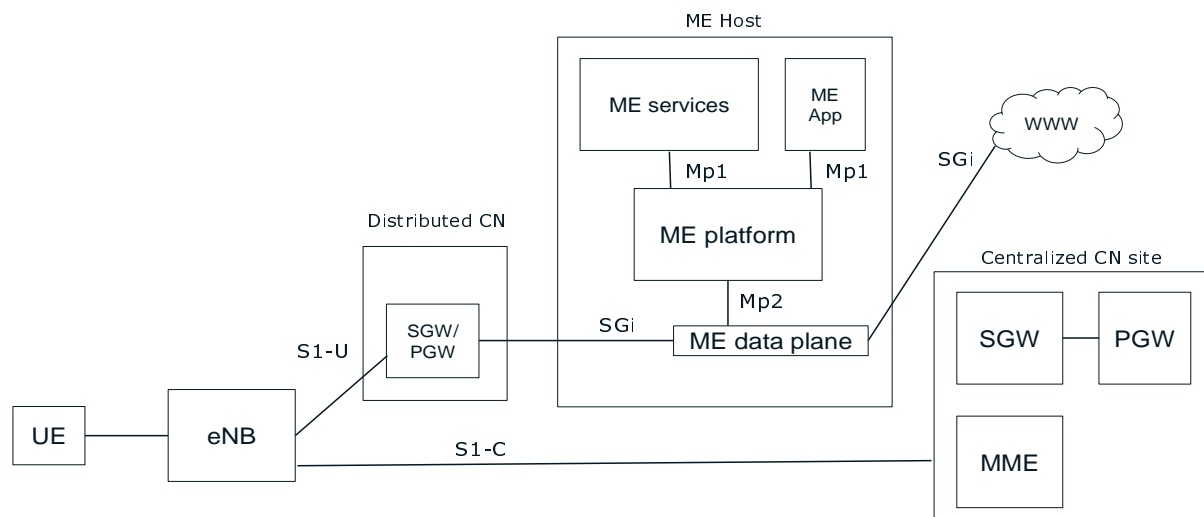
Figure 5.2-1: Example MEC deployment option on S1 interface

There are three types of traffic expected in a MEC host:

- Passing through further to the CN:
  - For such traffic LI is taken care of by the 3GPP functions.
- Terminated in a MEC application instance:
  - If CUPS architecture is assumed for the underlying network, the LI support can be provided based on the available 3GPP standard. If CUPS architecture is not available, alternative solution needs to be considered to provide the necessary LI support in MEC.
- Breaking out to the external network:
  - If CUPS architecture is assumed for the underlying network, the LI support can be provided based on the available 3GPP standard. If CUPS architecture is not available, alternative solution needs to be considered to provide the necessary LI support in MEC.

### 5.3 MEC deployed over SGi interface

Figure 5.3-1 illustrated an example MEC deployment on SGi interface.



**Figure 5.3-1: Example MEC deployment option on SGi interface**

LI is taken care of by the 3GPP functions if a distributed CN is assumed. If a distributed CN is not available, similarly three types of traffic are expected in a MEC host:

- Passing through further to the CN:
  - For such traffic LI is taken care of by the 3GPP functions.
- Terminated in a MEC application instance:
  - If CUPS architecture is assumed for the underlying network, the LI support can be provided based on the available 3GPP standard. If CUPS architecture is not available, alternative solution needs to be considered to provide the necessary LI support in MEC.
- Breaking out to the external network:
  - If CUPS architecture is assumed for the underlying network, the LI support can be provided based on the available 3GPP standard. If CUPS architecture is not available, alternative solution needs to be considered to provide the necessary LI support in MEC.



The deployment scenario of MEC on the SGI is standardized by 3GPP thus support for LI & RD in that scenario does not need to be handled by MEC standard.

For most MEC deployment scenarios in the cases where the standardized 3GPP architecture can be assumed the LI & RD are supported based on the available 3GPP standards. However, in the cases where the standardized 3GPP architecture is not available, especially in the MEC deployment scenario over S1 interface (either by the eNB or at aggregation points), alternative solutions need to be considered to ensure full LI and RD support.

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## 6 Enabling support for regulatory requirements (informative)

### 6.1 Introduction

Apart from the deployment scenario over S1 without CUPS, all deployment scenarios support LI as part of the 3GPP standards. Therefore the scenario of MEC deployment over S1 without CUPS requires a specific solution to support LI.

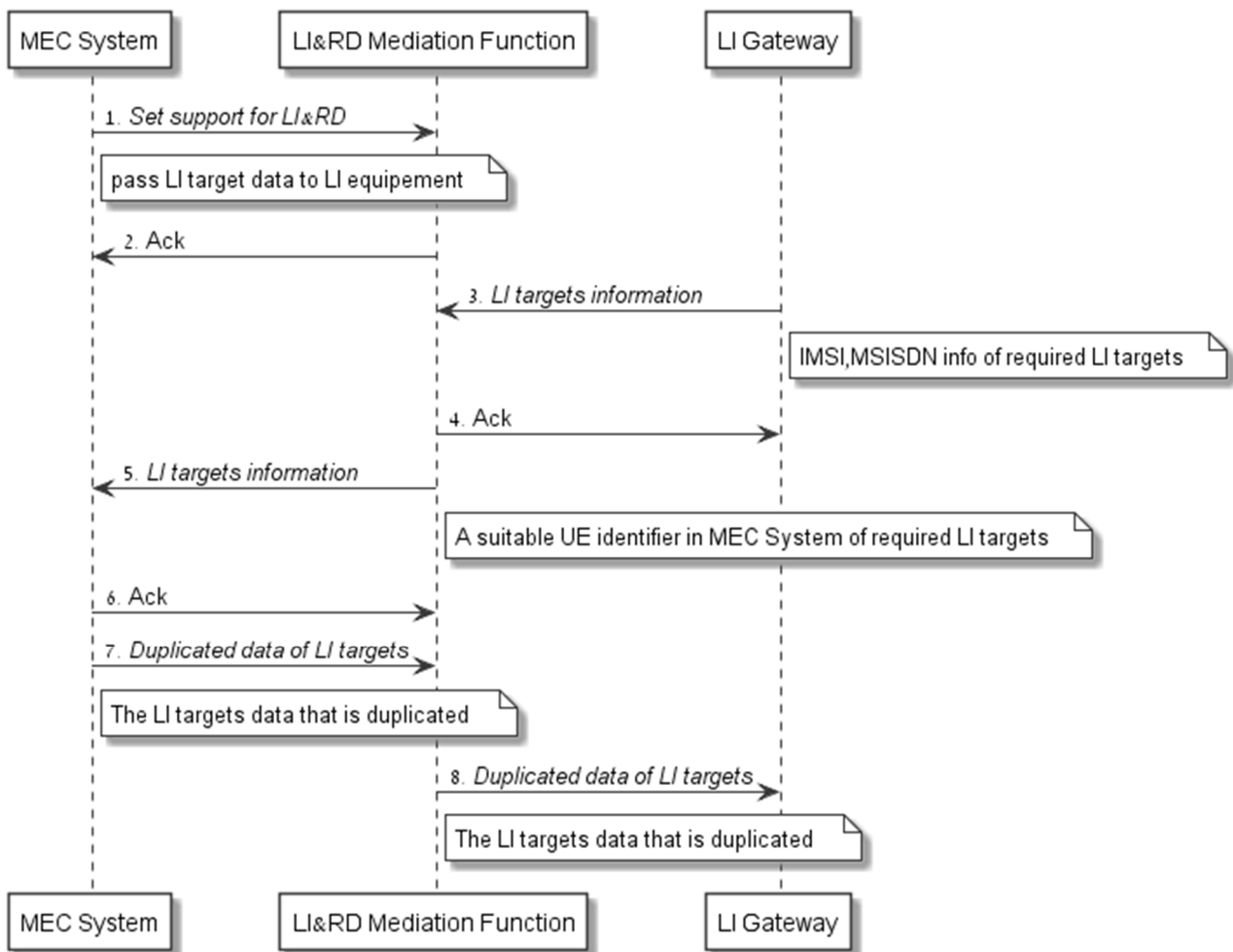
The specific capabilities required to support LI in this deployment scenario are as follows:

- Interface with the LI Gateway (LIG) via standard X1, X2, and X3 interfaces (as specified in ETSI TS 133 107 [i.1]).
- A capability to receive LI targets information and save/manage an up to date list.
- A function to duplicate traffic of LI targets towards the LIG.

A LI and RD mediation function is assumed to provide the required capabilities. The mediation function interfaces with the LIG via standard X1, X2, and X3 interfaces. Following is a possible scenario describing the support for LI & RD when MEC is implemented over S1:

- MEC System configures mediation function to start supporting LI & RD.
- LIG receives LI target information (MSISDN, IMSI, etc.) over the H1 interface from the LEMF.
- LIG sends LI target information (MSISDN, IMSI, etc.) over the X1 interface to the mediation function.
- Mediation function translates the IMSI, MSISDN into a suitable UE identifier in MEC system..
- Mediation function notifies MEC system to start traffic duplication for a specific IP.
- MEC system starts duplicating relevant data towards mediation function.
- Mediation function correlates between the data and the specific LI target and send information data over X3 to the LIG.
- LIG sends data over H3 to the LEMF.

A possible scenario of LI & RD support for MEC is described in the message flow in figure 6.1-1.



**Figure 6.1-1: LI in MEC possible scenario**

The following are out of the scope of the present document:

- How the LI & RD mediation function receives the LI targets from the LI equipment.
- How the LI & RD mediation passes the LI targets identities to the MEC system.
- How the LI & RD mediation received the duplicated data from the MEC system and passes it to the LI equipment.

## 6.2 Sequence diagrams

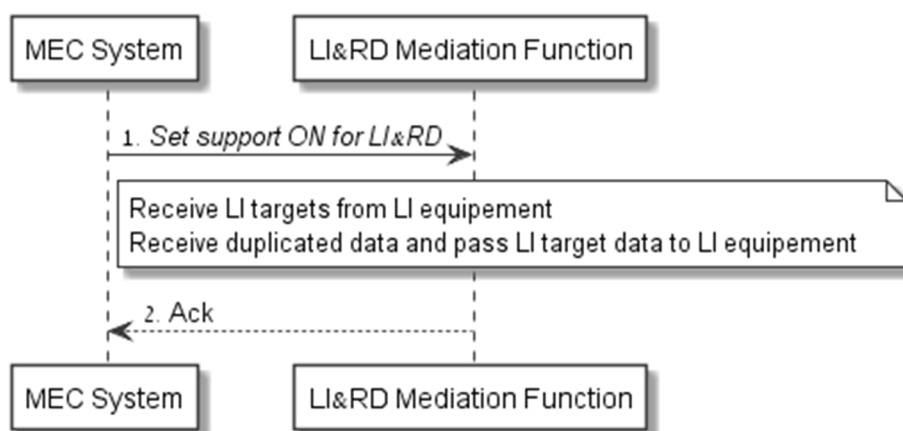
### 6.2.1 General

Clauses 6.2.2 and 6.2.3 describe the flows enabling support for LI and RD regulatory requirements when MEC is implemented on the S1 interface without CUPS.

The LI & RD API enables the MEC System to configure LI & RD mediation function to support the specific LI targets towards the operator's LI solution for regulatory requirements support.

## 6.2.2 Configure LI & RD support ON in LI & RD Mediation Function

Figure 6.2.2-1 shows the flow of the LI & RD Mediation function being configured by the MEC System for LI & RD support.



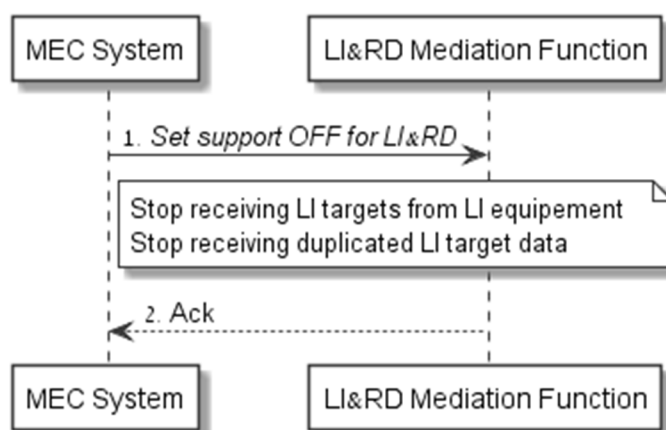
**Figure 6.2.2-1: Flow of Flow of LI & RD support ON in Mediation Function**

MEC System sends a configuration command to the LI & RD Mediation Function to start receiving duplicated data and send relevant LI target data to the LI equipment, consisting of the following steps:

- 1) MEC System sends a configuration command to the LI & RD Mediation Function to start receiving duplicated data and send LI target data to the LI equipment.
- 2) LI & RD Mediation Function acknowledges the receipt of the command, configures the relevant configurations and starts extracting the relevant data received and sending it to the LI equipment.

## 6.2.3 Configure LI & RD support OFF in LI & RD Mediation Function

Figure 6.2.3-1 shows the flow of the LI & RD Mediation function being configured by the MEC System for LI & RD support.



**Figure 6.2.3-1: Flow of LI & RD support OFF in Mediation Function**

MEC System sends a configuration command to the LI & RD Mediation Function to stop receiving LI target data, consisting of the following steps:

- 1) MEC System sends a configuration command to the LI & RD Mediation Function to stop receiving LI target data.
- 2) LI & RD Mediation Function acknowledges the receipt of the command, configures the relevant configurations and stops received LI target data.

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## 7 Data model & Data format

### 7.1 Introduction

The data types are specified that are used to provide LI & RD support in the deployment scenario over S1 without CUPS, for which the relevant sequence diagrams are described in clauses 6.2.2 and 6.2.3.

### 7.2 Resource data types

#### 7.2.1 Introduction

This clause defines data structures to be used in resource representations.

#### 7.2.2 Type: LiRdSupportInfo

This type represents the information of LI & RD support. The attributes of the LiRdSupportInfo shall follow the indications provided in table 7.2.2-1.

**Table 7.2.2-1: Definition of type LiRdSupportInfo**

Attribute name	Data type	Cardinality	Description
state	Enum (inlined)	1	The following numeric values are defined: 0 = ON 1 = OFF

### 7.3 Subscription types

In the present document, no subscription data types are defined.

### 7.4 Notifications types

In the present document, no notifications data types are defined.

### 7.5 Referenced structured data types

In the present document, no referenced structured data types are defined.

### 7.6 Referenced simple data types

In the present document, no referenced simple data types are defined.

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## 8 API definition

### 8.1 Introduction

This clause defines the resources and operations of the LiRdSupport API.

## 8.2 Global definitions and resource structure

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

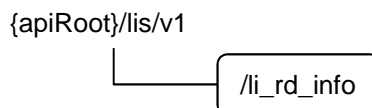
**{apiRoot}/{apiName}/{apiVersion}/**

The "apiRoot" is discovered using the service registry. The "apiName" shall be set to "lis" and the "apiVersion" shall be set to "v1" for the present document. It includes the scheme ("http" or "https"), host and optional port, and an optional prefix string. The API shall support HTTP over TLS (also known as HTTPS - see IETF RFC 2818 [4]). TLS version 1.2 as defined by IETF RFC 5246 [5] shall be supported. HTTP without TLS is not recommended.

This API shall require the use of the OAuth 2.0 client credentials grant type according to IETF RFC 6749 [6] with bearer tokens according to IETF RFC 6750 [7]. See clause 7.16 of ETSI GS MEC 009 [3] for more information. How the token endpoint and client credentials are provisioned into the MEC applications 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 7.15 of ETSI GS MEC 009 [3] for more information.

Figure 8.2-1 illustrates the resource URI structure of this API.



**Figure 8.2-1: Resource URI structure of the LI & RD Support API**

Table 8.2-1 provides an overview of the resources defined by the present specification, and the applicable HTTP methods.

**Table 8.2-1: Resources and methods overview**

Resource name	Resource URI	HTTP method	Meaning
liRdSupportInfo	/li_rd_info	PUT	Update the information about a liRdSupportInfo resource

## 8.3 Resource: liRdSupportInfo

### 8.3.1 Description

This resource is used to represent a liRdSupportInfo resource, which follows the resource data type of "LiRdSupportInfo" as specified in clause 7.2.2.

### 8.3.2 Resource definition

Resource URI: {apiRoot}/uis/v1/li\_rd\_info

Resource URI Variables for this resource are defined in table 8.3.2-1.

**Table 8.3.2-1: Resource URI Variables for resource "liRdSupportInfo"**

Name	Definition
apiRoot	See clause 8.2

## 8.3.3 Resource Methods

### 8.3.3.1 GET

Not supported.

### 8.3.3.2 PUT

This method sets/resets a LI & RD support information. The PUT HTTP method has "replace" semantics.

PUT method is typically used in "Configure LI & RD support ON in LI & RD Mediation Function" procedure as described in clause 6.2.2 and "Configure LI & RD support OFF in LI & RD Mediation Function" procedure as described in clause 6.2.3.

PUT HTTP method shall comply with the URI query parameters, request and response data structures, and response codes, as specified in the tables 8.3.3.2-1 and 8.3.3.2-2.

**Table 8.3.3.2-1: URI query parameters supported by the PUT method on this resource**

Name	Data type	Cardinality	Remarks
n/a			

**Table 8.3.3.2-2: Data structures supported by the PUT request/response on this resource**

Request body	Data type	Cardinality	Remarks	
	LiRdSupportInfo	1	The updated "state" attribute is included in the entity body of the request.	
Response body	Data type	Cardinality	Response codes	Remarks
	LiRdSupportInfo	1	200 OK	Upon success, a response body containing data type describing the updated LiRdSupportInfo 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	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	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	412 Precondition Failed	It is used when a condition has failed during conditional requests, e.g. when using ETags to avoid write conflicts.  In the returned ProblemDetails structure, the "detail" attribute should convey more information about the error.

### 8.3.3.3 PATCH

Not supported.

### 8.3.3.4 POST

Not supported.

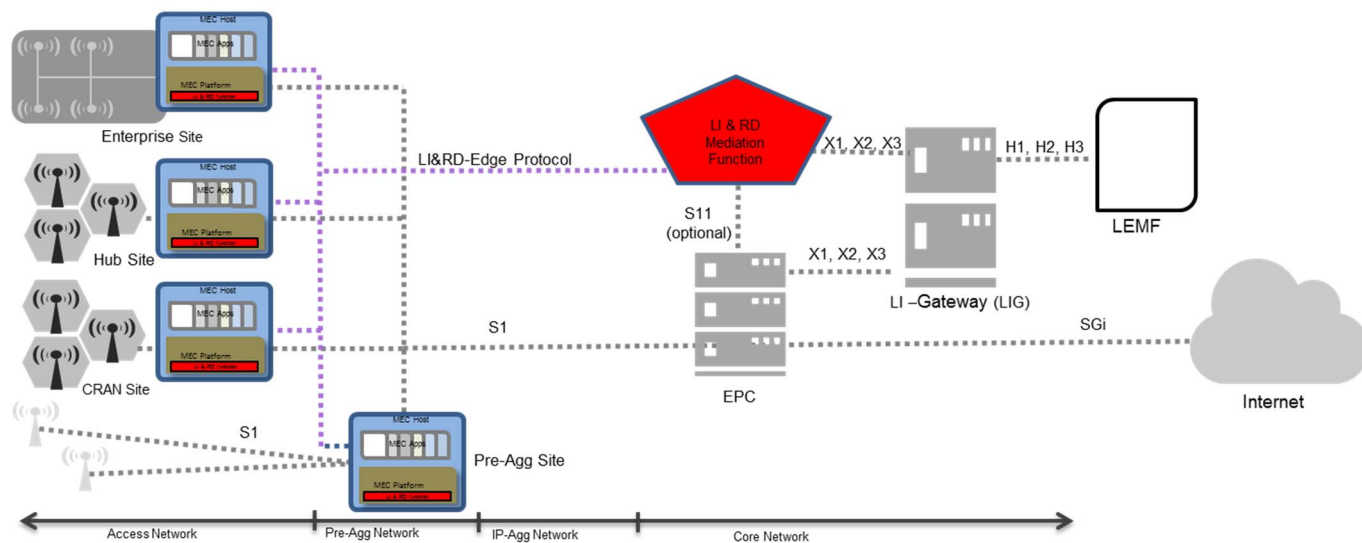
### 8.3.3.5 DELETE

Not supported.

## Annex A (informative): Example LI support for MEC deployment over S1 without CUPS

Except for the deployment scenario over S1 without CUPS, all deployment scenarios support LI as part of the 3GPP standards. Therefore, the scenario of MEC deployment over S1 without CUPS requires a specific solution to support LI.

Figure A-1 illustrates an example LI support for this deployment scenario. Although in this figure the LI and retained data mediation function is described as an external function interfacing with multiple MEC Hosts, it may optionally run as part of the MEC platform or as an external entity, interfacing with the operator's LI network solution.



**Figure A-1: Example regulatory requirements support**



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## Annex B (informative): Bibliography

NGMN: "5G security - Package 3: Mobile Edge Computing / Low Latency / Consistent User Experience".

NOTE: Available at [https://www.ngmn.org/fileadmin/user\\_upload/161028\\_NGMN-5G\\_Security\\_MEC\\_ConsistentUEExp\\_v1.3\\_final.pdf](https://www.ngmn.org/fileadmin/user_upload/161028_NGMN-5G_Security_MEC_ConsistentUEExp_v1.3_final.pdf).

ETSI TS 101 331: "Lawful Interception (LI); Requirements of Law Enforcement Agencies".

ETSI TS 102 656: "Lawful Interception (LI); Retained Data; Requirements of Law Enforcement Agencies for handling Retained Data".

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## History

<b>Document history</b>		
V2.1.1	January 2019	Publication