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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).

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.

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] 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.

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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 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)".

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 Programing 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

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.

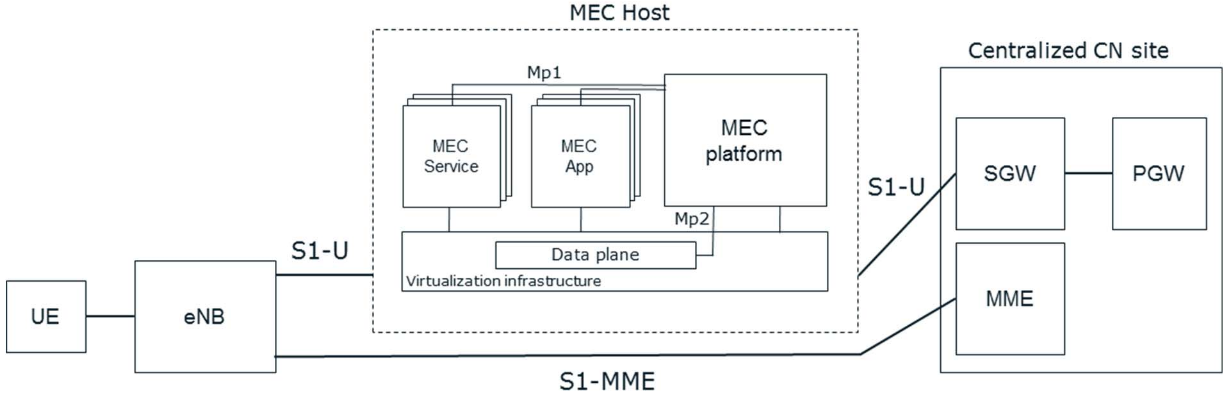

Figure 5.2-1: Example MEC deployment option on S1 interface

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.

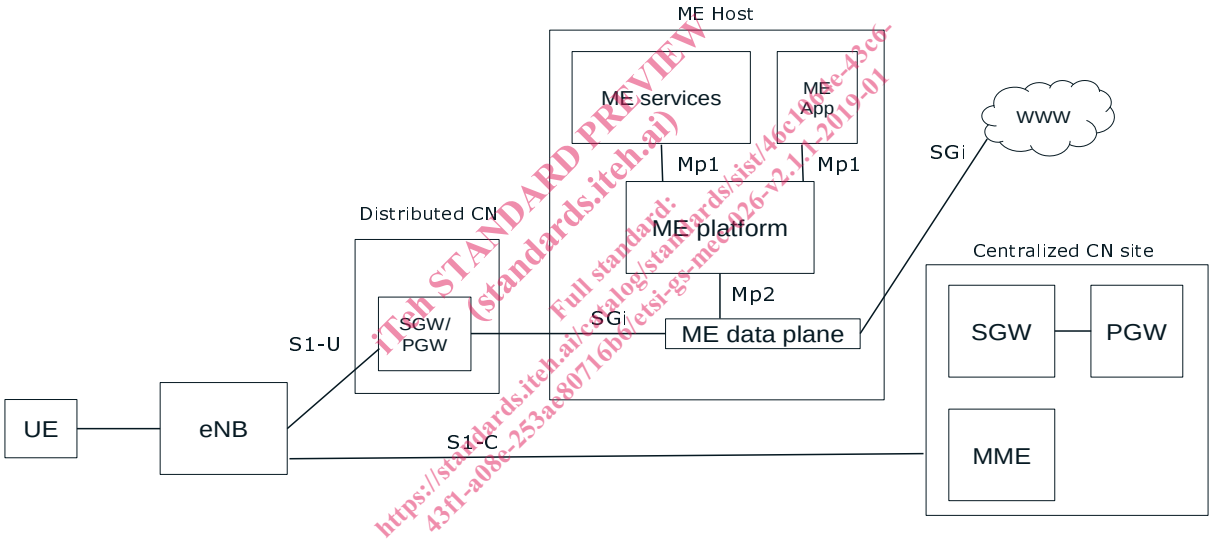

Figure 5.3-1: Example MEC deployment option on SGi interface

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.

6 Enabling support for regulatory requirements (informative)

6.1 Introduction

Apart from the deployment scenario over S1without CUPS, all deployment scenarios support LI as part of the 3GPP standards. Therefor 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.