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Multi-access Edge Computing (MEC);

Location API

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**Group Specification**

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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

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# 1 Scope

The present document focuses on the MEC 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.

# 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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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: "Mobile Edge Computing (MEC); Technical Requirements".

[3] ETSI GS MEC 003: "Multi-access 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-TerminalLocation-V1-0-1-20151029-A: "RESTful Network API for Terminal Location".

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

[8] 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)".

[9] Void.

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

NOTE: Available at <https://www.rfc-editor.org/rfc/rfc5246>.

[11] IETF RFC 6749: "The Oauth 2.0 Authorization Framework".

NOTE: Available at <https://www.rfc-editor.org/rfc/rfc6749>.

[12] IETF RFC 6750: "The Oauth 2.0 Authorization Framework: Bearer Token Usage".

NOTE: Available at <https://www.rfc-editor.org/rfc/rfc6750>.

[13] National Geospatial-Intelligence Agency (NGA) Standardization Document, World Geodetic System 1984, Its Definition and Relationships with Local Geodetic Systems, NGA.STND.0036-1.0.0-WGS84, 2014-07-08, Version 1.0.0.

NOTE: Available at <https://earth-info.nga.mil/php/download.php?file=coord-wgs84>.

[14] ETSI TS 123 032: "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); Universal Geographical Area Description (GAD) (3GPP TS 23.032).

[15] IETF RFC 6225: "Dynamic Host Configuration Protocol Options for Coordinate-Based Location Configuration Information".

NOTE: Available at <https://www.rfc-editor.org/rfc/rfc6225>.

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

NOTE: Available at <https://www.rfc-editor.org/rfc/rfc8446>.

[17] ETSI TS 129 572: "5G System;Location Management Services;Stage 3 (3GPP TS 29.572)".

## 2.2 Informative references

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

# 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] 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

## 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:

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

WGS World Geodetic System

# 4 Overview

The present document specifies the Location Service API to support the requirements defined for Multi-access 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 present document references some data types defined in the Open Mobile Alliance (OMA) specification "RESTful Network API for Zonal Presence" [5] and "RESTful Network API for Terminal Location" [6].

In addition, the present document contains application instructions on how the Anonymous Customer Reference (ACR) defined in [7] 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 [8] can be mapped to the Access Point identifier of the OMA API [5].

The causes of the dramatic change from V2 to V3 are as follows:

1. To support the WebSocket feature, several new data types and resources need to be defined instead of being referenced from the OMA specifications, e.g. UserLocationEventSubscription, UserLocationPeriodicSubscription, etc.
2. Civic address and relative location are added to enhance the location services.
3. For better understanding, some modifications are implemented, including the combination of some similar procedures and deletion of redundant procedures.

# 5 Description of the service (informative)

## 5.1 Introduction

Location Service is a service to provide the location related information to the MEC platform or authorized applications. With location related information, the MEC 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 MEC host;
* the location information of all UEs currently served by the radio node(s) associated with the MEC host;
* the distance between specified UEs currently served by the radio node(s) associated with the MEC host;
* the distance between a specified location and a UE currently served by the radio node(s) associated with the MEC host;
* the location information of a certain category of UEs currently served by the radio node(s) associated with the MEC 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 MEC host;
* subscriptions to location information are also offered, including periodic location information updates, updates on changes in distance and location updates relating to UEs in a particular location area.

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

## 5.2 Relation with OMA

### 5.2.1 Void

### 5.2.2 Void

### 5.2.3 General

The Location Service before version 3.1.1 references the APIs and the data types defined in [5] and [6] with slight modifications on the URI of the service. Beginning with version 3.1.1, the LS defines its data types and APIs in support of other location information (e.g. civic address, relative location) and the websocket feature of the subscription. However, the present document still references some data types to avoid duplicate work. See clause 6.2.1 and clause 6.2.1A for detailed information.

## 5.3 Sequence diagrams

### 5.3.1 Introduction

Clauses 5.3.2 to 5.3.11 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 MEC 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 MEC application and MEC platform can be Service Consumers. Location information can be provided by both MEC platform and MEC 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 APIs [5] and [6].

### 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.

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

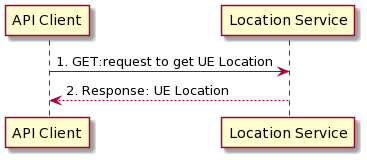


Figure 5.3.2-1: Flow of UE Location Lookup

1) The MEC application looks up UE location by sending a request to the resource representing the UE location, which includes location area information. The request may optionally include one or more query parameters specifying the sub-region of interest, the Access Point identifier and requirements on reporting timeliness and accuracy.

2) The Location Service returns a response with a message body including the UE location of the UE(s) according to the query parameters, if the UE location lookup is accepted.

### 5.3.3 Void

### 5.3.4 UE Location Subscribe

The UE Location Subscribe is the procedure for applications to request to receive notifications about some events happened, e.g. location information changes of a specific UE or a group of UEs or timer expiration, which for instance may help the applications to regularly track the UE(s) location. In this procedure, the Location Service will continue to report the subscribed information until the subscription is cancelled, or an optional specified time limit.

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

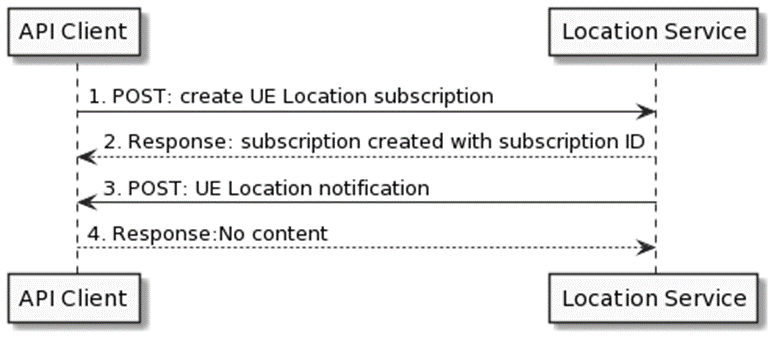


Figure 5.3.4-1: Flow of UE Location Subscribe

1) The MEC 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 MEC application by sending a message with the message body containing the UE Location notification to the callbackURL, which includes location information.

4) The MEC application returns a response with the code 204.

### 5.3.5 Zone Location Event Subscribe

The Zone Location Event Subscribe is the procedure for API clients to receive notifications of UE location events related with a zone, e.g. UE entering the zone, UE leaving the zone. In this procedure, the Location Service will continue to report the subscribed information until the subscription is cancelled.

The Zone Location Event Subscribe procedure is illustrated in figure 5.3.5-1.

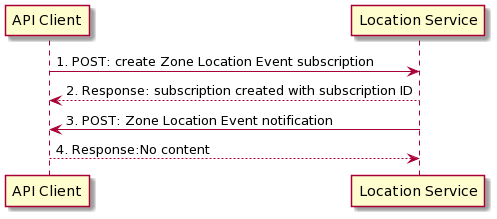


Figure 5.3.5-1: Flow of Zone Location Event Subscribe

1) The API Client (e.g. MEC application) subscribes to the Zone Location Event notification for azone by requesting the creation of a resource containing all subscription details, which includes zone Id and a callbackURL for receiving the notifications.

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

3) The Location Service reports the subscribed information to the API Client by sending a message with the request body containing the UE location event related with the zone to the callbackURL.

4) The API Client returns a response with the code 204.

### 5.3.5A Zone Status Subscribe

The Zone Status Subscribe is the procedure for applications to receive notifications of the number of UEs reaching threshold or the status of access point changing. In this procedure, the Location Service will continue to report the subscribed information until the subscription is cancelled.

The Zone Status Subscribe procedure is illustrated in figure 5.3.5A-1.

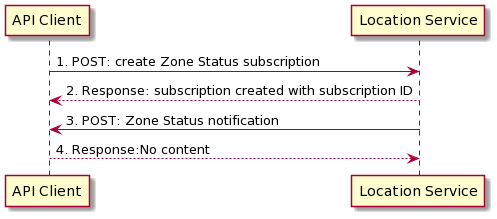


Figure 5.3.5A-1: Flow of Zone Status Subscribe

1) The API Client (e.g. MEC application) subscribes to the Zone Status notification for a particular area by requesting the creation of a resource containing all subscription details, which includes zone Id and a callbackURL for receiving the notifications.

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

3) The Location Service reports the subscribed information to the API Client by sending a message with the request body containing the zone status notification to the callbackURL.

4) The API Client returns a response with the code 204.

### 5.3.6 Subscribe Cancellation

The Subscribe Cancellation is the procedure for applications to cancel the subscription, with which the Location Service stop reporting the subscribed information to the application.

The Subscribe Cancellation procedure is illustrated in figure 5.3.6-1.

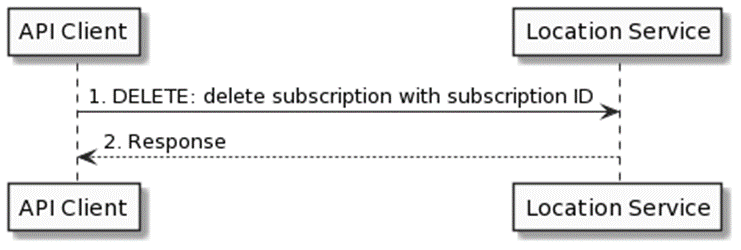


Figure 5.3.6-1: Flow of Location Subscribe Cancellation

1) The MEC application unsubscribes to notifications by sending a request to delete the resource URI containing the subscriptionId.

2) The Location Service returns a successful response if the subscription cancellation is accepted.

### 5.3.6A Zone List Lookup

The Zone List Lookup procedure enables an API client to make an enquiry about all the zones currently associated with the MEC host. The Zone List Lookup procedure is illustrated in figure 5.3.6A-1.

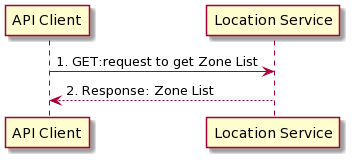


Figure 5.3.6A-1: Zone List Lookup

1) The API Client (e.g. MEC application) makes an enquiry about the zones currently associated with the MEC host by sending a request to the resource representing zones information.

2) The Location Service returns a response with message body including the list of zones currently associated with the MEC host.

### 5.3.7 Access Point List Lookup

The Access Point List Lookup procedure enables an API client to make an information enquiry about the access points currently associated with the MEC host. The Access Point List Lookup procedure is illustrated in figure 5.3.7-1.

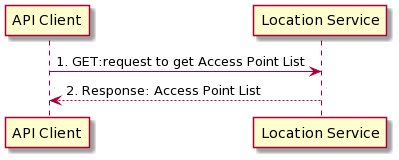


Figure 5.3.7-1: Access Point List Lookup

1) The API Client (e.g. MEC application) makes an enquiry about the access points currently associated with the MEC host by sending a request to the resource representing access point information, e.g. E-CGI as per ETSI TS 129 171 [8].

2) The Location Service returns a response with message body including the list of access points currently associated with the MEC host and the information of each access point.

### 5.3.8 Void

### 5.3.9 UE Distance Lookup

The UE Distance Lookup is the procedure for applications acquiring the current distance of a specific UE to a geographical location, or another UE.

The UE Distance Lookup procedure is illustrated in figure 5.3.9-1.

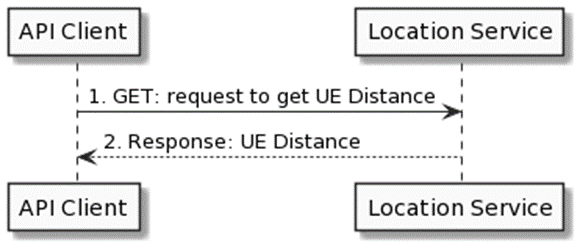


Figure 5.3.9-1: Flow of UE Distance Lookup

1) The MEC application looks up an UE distance by sending a request to the resource representing the UE distance, which includes the two UE identities, e.g. UE IP address, or a single UE identifier plus the coordinates of the location to measure from.

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

### 5.3.10 UE Distance Subscribe

The UE Distance Subscribe is the procedure for applications acquiring up-to-data distance of a specific UE to a geographical location, or another UE. In this procedure, the Location Service will continue to report the subscribed information until the subscription is cancelled.

The UE Distance Subscribe procedure is illustrated in figure 5.3.10-1.

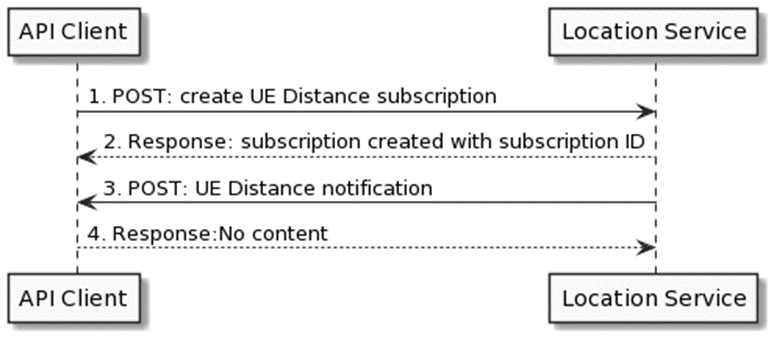


Figure 5.3.10-1: Flow of UE Distance Subscribe

1) The MEC application subscribes to UE distance notification by requesting the creation of a resource containing the subscription details, with a callbackURL for receiving the UE distance. It also includes the UE identities, e.g. UE IP address, between which to calculate the distances, the required accuracy and the minimum interval between notifications.

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 MEC application by sending a message with the message body containing the UE Distance notification to the callbackURL, which includes distance information.

4) The MEC application returns a response with the code 204.

### 5.3.11 UE Area Subscribe

The UE Area Subscribe is the procedure for applications acquiring UE movement notifications in relation to a geographic area. In this procedure, the Location Service will continue to report the subscribed information until the subscription is cancelled.

The UE Area Subscribe procedure is illustrated in figure 5.3.11-1.

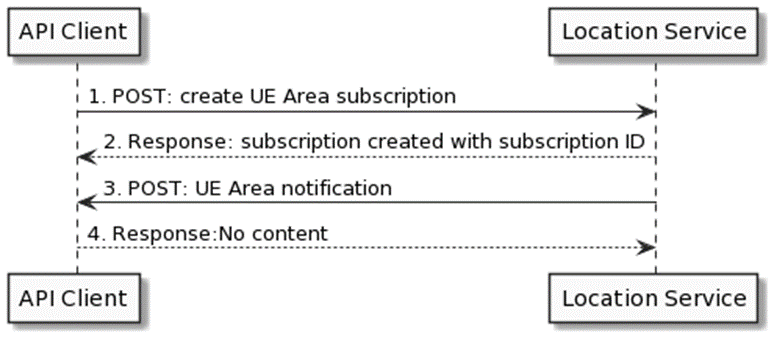


Figure 5.3.11-1: Flow of UE Area Subscribe

1) The MEC application subscribes to UE Area notifications by requesting the creation of a resource containing the subscription details, which includes the UE identities, e.g. UE IP address, and a callbackURL for receiving the UE Area notification. Also included is the area definition, the required accuracy, the minimum interval between notifications and whether notifications should be generated on entering, or leaving the area, or both.

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 MEC application by sending a message with the message body containing the UE Area notification to the callbackURL, which includes area information.

4) The MEC application returns a response with the code 204.

# 6 Data Model

## 6.1 Introduction

Data types from the APIs defined in [5] and in [6] are reused. The following application instructions describe the mapping between the terminology used in the OMA specifications and the terminologies used in ETSI MEC and ETSI TS 129 171 [8].

The elements specified in OMA APIs' data models in [5] and [6] shall be represented as a JSON object. Moreover, the elements therein with upperbound cardinality greater than 1, e.g. "0.. N", "1.. N", etc., shall be represented as a JSON array.

## 6.2 Resource data types

### 6.2.1 Zonal presence data types

The data structures to be used in resource representations for the Location Service API consist in the following data types defined in [5], clause 5:

* ZoneList  
  A type containing list of zones' information;
* ZoneInfo  
  A type containing zone information;
* AccessPointList  
  A type containing list of access points' information;
* AccessPointInfo  
  A type containing access point information; the element ConnectionType is redefined in clause 6.7.5.

### 6.2.1A Terminal location data types

In addition, further data types as defined in [6], clause 5, are offered:

* TerminalLocation  
  A type containing device address, retrieval status and location information;
* TerminalDistance  
  A type containing information about the distance from a terminal to a location or between two terminals.

### 6.2.2 Type: UserInfo

This type represents the information related to a user attached to an access point associated to the MEC host, such access point is in scope of the Location Service instance.

The UserInfo data type extends the UserInfo data type defined in [5], and its elements shall follow the notations provided in table 6.2.2-1.

Table 6.2.2-1: Definition of type UserInfo

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| address | AnyURI | 1 | Address of user (e.g. 'sip' URI, 'tel' URI, 'acr' URI) currently on the access point, see note 1. |
| AccessPointId | String | 1 | The identity of the access point the user is currently on, see note 1. |
| zoneId | String | 1 | The identity of the zone the user is currently within, see note 1. |
| resourceURL | AnyURI | 0..1 | Self-referring URL, see note 1. This shall be only included in the procedure of UE Location Lookup. |
| timeStamp | TimeStamp | 1 | Date and time that location was collected. |
| locationInfo | LocationInfo | 0..1 | The geographical coordinates where the user is. |
| civicInfo | CivicAddress | 0..1 | Contextual information of a user location (e.g. aisle, floor, room number, etc.). See note 3. |
| ancillaryInfo | String | 0..1 | Reserved for future use. |
| relativeLocationInfo | RelativeLocationInfo | 0..1 | The relative location in a reference system. |
| NOTE 1: As specified in [5], clause 5.2.2.7.  NOTE 2: Void.  NOTE 3: As specified in [17], clause 6.1.6.2.14. | | | |

The address sub-element supports the representation of the UE's IP address, as specified in clause 6.6.2.

### 6.2.3 Type: RelativeLocationInfo

This type represents the relative location in a reference system that is a Cartesian coordinate system and described by a map.

Table 6.2.3-1: Definition of type RelativeLocationInfo

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| mapInfo | MapInfo | 1 | Indicates a map corresponding to a location area. |
| X | Float | 1 | Indicates the value (in the unit of meters) on x-axis of the relative location in the Cartesian system.  Positive value represents easting from origin. |
| Y | Float | 1 | Indicates the value (in the unit of meters) on y-axis of the relative location in the Cartesian system.  Positive value represents northing from origin. |
| Z | Float | 0..1 | Indicates the value (in the unit of meters) on z-axis of the relative location in the Cartesian system for a 3D‑Point.  Positive value represents height above origin. |

### 6.2.4 Type: MapInfo

This type represents a map that may incorporates an origin. For the sake of security, the location of map origin could be configured to the service consumer instead of being transported explicitly. The ancillaryMapInfo may help the service consumer do coordinates conversion, e.g. converting Cartesian coordinate to Universal Transverse Mercator (UTM) coordinate.

Table 6.2.4-1: Definition of type MapInfo

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| mapId | String | 1 | Indicates the ID of the map. |
| origin | Structure(inlined) | 0..1 | Indicates the location of the map origin in the local Cartesian coordinate system. |
| >latitude | Float | 1 | Location latitude, expressed in the range -90° to +90°. |
| >longitude | Float | 1 | Location longitude, expressed in the range -180° to +180°. |
| >altitude | Float | 0..1 | Location altitude relative to the WGS84 ellipsoid surface. |
| ancillaryMapInfo | Not specified | 0..1 | Ancillary map information may be used to convert coordinates between different coordinate systems. |

### 6.2.5 Type: UserList

This type represents a list of UserInfo.

Table 6.2.5-1: Definition of type UserList

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| user | Array(UserInfo) | 0..N | Collection of the user location information list. |
| resourceURL | Uri | 0..1 | Self referring URL. This shall be only included in the procedure of UE Location Lookup. |

## 6.3 Subscription data types

### 6.3.1 Void

### 6.3.2 Void

### 6.3.3 Type: NotificationSubscriptionList

This type contains a list of subscriptions.

Table 6.3.3-1: Definition of type NotificationSubscriptionList

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| subscription | Structure (inlined) | 0..N |  |
| >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 defined in clauses 6.3.4, 6.3.5, 6.3.6, 6.3.7 6.3.8 and 6.3.9:  "UserLocationEventSubscription"  "UserLocationPeriodicSubscription"  "ZoneLocationEventSubscription"  "ZoneStatusSubscription"  "UserAreaSubscription"  "UserDistanceSubscription" |
| resourceURL | LinkType | 1 | Self-referring URL. |
| NOTE 1: Void.  NOTE 2: Void. | | | |

### 6.3.4 Type: UserLocationEventSubscription

This type represents a subscription to the notifications from location server about events related with user location.

The attributes of the UserLocationEventSubscription shall follow the indications provided in table 6.3.4-1.

Table 6.3.4-1: Definition of type UserLocationEventSubscription

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| subscriptionType | String | 1 | Shall be set to "UserLocationEventSubscription". |
| clientCorrelator | String | 0..1 | A correlator that the client can use to tag this particular resource representation during a request to create a resource on the server. See note 2. |
| callbackReference | Uri | 0..1 | URI exposed by the client on which to receive notifications via HTTP. See note 1. |
| requestTestNotification | Boolean | 0..1 | Set to TRUE by the service consumer to request a test notification via HTTP on the callbackReference URI, as specified in ETSI GS MEC 009 [4], clause 6.12a. |
| websockNotifConfig | WebsockNotifConfig | 0..1 | Provides details to negotiate and signal the use of a Websocket connection between the location server and the service consumer for notifications. See note 1. |
| \_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 UE Location Subscribe as it acts as an ID for the subscription. |
| address | Uri | 1 | Address of user (e.g. 'sip' URI, 'tel' URI, 'acr' URI) to monitor. |
| userEventPara | UserEventPara | 0..1 | Requirements for user event reporting. |
| locationEventCriteria | Array(LocationEventType) | 0..N | List of user event values to generate notifications for (these apply to address specified). |
| expiryDeadline | TimeStamp | 0..1 | The expiration time of the subscription determined by the UE Location Subscribe Service. |
| NOTE 1: At least one of callbackReference and websockNotifConfig shall be provided by the service consumer. If both are provided, it is up to location server to select an alternative and return only that alternative in the response, as specified in ETSI GS MEC 009 [4], clause 6.12a.  NOTE 2: This allows the client to recover from communication failures during resource creation and therefore avoids duplicate subscription creation in such situations. In case the element is present, the server shall not alter its value, and shall provide it as part of the representation of this resource. In case the element is not present, the server shall not generate it. | | | |

### 6.3.5 Type: UserLocationPeriodicSubscription

This type represents a subscription to the notifications from location server about events triggered by timer expiration.

The attributes of the UserLocationPeriodicSubscription shall follow the indications provided in table 6.3.5-1.

Table 6.3.5-1: Definition of type UserLocationPeriodicSubscription

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| subscriptionType | String | 1 | Shall be set to "UserLocationPeriodicSubscription". |
| clientCorrelator | String | 0..1 | A correlator that the client can use to tag this particular resource representation during a request to create a resource on the server. See note 2. |
| callbackReference | Uri | 0..1 | URI exposed by the client on which to receive notifications via HTTP. See note 1. |
| requestTestNotification | Boolean | 0..1 | Set to TRUE by the service consumer to request a test notification via HTTP on the callbackReference URI, as specified in ETSI GS MEC 009 [4], clause 6.12a. |
| websockNotifConfig | WebsockNotifConfig | 0..1 | Provides details to negotiate and signal the use of a Websocket connection between the location server and the service consumer for notifications. See note 1. |
| \_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 UE Location Subscribe as it acts as an ID for the subscription. |
| address | Uri | 1 | Address of user (e.g. 'sip' URI, 'tel' URI, 'acr' URI) to monitor. |
| periodicEventInfo | PeriodicEventInfo | 1 | Information for periodic event reporting. See note 3. |
| expiryDeadline | TimeStamp | 0..1 | The expiration time of the subscription determined by the UE Location Subscribe Service. |
| NOTE 1: At least one of callbackReference and websockNotifConfig shall be provided by the service consumer. If both are provided, it is up to location server to select an alternative and return only that alternative in the response, as specified in ETSI GS MEC 009 [4], clause 6.12a.  NOTE 2: This allows the client to recover from communication failures during resource creation and therefore avoids duplicate subscription creation in such situations. In case the element is present, the server shall not alter its value, and shall provide it as part of the representation of this resource. In case the element is not present, the server shall not generate it.  NOTE 3: As specified in [17], clause 6.1.6.2.24. | | | |

### 6.3.6 Type: ZoneLocationEventSubscription

This type represents a subscription to the notifications from location server about user location events happened in the zone.

The attributes of the ZoneLocationEventSubscription shall follow the indications provided in table 6.3.6-1.

Table 6.3.6-1: Definition of type ZoneLocationEventSubscription

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| subscriptionType | String | 1 | Shall be set to "ZoneLocationEventSubscription". |
| clientCorrelator | String | 0..1 | A correlator that the client can use to tag this particular resource representation during a request to create a resource on the server. See note 2. |
| callbackReference | Uri | 0..1 | URI exposed by the client on which to receive notifications via HTTP. See note 1. |
| requestTestNotification | Boolean | 0..1 | Set to TRUE by the service consumer to request a test notification via HTTP on the callbackReference URI, as specified in ETSI GS MEC 009 [4], clause 6.12a. |
| websockNotifConfig | WebsockNotifConfig | 0..1 | Provides details to negotiate and signal the use of a Websocket connection between the location server and the service consumer for notifications. See note 1. |
| \_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 UE Location Subscribe as it acts as an ID for the subscription. |
| zoneId | String | 1 | Identifier of zone (e.g. zone001) to monitor. |
| addressList | Array(Uri) | 0..N | List of the users to be monitored. If not present, all the users need to be monitored. |
| locationEventCriteria | Array(LocationEventType) | 0..N | List of user event values to generate notifications for. |
| reportingCtrl | ReportingCtrl | 0..1 | Provides parameters that ctrl the reporting. |
| expiryDeadline | TimeStamp | 0..1 | The expiration time of the subscription determined by the Zone Location Event Service. |
| NOTE 1: At least one of callbackReference and websockNotifConfig shall be provided by the service consumer. If both are provided, it is up to location server to select an alternative and return only that alternative in the response, as specified in ETSI GS MEC 009 [4], clause 6.12a.  NOTE 2: This allows the client to recover from communication failures during resource creation and therefore avoids duplicate subscription creation in such situations. In case the element is present, the server shall not alter its value, and shall provide it as part of the representation of this resource. In case the element is not present, the server shall not generate it. | | | |

### 6.3.7 Type: ZoneStatusSubscription

This type represents a subscription to the notifications from location server about the number of users reaching the threshold or the status of access points changing.

The attributes of the ZoneStatusSubscription shall follow the indications provided in table 6.3.7-1.

Table 6.3.7-1: Definition of type ZoneStatusSubscription

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| subscriptionType | String | 1 | Shall be set to "ZoneStatusSubscription". |
| clientCorrelator | String | 0..1 | A correlator that the client can use to tag this particular resource representation during a request to create a resource on the server. See note 2. |
| callbackReference | Uri | 0..1 | URI exposed by the client on which to receive notifications via HTTP. See note 1. |
| requestTestNotification | Boolean | 0..1 | Set to TRUE by the service consumer to request a test notification via HTTP on the callbackReference URI, as specified in ETSI GS MEC 009 [4], clause 6.12a. |
| websockNotifConfig | WebsockNotifConfig | 0..1 | Provides details to negotiate and signal the use of a Websocket connection between the location server and the service consumer for notifications. See note 1. |
| \_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 UE Location Subscribe as it acts as an ID for the subscription. |
| zoneId | String | 1 | Identifier of zone (e.g. zone001) to monitor. |
| upperNumberOfUsersZoneThreshold | UnsignedInt | 0..1 | Threshold number of users in a zone which if crossed upward shall cause a notification. |
| lowerNumberOfUsersZoneThreshold | UnsignedInt | 0..1 | Threshold number of users in a zone which if crossed downward shall cause a notification. |
| upperNumberOfUsersAPThreshold | UnsignedInt | 0..1 | Threshold number of users in an access point which if crossed upward shall cause a notification. |
| lowerNumberOfUsersAPThreshold | UnsignedInt | 0..1 | Threshold number of users in an access point which if crossed downward shall cause a notification. |
| operationStatus | OperationStatus | 0..N | List of operation status values to generate notifications for (these apply to all access points within a zone). See note 3. |
| reportingCtrl | ReportingCtrl | 0..1 | Provides parameters that ctrl the reporting. |
| expiryDeadline | TimeStamp | 0..1 | The expiration time of the subscription determined by the Zone Status Service. |
| NOTE 1: At least one of callbackReference and websockNotifConfig shall be provided by the service consumer. If both are provided, it is up to location server to select an alternative and return only that alternative in the response, as specified in ETSI GS MEC 009 [4], clause 6.12a.  NOTE 2: This allows the client to recover from communication failures during resource creation and therefore avoids duplicate subscription creation in such situations. In case the element is present, the server shall not alter its value, and shall provide it as part of the representation of this resource. In case the element is not present, the server shall not generate it.  NOTE 3: As specified in [5], clause 5.2.3.2. | | | |

### 6.3.8 Type: UserAreaSubscription

This type represents a subscription to the notifications from location server about user location events happened in the area.

The attributes of the UserAreaSubscription shall follow the indications provided in table 6.3.8-1.

Table 6.3.8-1: Definition of type UserAreaSubscription

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| subscriptionType | String | 1 | Shall be set to "UserAreaSubscription". |
| clientCorrelator | String | 0..1 | A correlator that the client can use to tag this particular resource representation during a request to create a resource on the server. See note 2. |
| callbackReference | Uri | 0..1 | URI exposed by the client on which to receive notifications via HTTP. See note 1. |
| requestTestNotification | Boolean | 0..1 | Set to TRUE by the service consumer to request a test notification via HTTP on the callbackReference URI, as specified in ETSI GS MEC 009 [4], clause 6.12a. |
| websockNotifConfig | WebsockNotifConfig | 0..1 | Provides details to negotiate and signal the use of a Websocket connection between the location server and the service consumer for notifications. See note 1. |
| \_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 UE Location Subscribe as it acts as an ID for the subscription. |
| areaDefine | AreaInfo | 1 | The parameters describing the area to subscribe. |
| addressList | Array(Uri) | 1..N | List of the users to be monitored. |
| trackingAccuracy | Float | 1 | Number of meters of acceptable error. |
| locationEventCriteria | Array(LocationEventType) | 0..N | List of user event values to generate notifications for (these apply to address specified). |
| reportingCtrl | ReportingCtrl | 0..1 | Provides parameters that ctrl the reporting. |
| reportingLocationReq | boolean | 0..1 | This IE shall be set to true if a location estimate is required for each event report. |
| expiryDeadline | TimeStamp | 0..1 | The expiration time of the subscription determined by the UE Area Subscribe Service. |
| NOTE 1: At least one of callbackReference and websockNotifConfig shall be provided by the service consumer. If both are provided, it is up to location server to select an alternative and return only that alternative in the response, as specified in ETSI GS MEC 009 [4], clause 6.12a.  NOTE 2: This allows the client to recover from communication failures during resource creation and therefore avoids duplicate subscription creation in such situations. In case the element is present, the server shall not alter its value, and shall provide it as part of the representation of this resource. In case the element is not present, the server shall not generate it. | | | |

6.3.9 Type: UserDistanceSubscription

This type represents a subscription to the notifications from location server about changes in the geographical relationships between monitored users or between monitored users and reference users.

The attributes of the UserDistanceSubscription shall follow the indications provided in table 6.3.9-1.

Table 6.3.9-1: Definition of type UserDistanceSubscription

|  |  |  |  |
| --- | --- | --- | --- |
| **Attribute name** | **Data type** | **Cardinality** | **Description** |
| subscriptionType | String | 1 | Shall be set to "UserDistanceSubscription". |
| clientCorrelator | String | 0..1 | A correlator that the client can use to tag this particular resource representation during a request to create a resource on the server. See note 2. |
| callbackReference | Uri | 0..1 | URI exposed by the client on which to receive notifications via HTTP. See note 1. |
| requestTestNotification | Boolean | 0..1 | Set to TRUE by the service consumer to request a test notification via HTTP on the callbackReference URI, as specified in ETSI GS MEC 009 [4], clause 6.12a. |
| websockNotifConfig | WebsockNotifConfig | 0..1 | Provides details to negotiate and signal the use of a Websocket connection between the location server and the service consumer for notifications. See note 1. |
| \_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 User Distance Subscribe as it acts as an ID for the subscription. |
| referenceAddress | Array (Uri) | 0..N | If specified, indicates address of each user that will be used as reference users from which the distances towards monitored users indicated in the Addresses will be monitored (e.g., 'sip' URI, 'tel' URI, 'acr' URI). Reference to a group could be provided here if supported by implementation. |
| monitoredAddress | Array (Uri) | 1..N | Contains addresses of users to monitor (e.g. 'sip' URI, 'tel' URI, 'acr' URI). Reference to a group could be provided here if supported by implementation.  If the ReferenceAddress is specified, then the distance between each monitored user and reference user(s) will be monitored.  If the ReferenceAddress is not present, then the distance between each pair of the monitored users will be monitored. Note that in that case there shall be at least two addresses specified here. |
| distance | Float | 1 | Distance between users that shall be monitored. The unit is meter. |
| trackingAccuracy | Float | 1 | Number of meters of acceptable error in tracking distance. |
| criteria | DistanceCriteria | 1 | Indicates whether the notification should occur when the geographical relationship between monitored and referenced users' changes. See note 3. |
| checkImmediate | Bool | 1 | Check location immediately after establishing notification. |
| reportingCtrl | ReportingCtrl | 0..1 | Provides parameters that ctrl the reporting. |
| expiryDeadline | TimeStamp | 0..1 | The expiration time of the subscription determined by the UE Distance Subscribe Service. |
| NOTE 1: At least one of callbackReference and websockNotifConfig shall be provided by the service consumer. If both are provided, it is up to location server to select an alternative and return only that alternative in the response, as specified in ETSI GS MEC 009 [4], clause 6.12a.  NOTE 2: This allows the client to recover from communication failures during resource creation and therefore avoids duplicate subscription creation in such situations. In case the element is present, the server shall not alter its value, and shall provide it as part of the representation of this resource. In case the element is not present, the server shall not generate it.  NOTE 3: As specified in [6], clause 5.2.3.2. | | | |

## 6.4 Notifications data types

### 6.4.1 Void

### 6.4.2 Void

### 6.4.3 Type: TestNotification

This type represents a test notification from a location server to determine if the Websocket method is to be utilized for the location server to issue notifications for a subscription, as defined in clause 6.12a of ETSI GS MEC 009 [4].

Table 6.4.3-1: 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. |

### 6.4.4 Type: UserLocationEventNotification

This type represents a notification from location server with regards to UE location event. The notification is sent by the location server to inform about the modification of UE location.

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

Table 6.4.4-1: Attributes of the UserLocationEventNotification

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| notificationType | String | 1 | Shall be set to "UserLocationEventNotification". |
| timeStamp | TimeStamp | 0..1 | Time stamp. |
| address | Uri | 0..1 | Address of user (e.g. 'sip' URI, 'tel' URI, 'acr' URI). |
| userLocationEvent | LocationEventType | 1 | The specific event triggering this notification, e.g. "ENTERING\_AREA\_EVENT", "LEAVING\_AREA\_EVENT". |
| locationInfo | LocationInfo | 0..1 | The geographical coordinates where the user is. See note 3. |
| civicInfo | CivicAddress | 0..1 | Contextual information of a user location (e.g. aisle, floor, room number, etc.). See note 1 and note 3. |
| relativeLocationInfo | RelativeLocationInfo | 0..1 | The relative location in a reference system. See note 3. |
| zoneId | String | 0..1 | The identity of the zone.  For the events of "ENTERING\_AREA\_EVENT", it is the zone that the user is currently within.  For the event of "LEAVING\_AREA\_EVENT", it is the zone that the user used to be within.  See note 2. |
| accessPointId | String | 0..1 | The identity of the access point.  For the events of "ENTERING\_AREA\_EVENT", it indicates the access point that the user is currently within.  For the event of "LEAVING\_AREA\_EVENT", it indicates the access point that the user used to be within.  See note 2. |
| \_links | Structure(inlined) | 1 | Object containing hyperlinks related to the resource. |
| >subscription | LinkType | 1 | A link to the related subscription. |
| NOTE 1: As specified in [17], clause 6.1.6.2.14.  NOTE 2: As specified in [5], clause 5.2.2.7.  NOTE 3: At least one of these attributes shall be present only when reportingLocationReq is set to TRUE in the UserLocationEventSubscription. | | | |

### 6.4.5 Type: UserLocationPeriodicNotification

This type represents a notification from location server with regards to UE location periodic reporting. The notification is sent by the location server periodically for monitoring the UE location.

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

Table 6.4.5-1: Attributes of the UserLocationPeriodicNotification

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| notificationType | String | 1 | Shall be set to "UserLocationPeriodicNotification". |
| timeStamp | TimeStamp | 0..1 | Time stamp. |
| address | Uri | 0..1 | Address of user (e.g. 'sip' URI, 'tel' URI, 'acr' URI). |
| result | NotificationResult | 1 | The result of Localization. See note 3. |
| locationInfo | LocationInfo | 0..1 | The geographical coordinates where the user is. |
| civicInfo | CivicAddress | 0..1 | Contextual information of a user location (e.g. aisle, floor, room number, etc.). See note 1. |
| relativeLocationInfo | RelativeLocationInfo | 0..1 | The relative location in a reference system. |
| zoneId | String | 0..1 | The identity of the zone that the user is currently within.  See note 2. |
| accessPointId | String | 0..1 | The identity of the access point that the user is currently within.  See note 2. |
| isFinalNotification | Boolean | 0..1 | Shall be set to true if it is a final notification. |
| \_links | Structure(inlined) | 1 | Object containing hyperlinks related to the resource. |
| >subscription | LinkType | 1 | A link to the related subscription. |
| NOTE 1: As specified in [17], clause 6.1.6.2.14.  NOTE 2: As specified in [5], clause 5.2.2.7.  NOTE 3: If the result is SUCCESS, at least one of locationInfo, civicInfo and relativeLocationInfo shall be present. | | | |

### 6.4.6 Type: ZoneLocationEventNotification

This type represents a notification from location server with regards to UE location event happened in a zone. The notification is sent by the location server to inform about the modification of UE location.

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

Table 6.4.6-1: Attributes of the ZoneLocationEventNotification

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| notificationType | String | 1 | Shall be set to "ZoneLocationEventNotification". |
| timeStamp | TimeStamp | 0..1 | Time stamp. |
| address | Uri | 1 | Address of user (e.g. 'sip' URI, 'tel' URI, 'acr' URI). |
| userLocationEvent | LocationEventType | 1 | The specific event triggering this notification, e.g. "ENTERING\_AREA\_EVENT","LEAVING\_AREA\_EVENT". |
| zoneId | String | 1 | The identity of the zone. |
| \_links | Structure(inlined) | 1 | Object containing hyperlinks related to the resource. |
| >subscription | LinkType | 1 | A link to the related subscription. |

### 6.4.7 Type: ZoneStatusNotification

This type represents a notification from location server with regards to status changing event or user number reaching threshold event happened in a zone.

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

Table 6.4.7-1: Attributes of the ZoneStatusNotification

|  |  |  |  |
| --- | --- | --- | --- |
| **Attribute name** | **Data type** | **Cardinality** | **Description** |
| notificationType | String | 1 | Shall be set to "ZoneStatusNotification". |
| timeStamp | TimeStamp | 0..1 | Time stamp. |
| userNumEvent | Enum(inlined) | 0..1 | Shall be present when ZoneStatusSubscription includes upperNumberOfUsersZoneThreshold, lowerNumberOfUsersZoneThreshold, upperNumberOfUsersAPThreshold or lowerNumberOfUsersAPThreshold, and the number of users in a zone or an access point crosses the threshold defined in the subscription:  1 = OVER\_ZONE\_UPPER\_THD.  2 = UNDER\_ZONE\_LOWER\_THD.  3 = OVER\_AP\_UPPER\_THD.  4 = UNDER\_AP\_LOWER\_THD. |
| operationStatus | OperationStatus | 0..1 | Shall be present when ZoneStatusSubscription includes operationStatus and the operation status value of an access point meets Serviceable or Unserviceable or Unknown defined in the subscription. See note 1. |
| zoneId | String | 1 | The identity of the zone. |
| accessPointId | String | 0..1 | Identifier of an access point (e.g. ap01). Shall be included when userNumEvent related with access point or operationStatus is included. |
| \_links | Structure(inlined) | 1 | Object containing hyperlinks related to the resource. |
| >subscription | LinkType | 1 | A link to the related subscription. |
| NOTE: As specified in [5], clause 5.2.3.2. | | | |

### 6.4.8 Type: UserAreaNotification

This type represents a notification from location server with regards to UE location events happened in an area.

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

Table 6.4.8-1: Attributes of the UserAreaNotification

|  |  |  |  |
| --- | --- | --- | --- |
| **Attribute name** | **Data type** | **Cardinality** | **Description** |
| notificationType | String | 1 | Shall be set to "UserAreaNotification". |
| timeStamp | TimeStamp | 0..1 | Time stamp. |
| address | Uri | 1 | Address of user (e.g. 'sip' URI, 'tel' URI, 'acr' URI). |
| locationInfo | LocationInfo | 0..1 | The geographical coordinates where the user is. See note 2. |
| civicInfo | CivicAddress | 0..1 | Contextual information of a user location (e.g. aisle, floor, room number, etc.). See note 1 and note 2. |
| relativeLocationInfo | RelativeLocationInfo | 0..1 | The relative location in a reference system. See note 2. |
| userLocationEvent | LocationEventType | 1 | The specific event triggering this notification, e.g. "ENTERING\_AREA\_EVENT", "LEAVING\_AREA\_EVENT". |
| \_links | Structure(inlined) | 1 | Object containing hyperlinks related to the resource. |
| >subscription | LinkType | 1 | A link to the related subscription. |
| NOTE 1: As specified in [17], clause 6.1.6.2.14.  NOTE 2: At least one of these attributes shall be present only when reportingLocationReq is set to TRUE in the UserAreaSubscription. | | | |

### 6.4.9 Type: UserDistanceNotification

This type represents a notification from location server with regards to changes in the geographical relationships between monitored users or between monitored users and reference users.

The attributes of the UserDistanceNotification shall follow the indications provided in table 6.4.9-1.

Table 6.4.9-1: Attributes of the UserDistanceNotification

|  |  |  |  |
| --- | --- | --- | --- |
| **Attribute name** | **Data type** | **Cardinality** | **Description** |
| notificationType | String | 1 | Shall be set to "UserDistanceNotification". |
| timeStamp | TimeStamp | 0..1 | Time stamp. |
| monitoredUsers | UserList | 1 | Indicates the location information related to monitored users. |
| distanceEvent | DistanceCriteria | 1 | Indicates the distance event triggering the notification. See note. |
| \_links | Structure(inlined) | 1 | Object containing hyperlinks related to the resource. |
| >subscription | LinkType | 1 | A link to the related subscription. |
| NOTE: As specified in [6], clause 5.2.3.2. | | | |

## 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 can neither be resource representations nor bound to any pub/sub mechanism.

### 6.5.2 Type: TimeStamp

This type represents a time stamp.

Table 6.5.2-1: Attributes of type 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. |

### 6.5.3 Type: LocationInfo

This data type extends the LocationInfo data type defined in [5], clause 5.2.2.5, and its elements shall follow the notations provided in table 6.5.3-1. The World Geodetic System 1984 (WGS 84) [13] shall be used as the base coordinate reference system for the coding of location information. The listed attributes are aligned to those defined for the Universal Geographical Area Description (GAD) specified in ETSI TS 123 032 [14]. However, attributes are not limited to the reporting of location information obtained from a 3GPP based access network. For instance, location information from WLAN may also include uncertainty information [15]. In addition, the source of the location information is not limited to GNSS reports from the end user device and may be provided an entity associated with the underlying access network, or even by a specific MEC application.

Table 6.5.3-1: Definition of type LocationInfo

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| latitude | Float | 1..N | Location latitude, expressed in the range -90° to +90°. Cardinality greater than one only if "shape" equals 7. |
| longitude | Float | 1..N | Location longitude, expressed in the range -180° to +180°. Cardinality greater than one only if "shape" equals 7. |
| altitude | Float | 0..1 | Location altitude relative to the WGS84 ellipsoid surface. |
| accuracy | UnsignedInt | 0..1 | Horizontal accuracy/(semi-major) uncertainty of location provided in meters, as defined in [14]. Present only if "shape" equals 4, 5 or 6. |
| accuracySemiMinor | UnsignedInt | 0..1 | Horizontal accuracy/(semi-major) uncertainty of location provided in meters, as defined in [14]. Present only if "shape" equals 4, 5 or 6. |
| accuracyAltitude | UnsignedInt | 0..1 | Altitude accuracy/uncertainty of location provided in meters, as defined in [14]. Present only if "shape" equals 3 or 4. |
| orientationMajorAxis | UnsignedInt | 0..1 | Angle of orientation of the major axis, expressed in the range 0° to 180°, as defined in [14]. Present only if "shape" equals 4 or 6. |
| confidence | UnsignedInt | 0..1 | Confidence by which the position of a target entity is known to be within the shape description, expressed as a percentage and defined in [14]. Present only if "shape" equals 1, 4 or 6. |
| innerRadius | UnsignedInt | 0..1 | Present only if "shape" equals 6. |
| uncertaintyRadius | UnsignedInt | 0..1 | Present only if "shape" equals 6. |
| offsetAngle | UnsignedInt | 0..1 | Present only if "shape" equals 6. |
| includedAngle | UnsignedInt | 0..1 | Present only if "shape" equals 6. |
| shape | Enum (inlined) | 1 | Shape information, as detailed in [14], associated with the reported location coordinate:  1 = Ellipsoid\_Arc  2 = ellipsoid\_Point  3 = ellipsoid\_Point\_Altitude  4 = ellipsoid\_Point\_Altitude\_Uncert\_Ellipsoid  5 = ellipsoid\_Point\_Uncert\_Circle  6 = ellipsoid\_Point\_Uncert\_Ellipse  7 = polygon |
| velocity | Structure (inlined) | 0..1 | Structure with attributes relating to the target entity's velocity, as defined in [14]. |
| >velocityType | Enum (inlined) | 1 | Velocity information, as detailed in [14], associated with the reported location coordinate:  1 = Horizontal  2 = Horizontal\_Vertical  3 = Horizontal\_Uncert  4 = Horizontal\_Vertical\_Uncert |
| >bearing | UnsignedInt | 1 | Bearing, expressed in the range 0° to 360°, as defined in [14]. |
| >horizontalSpeed | UnsignedInt | 1 | Horizontal speed, expressed in km/h and defined in [14]. |
| >uncertainty | UnsignedInt | 0..1 | Horizontal uncertainty, as defined in [14]. Present only if "velocityType" equals 3 or 4. |
| >verticalSpeed | Int | 0..1 | Vertical speed, expressed in km/h and defined in [14]. Present only if "velocityType" equals 2 or 4. |
| >verticalUncertainty | UnsignedInt | 0..1 | Vertical uncertainty, as defined in [14]. Present only if "velocityType" equals 4. |

### 6.5.4 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 [4].

**Table 6.5.4-1: Attributes of the WebsockNotifConfig**

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| websocketUri | Uri | 0..1 | Set by location server 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. |

### 6.5.5 Type: UserEventPara

This type represents some requirements about reporting the event of user location.

Table 6.5.5-1: Attributes of the UserEventPara

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| reportingLocationReq | boolean | 0..1 | This IE shall be set to true if a location estimate is required for each event report. |
| accessPointList | Array(String) | 0..N | One or more access points forming a monitoring area that could be any shape. See note 1. |
| zoneId | String | 0..1 | Identifier of zone (e.g. zone001) to monitor. See note 1. |
| occurrenceInfo | OccurrenceInfo | 0..1 | One time only report indication. See note 2. |
| NOTE 1: Only one of accessPointList and zoneId may be present.  NOTE 2: As specified in [17], clause 6.1.6.3.16. | | | |

### 6.5.6 Type: ReportingCtrl

This type represents the parameters that control the report times and frequency.

Table 6.5.6-1: Attributes of type ReportingCtrl

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| minimumInterval | UnsignedInt | 0..1 | Minimum interval between reports in case frequently reporting. Unit is second. |
| maximumFrequency | UnsignedInt | 0..1 | Maximum frequency (in seconds) of notifications per subscription. |
| maximumCount | UnsignedInt | 0..1 | Maximum number of notifications. For no maximum, either do not include this element or specify a value of zero. Default value is 0. |

### 6.5.7 Type: AreaInfo

This type represents the parameters that describe an area.

Table 6.5.7-1: Attributes of type AreaInfo

|  |  |  |  |
| --- | --- | --- | --- |
| **Attribute name** | **Data type** | **Cardinality** | **Description** |
| shape | Enum(inlined) | 1 | The shape of the area monitored:  1 = CIRCLE.  2 = POLYGON. |
| points | Array(Point) | 1..N | Shall include one point if the shape is CIRCLE. Shall include 3-15 points if the shape is POLYGON. |
| radius | UnsignedInt | 0..1 | Shall be present if the shape is CIRCLE. |

### 6.5.8 Type: Point

This type represents the geographical location of a point.

Table 6.5.8-1: Attributes of type Point

|  |  |  |  |
| --- | --- | --- | --- |
| **Attribute name** | **Data type** | **Cardinality** | **Description** |
| latitude | Float | 1 | Location latitude, expressed in the range -90° to +90°. |
| longitude | Float | 1 | Location longitude, expressed in the range -180° to +180°. |

## 6.6 Mapping of Identifiers

### 6.6.1 accessPointId

With respect to identifiers assigned to access points in a cellular deployment, the accessPointId shall equal to an E-CGI concatenated with a Cell Portion ID as defined in ETSI TS 129 171 [8], i.e.:

* accessPointId = <E-CGI><Cell Portion ID>

where the Cell Portion ID may not exist, if the cell does not contain portions.

### 6.6.2 userId

The Location Service allows using the UE's IP address as a user identifier. The OMA API [5] does not explicitly list IP address as a user identifier option (i.e. as part of the "address" Element of UserInfo). Therefore to satisfy the requirements of the Location Service, if a user identifier of type anyURI is in the form of an IP address, the "acr" scheme shall be used, followed by the UE's IP address, i.e.:

* address = acr:<UE's IP address>

where the format of the UE's IP address shall be an IP literal encapsulated within square brackets or an Ipv4 address in dotted-decimal form.

NOTE: The "acr" scheme can also be used to convey user identifiers other than an IP address, e.g. an alias.

## 6.7 Referenced simple data types and enumerations

### 6.7.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

### 6.7.2 Type: LinkType

This type represents a type of link and may be referenced from data structures.

Table 6.7.2-1: Definition of type LinkType

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

### 6.7.3 Enumeration: LocationEventType

This type represents specified event types for UE location report.

Table 6.7.3-1: Enumeration LocationEventType

|  |  |
| --- | --- |
| Type name | Description |
| "ENTERING\_AREA\_EVENT" | Entering area reporting event. |
| "LEAVING\_AREA\_EVENT" | Leaving area reporting event. |

### 6.7.4 Enumeration: NotificationResult

This enumeration represents the result of a localization associated with a notification.

Table 6.7.4-1: Enumeration NotificationResult

|  |  |
| --- | --- |
| Type name | Description |
| SUCCESS | Localization is successful. |
| ABNORMAL | Localization is failed due to timeout or other unspecific errors. |

### 6.7.5 Enumeration: ConnectionType

This enumeration represents the connection type of an access point.

Table 6.7.5-1: Enumeration ConnectionType

|  |  |
| --- | --- |
| Type name | Description |
| LTE | Access point provides a LTE-Femto connection |
| Wifi® | Access point provides a Wifi® connection |
| Wimax® | Access point provides a Wimax® connection |
| 5G NR | Access point provides a 5G NR connection |
| UNKNOWN | Access point connection type is unknown |

# 7 API definition

## 7.1 Introduction

This clause defines the resources and operations of the Location Service API.

## 7.2 Global definitions and resource structure

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

**{apiRoot}/location/{apiVersion}/**

"apiRoot" is discovered using the service registry, it includes the scheme ("http" or "https"), host and optional port, and an optional prefix string. The "apiVersion" shall be set to "v2" for the current version of the present document. It includes the scheme ("http" or "https"), host and optional port, and an optional prefix string.

This API shall support HTTP over TLS (also known as HTTPS) using TLS version 1.2 as defined by IETF RFC 5246 [10]). TLS 1.3 (including the new specific requirements for TLS 1.2 implementations) defined by IETF RFC 8446 [16] should be supported. HTTP without TLS shall not be used. Versions of TLS earlier than 1.2 shall neither be supported nor used.

The content format of JSON shall be supported and signalled by setting the content type header to "application/json".

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 [4] for more information.

This API shall require the use of the Oauth 2.0 client credentials grant type according to IETF RFC 6749 [11] with bearer tokens according to IETF RFC 6750 [12]. See ETSI GS MEC 009 [4], clause 6.16 for more information. How the token endpoint and client credentials are provisioned into the MEC applications is out of scope of the present document.

Figure 7.2-1 illustrates the resource URI structure of this API.

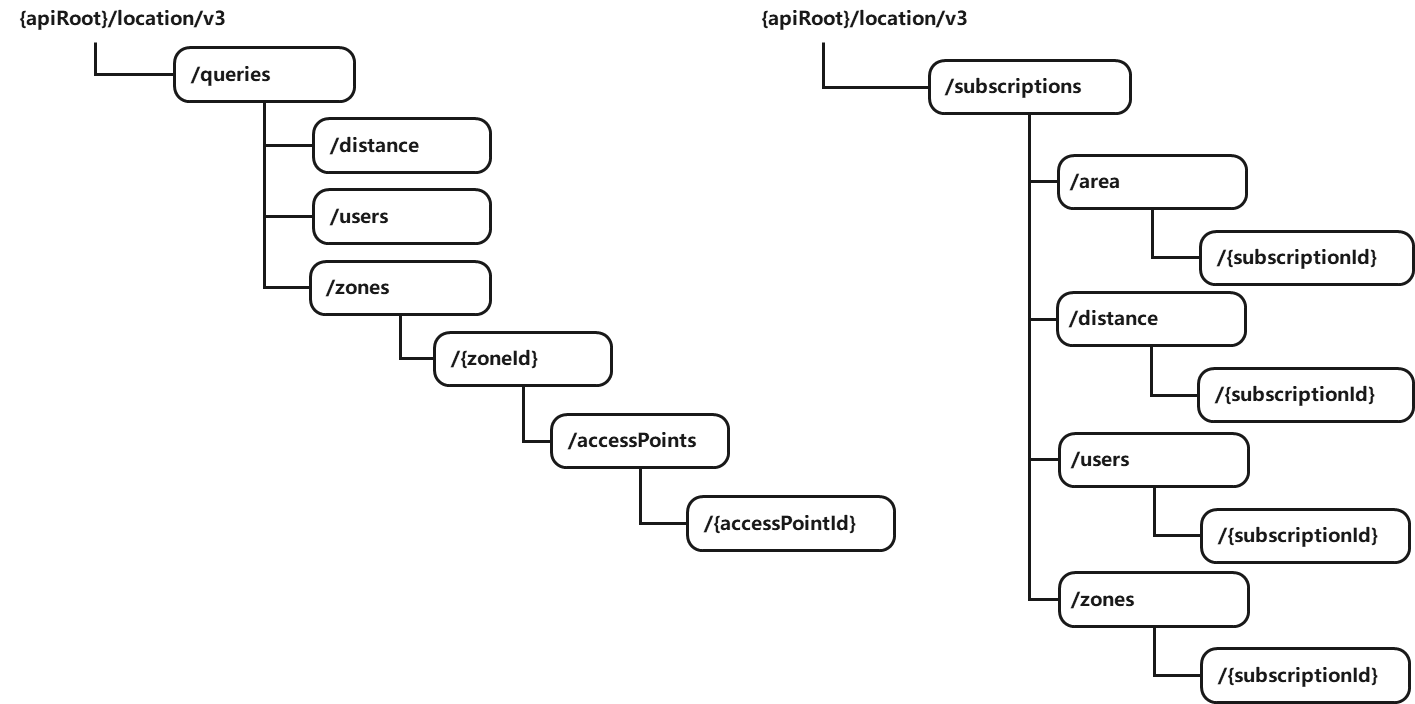


Figure 7.2-1: Resource URI structure of the Location API

## 7.3 Void

## 7.4 Resource: users

### 7.4.1 Description

This resource is queried to retrieve location information about a specific UE or a group of UEs.

### 7.4.2 Resource definition

Resource URI: **{apiRoot}/location/v3/queries/users**

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 "users"

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

### 7.4.3 Resource methods

#### 7.4.3.1 GET

The GET method is used to query location information about a specific UE or a group of UEs.

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** |
| zoneId | String | 0..N | Identifier of zone (e.g. zone001) |
| accessPointId | String | 0..N | Identifier of access point (e.g. 001010000000000000000000000000001) |
| address | AnyUri | 0..N | Address of users (e.g. 'sip' URI, 'tel' URI, 'acr' URI). See note. |
| NOTE: In order to perform the UE Location Lookup for a specific UE or a group of specific UEs, the filtering parameter "address" shall be used. | | | |

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** |
| UserList | 1 | 200 OK | Upon success, a response body containing the list of user location 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: user\_subscriptions

### 7.5.1 Description

This resource contains various resources related to subscriptions for notifications related to location.

### 7.5.2 Resource definition

Resource URI: **{apiRoot}/location/v3/subscriptions/users/**

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

Table 7.5.2-1: Resource URI variables defined in table 7.5.2-1

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

### 7.5.3 Resource methods

#### 7.5.3.1 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 7.5.3.1-1 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** |
| subscription\_type | String | 0..1 | Query parameter to filter on a specific subscription type. Permitted values:   * event * periodic |
| address | Uri | 0..1 | Address of user (e.g. 'sip' URI, 'tel' URI, 'acr' URI). |

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** |
| NotificationSubscriptionList | 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. |

#### 7.5.3.2 PUT

Not applicable.

#### 7.5.3.3 PATCH

Not applicable.

#### 7.5.3.4 POST

The POST method is used to create a new subscription to UE location 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 7.5.3.4-1.

Table 7.5.3.4-1: 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 UE location event subscription that is to be created, where the data type options are listed below and defined in clauses 6.3.4 and 6.3.5:   * UserLocationEventSubscription. * UserLocationPeriodicSubscription. | |
| **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 6.3.4, and 6.3.5:   * UserLocationEventSubscription. * UserLocationPeriodicSubscription. |
| 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 | 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. |

#### 7.5.3.5 DELETE

Not applicable.

## 7.6 Resouce: individual user\_subscription

### 7.6.1 Description

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

### 7.6.2 Resource definition

Resource URI: **{apiRoot}/location/v3/subscriptions/users/{subscriptionId}**

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 "individual user\_subscription"

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

### 7.6.3 Resource methods

#### 7.6.3.1 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 7.6.3.1-1 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** |
| n/a |  |  |  |

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** |
| {NotificationSubscription} | 1 | 200 OK | Upon success, a response body containing data type describing the specific Location event subscription is returned. The allowed data types for subscriptions are defined in clauses 6.3.4 and 6.3.5:   * + UserLocationEventSubscription.   + UserLocationPeriodicSubscription. |
| 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

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 7.6.3.2-1 and 7.6.3.2-2.

Table 7.6.3.2-1: URI query parameters supported by the PUT method on this resource

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

Table 7.6.3.2-2: 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 6.3.4 and 6.3.5:   * UserLocationEventSubscription. * UserLocationPeriodicSubscription. | |
| **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 6.3.4 and 6.3.5:   * UserLocationEventSubscription. * UserLocationPeriodicSubscription. |
| 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. |

#### 7.6.3.3 PATCH

Not applicable.

#### 7.6.3.4 POST

Not applicable.

#### 7.6.3.5 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 7.6.3.5-1 and 7.6.3.5-2.

Table 7.6.3.5-1: URI query parameters supported by the DELETE method on this resource

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

Table 7.6.3.5-2: 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. |

## 7.7 Resource: zones

### 7.7.1 Description

This resource is queried to retrieve the information about a specific zone or a list of zones.

### 7.7.2 Resource definition

Resource URI : **{apiRoot}/location/v3/queries/zones**

This resource shall support the resource URI variables defined in table 7.7.2-1.

Table 7.7.2-1: Resource URI variables for resource "zones"

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

### 7.7.3 Resource methods

#### 7.7.3.1 GET

The GET method is used to query the information about one or more specific zones or a list of zones.

This method shall support the URI query parameters, request and response data structures, and response codes, as specified in tables 7.7.3.1-1 and 7.7.3.1-2.

Table 7.7.3.1-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Data type** | **Cardinality** | **Remarks** |
| zoneId | String | 0..N | Identifier of zone (e.g. zone001) |

Table 7.7.3.1-2: 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** |
| ZoneList | 1 | 200 OK | Upon success, a response body containing the list of zone 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. |

#### 7.7.3.2 PUT

Not applicable.

#### 7.7.3.3 PATCH

Not applicable.

#### 7.7.3.4 POST

Not applicable.

#### 7.7.3.5 DELETE

Not applicable.

## 7.8 Resource: individual zone

### 7.8.1 Description

This resource is queried to retrieve the information about a specific zone.

### 7.8.2 Resource definition

Resource URI : **{apiRoot}/location/v3/queries/zones/{zoneId}**

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 "zones"

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

### 7.8.3 Resource methods

#### 7.8.3.1 GET

The GET method is used to query the information about a specific zone.

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** |
| ZoneInfo | 1 | 200 OK | Upon success, a response body containing the zone 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. |

#### 7.8.3.2 PUT

Not applicable.

#### 7.8.3.3 PATCH

Not applicable.

#### 7.8.3.4 POST

Not applicable.

#### 7.8.3.5 DELETE

Not applicable.

## 7.9 Resource: accessPoints

### 7.9.1 Description

This resource is queried to retrieve the information about one or more specific access points or a list of access points under a zone.

### 7.9.2 Resource definition

Resource URI : **{apiRoot}/location/v3/queries/zones/{zoneId}/accessPoints**

This resource shall support the resource URI variables defined in table 7.9.2-1.

Table 7.9.2-1: Resource URI variables for resource "accessPoints"

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

### 7.9.3 Resource methods

#### 7.9.3.1 GET

The GET method is used to query the information about a specific access point or a list of access points under a zone.

This method shall support the URI query parameters, request and response data structures, and response codes, as specified in tables 7.9.3.1-1 and 7.9.3.1-2.

Table 7.9.3.1-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Data type** | **Cardinality** | **Remarks** |
| accessPointId | String | 0..N | Identifier of access point (e.g. 001010000000000000000000000000001) |

Table 7.9.3.1-2: 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** |
| AccessPointList | 1 | 200 OK | Upon success, a response body containing the list of access point 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. |

#### 7.9.3.2 PUT

Not applicable.

#### 7.9.3.3 PATCH

Not applicable.

#### 7.9.3.4 POST

Not applicable.

#### 7.9.3.5 DELETE

Not applicable.

## 7.10 Resource: individual accessPoint

### 7.10.1 Description

This resource is queried to retrieve the information about a specific access point under a zone.

### 7.10.2 Resource definition

Resource URI : **{apiRoot}/location/v3/queries/zones/{zoneId}/accessPoints/{accessPointId}**

This resource shall support the resource URI variables defined in table 7.10.2-1.

Table 7.10.2-1: Resource URI variables for resource "accessPoints"

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

### 7.10.3 Resource methods

#### 7.10.3.1 GET

The GET method is used to query the information about a specific access point under a zone.

This method shall support the URI query parameters, request and response data structures, and response codes, as specified in tables 7.10.3.1-1 and 7.10.3.1-2.

Table 7.10.3.1-1: URI query parameters supported by the GET method on this resource

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

Table 7.10.3.1-2: 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** |
| AccessPointInfo | 1 | 200 OK | Upon success, a response body containing the access point 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. |

#### 7.10.3.2 PUT

Not applicable.

#### 7.10.3.3 PATCH

Not applicable.

#### 7.10.3.4 POST

Not applicable.

#### 7.10.3.5 DELETE

Not applicable.

## 7.11 Resource: zone\_subscriptions

### 7.11.1 Description

This resource contains various resources related to subscriptions for notifications related to location.

### 7.11.2 Resource definition

Resource URI: **{apiRoot}/location/v3/subscriptions/zones**

This resource shall support the resource URI variables defined in table 7.11.2-1.

Table 7.11.2-1: Resource URI variables defined in table 7.11.2-1

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

### 7.11.3 Resource methods

#### 7.11.3.1 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 7.11.3.1-1 and 7.11.3.1-2.

Table 7.11.3.1-1: 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:   * event * status |
| zoneId | String | 0..1 | The identity of the zone. |

Table 7.11.3.1-2: 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** |
| NotificationSubscriptionList | 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. |

#### 7.11.3.2 PUT

Not applicable.

#### 7.11.3.3 PATCH

Not applicable.

#### 7.11.3.4 POST

The POST method is used to create a new subscription to zone 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 7.11.3.4-1.

Table 7.11.3.4-1: 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 UE location event subscription that is to be created, where the data type options are listed below and defined in clauses 6.3.6 and 6.3.7:   * ZoneLocationEventSubscription. * ZoneStatusSubscription. | |
| **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 6.3.6 and 6.3.7:   * ZoneLocationEventSubscription. * ZoneStatusSubscription. |
| 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 | 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. |

#### 7.11.3.5 DELETE

Not applicable.

## 7.12 Resouce: individual zone\_subscription

### 7.12.1 Description

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

### 7.12.2 Resource definition

Resource URI: **{apiRoot}/location/v3/subscriptions/zones/{subscriptionId}**

This resource shall support the resource URI variables defined in table 7.12.2-1.

Table 7.12.2-1: Resource URI variables for resource "individual zone\_subscription"

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

### 7.12.3 Resource methods

#### 7.12.3.1 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 7.12.3.1-1 and 7.12.3.1-2.

Table 7.12.3.1-1: URI query parameters supported by the GET method on this resource

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

Table 7.12.3.1-2: 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 zone subscription is returned. The allowed data types for subscriptions are defined in clauses 6.3.6 and 6.3.7:   * ZoneLocationEventSubscription. * ZoneStatusSubscription. |
| 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. |

#### 7.12.3.2 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 7.12.3.2-1 and 7.12.3.2-2.

Table 7.12.3.2-1: URI query parameters supported by the PUT method on this resource

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

Table 7.12.3.2-2: 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 6.3.6 and 6.3.7:   * ZoneLocationEventSubscription. * ZoneStatusSubscription. | |
| **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 6.3.6 and 6.3.7:   * ZoneLocationEventSubscription. * ZoneStatusSubscription. |
| 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. |

#### 7.12.3.3 PATCH

Not applicable.

#### 7.12.3.4 POST

Not applicable.

#### 7.12.3.5 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 7.12.3.5-1 and 7.12.3.5-2.

Table 7.12.3.5-1: URI query parameters supported by the DELETE method on this resource

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

Table 7.12.3.5-2: 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. |

## 7.13 Resource: distance

### 7.13.1 Description

This resource is queried to retrieve information about distance from a user to a location or between two users.

### 7.13.2 Resource definition

Resource URI: **{apiRoot}/location/v3/queries/distance**

This resource shall support the resource URI variables defined in table 7.13.2-1.

Table 7.13.2-1: Resource URI variables for resource "distance"

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

### 7.13.3 Resource methods

#### 7.13.3.1 GET

The GET method is used to query information about distance from a user to a location or between two users.

This method shall support the URI query parameters, request and response data structures, and response codes, as specified in tables 7.13.3.1-1 and 7.13.3.1-2.

Table 7.13.3.1-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Data type** | **Cardinality** | **Remarks** |
| address | Array (Uri) | 1..2 | One or two addresses of user to check.  The second "address" parameter shall not be included when the distance between a user and a location is requested.  The second "address" parameter shall be included when a location is not provided. |
| location | Point | 0..1 | Shall not be included when the distance between two terminals is requested. |

Table 7.13.3.1-2: 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** |
| TerminalDistance | 1 | 200 OK | Upon success, a response body containing the list of distance 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. |

#### 7.13.3.2 PUT

Not applicable.

#### 7.13.3.3 PATCH

Not applicable.

#### 7.13.3.4 POST

Not applicable.

#### 7.13.3.5 DELETE

Not applicable.

## 7.14 Resource: distance\_subscriptions

### 7.14.1 Description

This resource contains various resources related to subscriptions for notifications related to distance changing.

### 7.14.2 Resource definition

Resource URI: **{apiRoot}/location/v3/subscriptions/distance**

This resource shall support the resource URI variables defined in table 7.14.2-1.

Table 7.14.2-1: Resource URI variables defined in table 7.14.2-1

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

### 7.14.3 Resource methods

#### 7.14.3.1 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 7.14.3.1-1 and 7.14.3.1-2.

Table 7.14.3.1-1: URI query parameters supported by the GET method on this resource

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

Table 7.14.3.1-2: 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** |
| NotificationSubscriptionList | 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. |

#### 7.14.3.2 PUT

Not applicable.

#### 7.14.3.3 PATCH

Not applicable.

#### 7.14.3.4 POST

The POST method is used to create a new subscription to user distance 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 7.14.3.4-1.

Table 7.14.3.4-1: 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 user distance subscription that is to be created, where the data type options are listed below and defined in clauses 6.3.9:   * UserDistanceSubscription. | |
| **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 6.3.9:   * UserDistanceSubscription. |
| 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 | 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. |

#### 7.14.3.5 DELETE

Not applicable.

## 7.15 Resouce: individual distance\_subscription

### 7.15.1 Description

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

### 7.15.2 Resource definition

Resource URI: **{apiRoot}/location/v3/subscriptions/distance/{subscriptionId}**

This resource shall support the resource URI variables defined in table 7.15.2-1.

Table 7.15.2-1: Resource URI variables for resource "individual user\_subscription"

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

### 7.15.3 Resource methods

#### 7.15.3.1 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 7.15.3.1-1 and 7.15.3.1-2.

Table 7.15.3.1-1: URI query parameters supported by the GET method on this resource

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

Table 7.15.3.1-2: 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 distance event subscription is returned. The allowed data types for subscriptions are defined in clause 6.3.9:   * + UserDistanceSubscription. |
| 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. |

#### 7.15.3.2 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 7.15.3.2-1 and 7.15.3.2-2.

Table 7.15.3.2-1: URI query parameters supported by the PUT method on this resource

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

Table 7.15.3.2-2: 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 clause 6.3.9:   * UserDistanceSubscription. | |
| **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 clause 6.3.9:   * UserDistanceSubscription. |
| 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. |

#### 7.15.3.3 PATCH

Not applicable.

#### 7.15.3.4 POST

Not applicable.

#### 7.15.3.5 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 7.15.3.5-1 and 7.15.3.5-2.

Table 7.15.3.5-1: URI query parameters supported by the DELETE method on this resource

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

Table 7.15.3.5-2: 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. |

## 7.16 Resource: area\_subscriptions

### 7.16.1 Description

This resource contains various resources related to subscriptions for notifications related to location events.

### 7.16.2 Resource definition

Resource URI: **{apiRoot}/location/v3/subscriptions/area**

This resource shall support the resource URI variables defined in table 7.16.2-1.

Table 7.16.2-1: Resource URI variables defined in table 7.16.2-1

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

### 7.16.3 Resource methods

#### 7.16.3.1 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 7.16.3.1-1 and 7.16.3.1-2.

Table 7.16.3.1-1: 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:   * event |

Table 7.16.3.1-2: 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** |
| NotificationSubscriptionList | 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. |

#### 7.16.3.2 PUT

Not applicable.

#### 7.16.3.3 PATCH

Not applicable.

#### 7.16.3.4 POST

The POST method is used to create a new subscription to area 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 7.16.3.4-1.

Table 7.16.3.4-1: 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 UE location event subscription that is to be created, where the data type options are listed below and defined in clause 6.3.8:   * UserAreaNotification. | |
| **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 clause 6.3.8:   * UserAreaNotification. |
| 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 | 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. |

#### 7.16.3.5 DELETE

Not applicable.

## 7.17 Resouce: individual area\_subscription

### 7.17.1 Description

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

### 7.17.2 Resource definition

Resource URI: **{apiRoot}/location/v3/subscriptions/area/{subscriptionId}**

This resource shall support the resource URI variables defined in table 7.17.2-1.

Table 7.17.2-1: Resource URI variables for resource "individual area\_subscription"

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

### 7.17.3 Resource methods

#### 7.17.3.1 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 7.17.3.1-1 and 7.17.3.1-2.

Table 7.17.3.1-1: URI query parameters supported by the GET method on this resource

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

Table 7.17.3.1-2: 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 zone subscription is returned. The allowed data types for subscriptions are defined in clause 6.3.8:   * + UserAreaNotification. |
| 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. |

#### 7.17.3.2 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 7.17.3.2-1 and 7.17.3.2-2.

Table 7.17.3.2-1: URI query parameters supported by the PUT method on this resource

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

Table 7.17.3.2-2: 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 6.3.8:   * UserAreaNotification. | |
| **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 clause 6.3.8:   * UserAreaNotification. |
| 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. |

#### 7.17.3.3 PATCH

Not applicable.

#### 7.17.3.4 POST

Not applicable.

#### 7.17.3.5 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 7.17.3.5-1 and 7.17.3.5-2.

Table 7.17.3.5-1: URI query parameters supported by the DELETE method on this resource

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

Table 7.17.3.5-2: 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):  
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 Location API a supplementary description file compliant to the OpenAPI Specification [i.3].

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

The supplementary description file, relating to the present document, is located at <https://forge.etsi.org/rep/gitweb.cgi/MEC.GS_013.git>.

Annex B (informative):  
Examples for the usage of Location API

# B.1 Examples for UE Location Lookup

## B.1.1 Example: Retrieve UE location by the address of a user

In this example, the client issues a request to fetch the user location of a certain user identified by its IP address.

Request

GET /exampleAPI/location/v3/queries/users?address=acr%3A10.0.0.1 HTTP/1.1

Host: example.com

Accept: application/json

Response

HTTP/1.1 200 OK

Date: Sun, 01 Jan 2017 00:38:59 GMT

Content-Type: application/json

Content-Length: nnnn

{"userList": {

"user": [

{

"address": "acr:10.0.0.1",

"accessPointId": "001010000000000000000000000000001",

"zoneId": "zone01",

"resourceURL": "http://example.com/exampleAPI/location/v3/queries/users?address=acr%3A10.0.0.1",

"timeStamp": {

"seconds": 1483231138,

"nanoSeconds": 0

},

"locationInfo": {

"latitude": 80.123,

"longitude": 70.123,

"altitude": 10.0,

"accuracy": 0

}}

],

"resourceURL": "http://example.com/exampleAPI/location/v3/queries/users?address=acr%3A10.0.0.1"

}}

## B.1.2 Example: Retrieve UE Location for the users in a zone

In this example, the client issues a request to retrieve a list of all the users connected to all the access points associated to the zone specified in the request.

Request

GET /exampleAPI/location/v3/queries/users?zoneId=zone01 HTTP/1.1

Host: example.com

Accept: application/json

Response

HTTP/1.1 200 OK

Date: Sun, 01 Jan 2017 00:38:59 GMT

Content-Type: application/json

Content-Length: nnnn

{"userList": {

"user": [

{

"address": "acr:10.0.0.1",

"accessPointId": "001010000000000000000000000000001",

"zoneId": "zone01",

"resourceURL": "http://example.com/exampleAPI/location/v3/queries/users?address=acr%3A10.0.0.1",

"timeStamp": {

"seconds": 1483231138,

"nanoSeconds": 0

}},

{

"address": "acr:10.0.0.2",

"accessPointId": "001010000000000000000000000000001",

"zoneId": "zone01",

"resourceURL": "http ://example.com/exampleAPI/location/v3/queries/users?address=acr%3A10.0.0.2",

"timeStamp": {

"seconds": 1483231138,

"nanoSeconds": 0

}},

{

"address": "acr:10.0.0.3",

"accessPointId": "001010000000000000000000000000002",

"zoneId": "zone01",

"resourceURL": "http ://example.com/exampleAPI/location/v3/queries/users?address=acr%3A10.0.0.3",

"timeStamp": {

"seconds": 1483231138,

"nanoSeconds": 0

}}

],

"resourceURL": "http ://example.com/exampleAPI/location/v3/queries/users?zoneId=zone01"

}}

# B.2 Examples for UE Location Subscribe

## B.2.1 Example: create a UE Location event subscription

In this example, the client issues a request to create a UE Location event subscription for a certain user identified by its IP address. The subscription is meant to receive a notification about the "ENTERING\_AREA\_EVENT" user event, i.e. when the requested UE enters an area which is comprised of one or more access points. If no "locationEventCriteria" is included in the request, then the subscription is created for all the events. If no "accessPointList" is included in the request, then the subscription is created for all the events happed at all the access points.

Request

POST /exampleAPI/location/v3/subscriptions/users HTTP/1.1

Content-Type: application/json

Content-Length: nnnn

Accept: application/json

Host: example.com

{"userLocationEventSubscription": {

"subscriptionType": "UserLocationEventSubscription",

"clientCorrelator": "0123",

"callbackReference": "http://clientApp.example.com/location\_notifications/123456",

"address": "acr:10.0.0.1",

"locationEventCriteria": ["ENTERING\_AREA\_EVENT"]

}}

Response

HTTP/1.1 201 Created

Content-Type: application/json

Location : http ://example.com/exampleAPI/location/v3/subscriptions/users/subscription123

Content-Length: nnnn

Date: Sun, 01 Jan 2017 00:38:59 GMT

{"userLocationEventSubscription": {

"subscriptionType": "UserLocationEventSubscription",

"clientCorrelator": "0123",

"\_links": {

Self: "http://example.com/exampleAPI/location/v3/subscriptions/users/subscription123"

},

"callbackReference": "http://clientApp.example.com/location\_notifications/123456",

"address": "acr:10.0.0.1",

"locationEventCriteria": ["ENTERING\_AREA\_EVENT"]

}}

## B.2.2 Example: client notification about UE entering an area

In this example, the client receives a notification of a location change of the requested UE, identified by its IP address. The notification relates to the "ENTERING\_AREA\_EVENT" user event, i.e. when the requested UE enters one access point.

Request

POST /location\_notifications/123456 HTTP/1.1

Content-Type : application/json

Content-Length: nnnn

Accept: application/json

Host: clientApp.example.com

{"userLocationEventNotification": {

"notificationType": "UserLocationEventNotification",

"timeStamp": {

"seconds": 1483231138,

"nanoSeconds": 0},

"address": "acr:10.0.0.1",

"userLocationEvent": "ENTERING\_AREA\_EVENT",

"zoneId" : "zone01",

"accessPointId" : "001010000000000000000000000000002",

"\_links" : {

"subscription" : "http ://example.com/exampleAPI/location/v3/subscriptions/users/subscription123"

}}}

Response

HTTP/1.1 204 No Content

Date: Sun, 01 Jan 2017 00:38:59 GMT

## B.2.3 Example: create a UE Location periodic subscription

In this example, the client issues a request to create a UE Location subscription for a certain UE. The client expects to receive periodic notifications about the location of the specified UE at the time interval specified in the request.

Request

POST /exampleAPI/location/v3/subscriptions/users HTTP/1.1

Content-Type: application/json

Content-Length: nnnn

Accept: application/json

Host: example.com

{"userLocationPeriodicSubscription": {

"subscriptionType": "UserLocationPeriodicSubscription",

"address": "acr:10.0.0.1",

"callbackReference": "http://clientApp.example.com/location\_notifications/123456",

"clientCorrelator": "0123",

"periodicEventInfo": {

"reportingAmount": 10,

"reportingInterval": 100

}

}}

Response

HTTP/1.1 201 Created

Content-Type : application/json

Location : http ://example.com/exampleAPI/location/v3/subscriptions/users/subscription123

Content-Length: nnnn

Date: Sun, 01 Jan 2017 00:38:59 GMT

{"userLocationPeriodicSubscription": {

"subscriptionType": "UserLocationPeriodicSubscription",

"address": "acr:10.0.0.1",

"callbackReference": "http://clientApp.example.com/location\_notifications/123456",

"clientCorrelator": "0123",

"\_links": {

"self": "http://example.com/exampleAPI/location/v3/subscriptions/users/subscription123"

},

"periodicEventInfo": {

"reportingAmount": 10,

"reportingInterval": 100

}

}}

## B.2.4 Example: client notification about UE location in a fixed interval

Request

POST /location\_notifications/123456 HTTP/1.1

Content-Type : application/json

Content-Length : nnnn

Accept : application/json

Host : clientApp.example.com

{"userLocationPeriodicNotification" : {

"notificationType" : "UserLocationPeriodicNotification",

"timeStamp" : {

"seconds" : 1483231138,

"nanoSeconds" : 0},

"address": "acr:10.0.0.1",

"result": "SUCCESS",

"zoneId": "zone01",

"accessPointId" : "001010000000000000000000000000002",

"locationInfo" : {

"latitude" : 80.123,

"longitude": 70.123,

"altitude": 10.0,

"accuracy": 0

}

"\_links": {

"subscription": "http://example.com/exampleAPI/location/v3/subscriptions/users/subscription123"

}}}

Response

HTTP/1.1 204 No Content

Date: Sun, 01 Jan 2017 00:38:59 GMT

# B.3 Examples for Zone List Lookup and Access Point List Lookup

## B.3.1 Example: Retrieve zone list

In this example, the client issues a request to fetch all information about zones related to the MEC system. After that, the client might enquire about user information or subscribe to user location by zone Id. How to define the relationship between the zones and the MEC system is out of the scope of the present document.

Request

GET /exampleAPI/location/v3/queries/zones HTTP/1.1

Host: example.com

Accept: application/json

Response

HTTP/1.1 200 OK

Date: Sun, 01 Jan 2017 00:38:59 GMT

Content-Type : application/json

Content-Length : nnnn

{"zoneList" : {

"zone" : [

{

"zoneId" : "zone01",

"numberOfAccessPoints" : 3,

"numberOfUnserviceableAccessPoints" : 1,

"numberOfUsers" : 10,

"resourceURL" :"http ://example.com/exampleAPI/location/v3/queries/zones/zone01"

},

{

"zoneId" : "zone02",

"numberOfAccessPoints" : 12,

"numberOfUnserviceableAccessPoints" : 0,

"numberOfUsers" : 36,

"resourceURL" :"http ://example.com/exampleAPI/location/v3/queries/zones/zone02"

}],

"resourceURL" :"http ://example.com/exampleAPI/location/v3/queries/zones "

}

}

## B.3.2 Example: Retrieve Access Point List

In this example, the client issues a request to fetch all information about access points related to the zone. How to define the relationship between the zone and the access points is out of the scope of the present document.

Request

GET /exampleAPI/location/v3/queries/zones/zone01/accessPoints HTTP/1.1

Host: example.com

Accept: application/json

Response

HTTP/1.1 200 OK

Date: Sun, 01 Jan 2017 00:38:59 GMT

Content-Type : application/json

Content-Length : nnnn

{"accessPointList" : {

"zoneId" : "zone01",

"accessPoint" : [

{

"accessPointId" : "ap01",

"locationInfo" : {

"latitude" : 90.123,

"longitude" : 80.123,

"accuracy" : 0

},

"connectionType": "5G NR",

"operationStatus": "Serviceable",

"numberOfUsers": 5,

"resourceURL":"http://example.com/exampleAPI/location/v3/queries/zones/zone01/accessPoints/ap01"

},

{

"accessPointId" : "ap02",

"locationInfo" : {

"latitude" : 93.123,

"longitude" : 83.123,

"accuracy" : 3

},

"connectionType": "5G NR",

"operationStatus": "Serviceable",

"numberOfUsers": 20,

"resourceURL":"http://example.com/exampleAPI/location/v3/queries/zones/zone01/accessPoints/ap02"

}

],

"resourceURL" :"http ://example.com/exampleAPI/location/v3/queries/zones/zone01/accessPoints

}

}

# B.4 Examples for Zone Location Event Subscribe and Zone Status Subscribe

## B.4.1 Example: create a zone location subscription

In this example, the client issues a request to create a zone location event subscription for a zone. The subscription is meant to receive a notification about the "ENTERING\_AREA\_EVENT" user event, i.e. when any UE enters this zone. If no user event is included in the request, then the subscription is created for all the events.

Request

POST /exampleAPI/location/v3/subscriptions/zones HTTP/1.1

Content-Type : application/json

Content-Length : nnnn

Accept : application/json

Host : example.com

{"zoneLocationEventSubscription" : {

"subscriptionType" : "ZoneLocationEventSubscription",

"clientCorrelator" : "0123",

"callbackReference" : "http ://clientApp.example.com/location\_notifications/123456",

"zoneId": "zone01",

"locationEventCriteria": ["ENTERING\_AREA\_EVENT"]

}}

Response

HTTP/1.1 201 Created

Content-Type: application/json

Location : http://example.com/exampleAPI/location/v3/subscriptions/zones/subscription123

Content-Length: nnnn

Date: Sun, 01 Jan 2017 00:38:59 GMT

{"zoneLocationEventSubscription": {

"subscriptionType": "ZoneLocationEventSubscription",

"clientCorrelator": "0123",

"\_links": {

"self": "http://example.com/exampleAPI/location/v3/subscriptions/zones/subscription123"},

"callbackReference": "http://clientApp.example.com/location\_notifications/123456",

"zoneId": "zone01",

"locationEventCriteria": ["ENTERING\_AREA\_EVENT"]

}}

## B.4.2 Example: client notification about UE entering the zone

In this example, the client receives a notification about a certain UE enters the zone subscribed by the client. The notification relates to the "ENTERING\_AREA\_EVENT" user event.

Request

POST /location\_notifications/123456 HTTP/1.1

Content-Type : application/json

Content-Length : nnnn

Accept : application/json

Host : clientApp.example.com

{"zoneLocationEventNotification" : {

"notificationType" : "ZoneLocationEventNotification",

"address" : "acr :10.0.0.2",

"zoneId" : "zone01",

"userLocationEvent" : "ENTERING\_AREA\_EVENT",

"timeStamp": {

"seconds": 1483231138,

"nanoSeconds": 0},

"\_links": {

"subscription":"http://example.com/exampleAPI/location/v3/subscriptions/zones/subscription123"

}}}

Response

HTTP/1.1 204 No Content

Date: Sun, 01 Jan 2017 00:38:59 GMT

## B.4.3 Example: create a zone status subscription

In this example, the client issues a request to create a zone status subscription for a zone. The client expects to be notified by the server when the user number of this zone reaches a threshold set in the subscribe request message.

Request

POST /exampleAPI/location/v3/subscriptions/zones HTTP/1.1

Content-Type : application/json

Content-Length : nnnn

Accept : application/json

Host : example.com

{"zoneStatusSubscription" : {

"subscriptionType" : "ZoneStatusSubscription",

"clientCorrelator" : "0123",

"callbackReference" : "http ://clientApp.example.com/location\_notifications/123456",

"zoneId": "zone01",

"upperNumberOfUsersZoneThreshold": 1000,

"lowerNumberOfUsersZoneThreshold": 10

}}

Response

HTTP/1.1 201 Created

Content-Type : application/json

Location : http://example.com/exampleAPI/location/v3/subscriptions/zones/subscription123

Content-Length: nnnn

Date: Sun, 01 Jan 2017 00:38:59 GMT

{"zoneStatusSubscription": {

"subscriptionType": "ZoneStatusSubscription",

"clientCorrelator": "0123",

"\_links": {

"self": "http://example.com/exampleAPI/location/v3/subscriptions/zones/subscription123"},

"callbackReference": "http://clientApp.example.com/location\_notifications/123456",

"zoneId": "zone01"

}}

## B.4.4 Example: client notification about UE number reaching the threshold

In this example, the client receives a notification about the UE number of the zone reaches the upper threshold that has already been set in the subscription.

Request

POST /location\_notifications/123456 HTTP/1.1

Content-Type : application/json

Content-Length : nnnn

Accept : application/json

Host : clientApp.example.com

{"zoneStatusNotification" : {

"notificationType" : "ZoneStatusNotification",

"userNumEvent" : "OVER\_ZONE\_UPPER\_THD",

"zoneId" : "zone01",

"timeStamp": {

"seconds": 1483231138,

"nanoSeconds": 0},

"\_links": {

"subscription":"http://example.com/exampleAPI/location/v3/subscriptions/zones/subscription123"

}}}

Response

HTTP/1.1 204 No Content

Date: Sun, 01 Jan 2017 00:38:59 GMT

# B.5 Examples for UE Distance Lookup

## B.5.1 Example: retrieve distance between two UEs

In this example, the client issues a request to fetch the distance between two UEs identified by their IP addresses.

Request

GET /exampleAPI/location/v3/queries/distance?address=acr%3A10.0.0.1&address=acr%3A10.0.0.2 HTTP/1.1

Content-Type: application/json

Content-Length: nnnn

Accept: application/json

Host: example.com

Response

HTTP/1.1 201 Created

Date: Sun, 01 Jan 2020 00:38:59 GMT

Content-Type: application/json

Content-Length: nnnn

{"terminalDistance": {

"distance": 1000

}}

# B.6 Examples for UE Distance Subscribe

## B.6.1 Example: create a UE Distance event subscription

In this example, the client issues a request to create UE distance event subscription. The subscription is meant to receive a notification about the "AllWithinDistance" distance event, i.e. when all monitored UEs are within a specified distance.

Request

POST /exampleAPI/location/v3/subscriptions/distance HTTP/1.1

Content-Type: application/json

Content-Length: nnnn

Accept: application/json

Host: example.com

{"userDistanceSubscription": {

"subscriptionType": "UserDistanceSubscription",

"clientCorrelator": "0123",

"callbackReference": "http://clientApp.example.com/location\_notifications/123456",

"monitoredAddress": ["acr:10.0.0.1", "acr:10.0.0.2", "acr:10.0.0.3"],

"distance": 100.0,

"trackingAccuracy": 10.0,

"criteria": "AllWithinDistance",

"checkImmediate": false

}}

Response

HTTP/1.1 201 Created

Content-Type: application/json

Location : http://example.com/exampleAPI/location/v3/subscriptions/distance/subscription123

Content-Length: nnnn

Date: Sun, 01 Jan 2017 00:38:59 GMT

{"userDistanceSubscription": {

"subscriptionType": "UserDistanceSubscription",

"clientCorrelator": "0123",

"\_links": {

"self": "http://example.com/exampleAPI/location/v3/subscriptions/distance/subscription123"},

"callbackReference": "http://clientApp.example.com/location\_notifications/123456",

"monitoredAddress": ["acr:10.0.0.1", "acr:10.0.0.2", "acr:10.0.0.3"],

"distance": 100.0,

"trackingAccuracy": 10.0,

"criteria": "AllWithinDistance",

"checkImmediate": false

}}

## B.6.2 Example: client notification about all monitored devices within the specified distance

In this example, the client receives a notification about all monitored UEs are within the specified distance. The notification relates to the "AllWithinDistance" user event.

Request

POST /location\_notifications/123456 HTTP/1.1

Content-Type: application/json

Content-Length: nnnn

Accept: application/json

Host: clientApp.example.com

{"userDistanceNotification": {

"notificationType": "UserDistanceNotification",

"monitoredUsers": {

"user": [

{

"address": "acr:10.0.0.1",

"accessPointId" : "001010000000000000000000000000001",

"zoneId" : "zone01",

"timeStamp" : {

"seconds" : 1483231138,

"nanoSeconds": 0

},

"locationInfo": {

"latitude": 80.123,

"longitude": 70.123,

"altitude": 10.0,

"accuracy": 10

}

},

{

"address": "acr:10.0.0.2",

"accessPointId" : "001010000000000000000000000000001",

"zoneId" : "zone01",

"timeStamp" : {

"seconds" : 1483231138,

"nanoSeconds": 0

},

"locationInfo": {

"latitude": 81.372,

"longitude": 71.463,

"altitude": 10.0,

"accuracy": 10

}

},

{

"address": "acr:10.0.0.3",

"accessPointId" : "001010000000000000000000000000001",

"zoneId" : "zone01",

"timeStamp" : {

"seconds" : 1483231138,

"nanoSeconds": 0

},

"locationInfo": {

"latitude": 82.511,

"longitude": 72.804,

"altitude": 10.0,

"accuracy": 10

}

}

]

},

"distanceEvent": "AllWithinDistance",

"\_links": {

"subscription":http://example.com/exampleAPI/location/v3/subscriptions/distance/subscription123

}

}}

Response

HTTP/1.1 204 No Content

Date: Sun, 01 Jan 2017 00:38:59 GMT

# B.7 Examples for UE Area Subscribe

## B.7.1 Example: Create a UE Area subscription

In this example, the client issues a request to create a UE Area subscription for a certain user identified by its IP address. The client expects to receive a notification when the requested UE enters the specified circle.

Request

POST /exampleAPI/location/v3/subscriptions/area HTTP/1.1

Content-Type: application/json

Content-Length: nnnn

Accept: application/json

Host: example.com

{"userAreaSubscription": {

"subscriptionType": "UserAreaSubscription",

"clientCorrelator": "0123",

"callbackReference": "http://clientApp.example.com/location\_notifications/123456",

"addressList": ["acr:10.0.0.1"],

"trackingAccuracy": 10.0,

"locationEventCriteria": ["ENTERING\_AREA\_EVENT"],

"areaDefine": {

"shape": 1,

"points": [{

"latitude": -80.86302,

"longitude": 41.277306

}],

"radius": 500

}

}}

Response

HTTP/1.1 201 Created

Content-Type : application/json

Location : http://example.com/exampleAPI/location/v3/subscriptions/area/subscription123

Content-Length: nnnn

Date: Sun, 01 Jan 2017 00:38:59 GMT

{"userAreaSubscription": {

"subscriptionType": "UserAreaSubscription",

"clientCorrelator": "0123",

"callbackReference": "http://clientApp.example.com/location\_notifications/123456",

"addressList": ["acr:10.0.0.1"],

"trackingAccuracy": 10.0,

"locationEventCriteria": ["ENTERING\_AREA\_EVENT"],

"areaDefine": {

"shape": 1,

"points": [{

"latitude": -80.86302,

"longitude": 41.277306

}],

"radius": 500

},

"\_links": {

Self: "http://example.com/exampleAPI/location/v3/subscriptions/area/subscription123"

}

}}

## B.7.2 Example: Client notification about UE Area change

In this example, the client receives a notification of the location of the requested UE, identified by its IP address.

Request

POST /location\_notifications/123456 HTTP/1.1

Content-Type : application/json

Content-Length: nnnn

Accept: application/json

Host: clientApp.example.com

{"userAreaNotification": {

"notificationType": "UserAreaNotification",

"addressList": ["acr:10.0.0.1"],

"userLocationEvent": "ENTERING\_AREA\_EVENT",

"\_links": {

Self: "http://example.com/exampleAPI/location/v3/subscriptions/area/subscription123"

}

}}

Response

HTTP/1.1 204 No Content

Date: Sun, 01 Jan 2017 00:38:59 GMT

# History

|  |  |  |
| --- | --- | --- |
| **Document history** | | |
| V1.1.1 | July 2017 | Publication |
| V2.1.1 | September 2019 | Publication |
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|  |  |  |