ETSI GS MEC 013 V1.1.1 (2017-07)

Mobile Edge Computing (MEC); Location API

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1 Scope

The present document focuses on the Mobile Edge Location Service. It describes the related application policy information including authorization and access control, information flows, required information and service aggregation patterns. The present document specifies the necessary API with the data model and data format.

It is to be noted that the actual data model and data format which is functional for the present API is defined in "RESTful Network API for Zonal Presence" published by the Open Mobile Alliance [5].

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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[1] ETSI GS MEC 001: "Mobile Edge Computing (MEC); Terminology".

[2] ETSI GS MEC 002: "Mobile Edge Computing (MEC); Technical Requirements".

[3] ETSI GS MEC 003: "Mobile Edge Computing (MEC); Framework and Reference Architecture".

[4] ETSI GS MEC 009: "Mobile Edge Computing (MEC); General principles for Mobile Edge Service APIs".

[5] OMA-TS-REST-NetAPI-ZonalPresence-V1-0-20160308-C: "RESTful Network API for Zonal Presence".

[6] OMA-TS-REST-NetAPI-ACR-V1-0-20151201-C: "RESTful Network API for Anonymous Customer Reference Management".

[7] ETSI TS 129 171: "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); LTE; Location Services (LCS); LCS Application Protocol (LCS-AP) between the Mobile Management Entity (MME) and Evolved Serving Mobile Location Centre (E-SMLC); SLs interface (3GPP TS 29.171)".

[8] IETF RFC 2818: "HTTP Over TLS".

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

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

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

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

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

[11] 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

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

[i.1] SCF 084.07.01: "Small cell zone services - RESTful bindings".

[i.2] SCF 152.07.01: "Small cell services API".

[i.3] OpenAPI Specification.

NOTE 1: Available at https://github.com/OAI/OpenAPI-Specification.

NOTE 2: OpenAPI Specification version 2.0 is recommended as it is the official release at the time of publication.

3 Definitions and abbreviations

3.1 Definitions

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

Anonymous Customer Reference (ACR): Uniform Resource Identifier (URI) scheme describing an anonymous reference that can be mapped to a resource or user/user group

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3.2 Abbreviations

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

ACR	Anonymous Customer Reference
API	Application Programming Interface
E-SMLC	Evolved Serving Mobile Location Centre
ID	Identifier
LS	Location Service
OMA	Open Mobile Alliance
REST	Representational State Transfer
SCF	Small Cell Forum
UE	User Equipment
URI	Uniform Resource Identifier
URL	Uniform Resource Locator

4 Overview

The present document specifies the Location Service API to support the requirements defined for Mobile Edge Computing in ETSI GS MEC 002 [2]. The Location Service (LS) defined in the present document leverages the Zonal Presence service described in SCF 084.07.01 [i.1] and in SCF 152.07.01 [i.2]. The Location Service is accessible through the API defined in the Open Mobile Alliance (OMA) specification "RESTful Network API for Zonal Presence" [5].

In addition to referencing the OMA API [5], the present document contains application instructions on how to apply the OMA API [5] in the MEC environment, and application instructions on how the Anonymous Customer Reference (ACR) defined in [6] can be applied to fulfil the ETSI MEC requirement [Location-04] on addressing user categories defined in ETSI GS MEC 002 [2], and application instructions on how the 3GPP Cell Identifiers defined in ETSI TS 129 171 [7] can be mapped to the Access Point identifier of the OMA API [5].

5 Description of the service (informative)

5.1 Introduction

Location Service is a service to provide the location related information to the Mobile edge platform or authorized applications. With location related information, the Mobile edge platform or applications perform the active device location tracking, location-based service recommendation, etc. see ETSI GS MEC 002 [2]. The Location Service is registered and discovered over the Mp1 reference point defined in ETSI GS MEC 003 [3].

The Location Service supports the location retrieval mechanism, i.e. the location is reported only once for each location information request.

The Location Service supports the location subscribe mechanism, i.e. the location is able to be reported multiple times for each location request, periodically or based on specific events, such as location change.

The Location Service supports the anonymous location report, i.e. without the related UE ID information, e.g. for the statistics collection.

The Location Service supports the following location information:

- the location information of specific UEs currently served by the radio node(s) associated with the Mobile edge host;
- the location information of all UEs currently served by the radio node(s) associated with the Mobile edge host;
- the location information of a certain category of UEs currently served by the radio node(s) associated with the Mobile edge host;
- a list of UEs in a particular location area;
- the specific UEs which move in or out of a particular location area;
- information about the location of all radio nodes currently associated with the Mobile edge host.

The Location Service supports both geolocation, such as a geographical coordinates, and logical location, such as a Cell ID.

5.2 Relation with OMA API for Zonal Presence

The Zonal Presence service utilizes the concept of "zone", defined in OMA API [5]. According to the definition therein, a zone lends itself to be used to group all the radio nodes that are associated to a Mobile edge host, or a subset of them, according to the desired deployment.

The OMA Zonal Presence API provides means to an application to retrieve information about a zone, the access points associated to the zones and the users that are connected to the access points. In addition, the OMA Zonal Presence API, allows authorized application to subscribe to a notification mechanism, reporting about user activities within a zone.

In the present document, clauses 6 and 7 define how the OMA Zonal Presence API is used to provide the Mobile edge Location Service.

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5.3 Sequence diagrams

5.3.1 Introduction

Clauses 5.3.2 to 5.3.7 describe how the Service Consumers interact with the Location Service over LS API to obtain location information of a UE, a group of UEs or the radio nodes currently associated with the Mobile edge host. The sequence diagrams that are relevant for the Location Service are presented.

The Service Consumers communicate with the Location Service over the LS API. Both the Mobile edge application and Mobile edge platform can be Service Consumers. Location information can be provided by both Mobile edge platform and Mobile edge application.

The Location Service API supports both queries and subscriptions (pub/sub mechanism) that can be used over RESTful API as per the mechanism in OMA API [5].

5.3.2 UE Location Lookup

The UE Location Lookup is the procedure for applications acquiring the current location information of a specific UE or a group of UEs. In this procedure, the Location Service will report the lookup result once on each request.

The UE Location Lookup procedure is illustrated in figure 5.3.2-1.

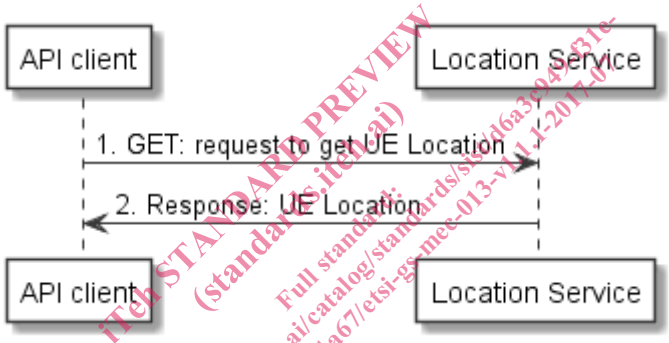

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Figure 5.3.2-1: Flow of UE Location Lookup

1) The Mobile edge application looks up an UE location by sending a request to the resource representing the UE location, which includes the UE(s) identifier, e.g. UE IP address.

2) The Location Service returns a response with a message body including the location information of the UE(s) if the UE location lookup is accepted.

5.3.3 UE Information Lookup

The UE Information Lookup is the procedure for applications acquiring information of a list of UEs in a particular location. In this procedure, the Location Service will report the lookup result once on each request.

The UE Information Lookup procedure is illustrated in figure 5.3.3-1.

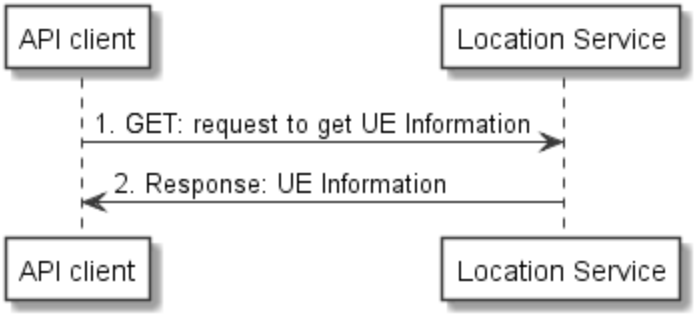

Figure 5.3.3-1: Flow of UE Information Lookup

1) The Mobile edge application looks up UE information in a particular area by sending a request to the resource representing the UE Information, which includes location area information.

2) The Location Service returns a response with a message body including the list of UEs in the location area, if the UE information lookup is accepted.

5.3.4 UE Location Subscribe

The UE Location Subscribe is the procedure for applications acquiring up-to-data location information of a specific UE or a group of UEs in a period, which help the applications to track the UE(s). In this procedure, the Location Service will continue to report the subscribed information until the subscription is cancelled.

The UE Location Subscribe procedure is illustrated in figure 5.3.4-1.

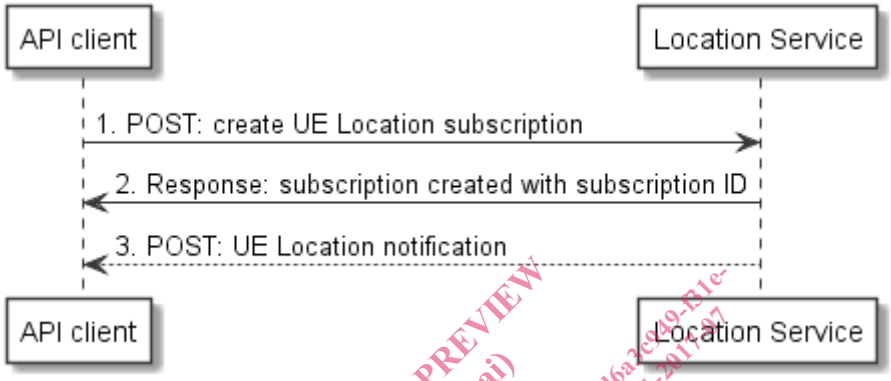

Figure 5.3.4-1: Flow of UE Location Subscribe

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1) The Mobile edge application subscribes to UE location notification by requesting the creation of a resource containing the subscription details, which includes UE(s) identifier, e.g. UE IP address, and a callbackURL for receiving the UE location.

2) The Location Service returns a response with resource URI containing the subscriptionId.

3) The Location Service reports the up-to-data subscribed information to the ME application by sending a message with the message body containing the UE Location notification to the callbackURL, which includes location information.

5.3.5 UE Information Subscribe

The UE Information Subscribe is the procedure for applications to receive notifications of UE Information updates for the list of UEs in a particular location. The UE Information can be to update the status changes or periodic notifications of UE information. In this procedure, the Location Service will continue to report the subscribed information until the subscription is cancelled.

The UE Information Subscribe procedure is illustrated in figure 5.3.5-1.