RESTful Network API for Terminal Location

Approved Version 1.0 – 24 Sep 2013

Open Mobile Alliance

OMA-TS-REST_NetAPI_TerminalLocation-V1_0-20130924-A

Contents

Figures

Tables

1. Scope

This specification defines a RESTful API for Terminal Location using HTTP protocol bindings, based on the similar API defined in [3GPP 29.199-9].

2. References

2.1 Normative References

[3GPP 29.199-9] 3GPP Technical Specification, "Open Service Access (OSA); Parlay X Web Services; Part [9]: Terminal Location (Release 8)", URL: http://www.3gpp.org/

[Autho4API_10] "Authorization Framework for Network APIs", Open Mobile Alliance™, OMA-ER-Autho4API-V1_0, URL: http://www.openmobilealliance.org/

[IETF_ACR_draft] "The acr URI for anonymous users", S.Jakobsson, K.Smith, July 2011, URL: http://tools.ietf.org/html/draft-uri-acr-extension-03

[REST_NetAPI_Common] "Common definitions for RESTful Network APIs", Open Mobile Alliance™, OMA-TS-REST_NetAPI_Common-V1_0, URL: http://www.openmobilealliance.org/

[REST_NetAPI_NotificationChannel] "RESTful Network API for Notification Channel", Open Mobile Alliance™, OMA-TS-REST_NetAPI_NotificationChannel-V1_0, URL: http://www.openmobilealliance.org/

[REST_SUP_TERMLOC] "XML schema for the RESTful Network API for Terminal Location", Open Mobile Alliance™, OMA-SUP-XSD_rest_netapi_terminallocation-V1_0, URL: http://www.openmobilealliance.org/

[RFC2119] "Key words for use in RFCs to Indicate Requirement Levels", S. Bradner, March 1997, URL: http://www.ietf.org/rfc/rfc2119.txt

[RFC2616] "Hypertext Transfer Protocol -- HTTP/1.1", R. Fielding et. al, January 1999, URL: http://www.ietf.org/rfc/rfc2616.txt

[RFC3261] "SIP: Session Initiation Protocol", J. Rosenberg et al., June 2002, URL: http://www.rfc-editor.org/rfc/rfc3261.txt

[RFC3966] "The tel URI for Telephone Numbers", H.Schulzrinne, December 2004, URL: http://www.ietf.org/rfc/rfc3966.txt

[RFC3986] "Uniform Resource Identifier (URI): Generic Syntax", R. Fielding et. al, January 2005, URL: http://www.ietf.org/rfc/rfc3986.txt

[RFC4627] "The application/json Media Type for JavaScript Object Notation (JSON)", D. Crockford, July 2006, URL: http://www.ietf.org/rfc/rfc4627.txt

[SCRRULES] "SCR Rules and Procedures", Open Mobile Alliance™, OMA-ORG-SCR_Rules_and_Procedures, URL: http://www.openmobilealliance.org/

[W3C_URLENC] HTML 4.01 Specification, Section 17.13.4 Form content types, The World Wide Web Consortium, URL: http://www.w3.org/TR/html401/interact/forms.html#h-17.13.4.1

[XMLSchema1] W3C Recommendation, XML Schema Part 1: Structures Second Edition, URL: http://www.w3.org/TR/xmlschema-1/

[XMLSchema2] W3C Recommendation, XML Schema Part 2: Datatypes Second Edition, URL: http://www.w3.org/TR/xmlschema-2/

2.2 Informative References

[OMADICT] "Dictionary for OMA Specifications", Version 2.9, Open Mobile Alliance™, OMA-ORG-Dictionary-V2_9, URL:http://www.openmobilealliance.org/

[ParlayREST_TS_Location] "RESTful bindings for Parlay X Web Services – Terminal Location", Version 1.0, Open Mobile Alliance™, OMA-TS-ParlayREST-TerminalLocation-V1_0, URL: http://www.openmobilealliance.org/

[REST_WP] "Guidelines for RESTful Network APIs", Open Mobile Alliance™, OMA-WP-Guidelines_for_RESTful_Network_APIs, URL:http://www.openmobilealliance.org/

3. Terminology and Conventions

3.1 Conventions

The key words “MUST”, “MUST NOT”, “REQUIRED”, “SHALL”, “SHALL NOT”, “SHOULD”, “SHOULD NOT”, “RECOMMENDED”, “MAY”, and “OPTIONAL” in this document are to be interpreted as described in [RFC2119].

All sections and appendixes, except “Scope” and “Introduction”, are normative, unless they are explicitly indicated to be informative.

3.2 Definitions

For the purpose of this TS, all definitions from the OMA Dictionary apply [OMADICT].

Client-side Notification URL	An HTTP URL exposed by a client, on which it is capable of receiving notifications and that can be used by the client when subscribing to notifications.
Notification Channel	A channel created on the request of the client and used to deliver notifications from a server to a client. The channel is represented as a resource and provides means for the server to post notifications and for the client to receive them via specified delivery mechanisms.
Notification Server	A server that is capable of creating and maintaining Notification Channels.
Server-side Notification URL	An HTTP URL exposed by a Notification Server, that identifies a Notification Channel and that can be used by a client when subscribing to notifications.

3.3 Abbreviations

ACR	Anonymous Customer Reference
API	Application Programming Interface
HTTP	HyperText Transfer Protocol
JSON	JavaScript Object Notation
MIME	Multipurpose Internet Mail Extensions
OMA	Open Mobile Alliance
REST	REpresentational State Transfer
SCR	Static Conformance Requirements
SIP	Session Initiation Protocol
TS	Technical Specification
URI	Uniform Resource Identifier
URL	Uniform Resource Locator
XML	eXtensible Markup Language
XSD	XML Schema Definition

4. Introduction

The Technical Specification of the RESTful Network API for Terminal Location contains HTTP protocol bindings for the [3GPP 29.199-9] specification, using the REST architectural style. The specification provides resource definitions, the HTTP verbs applicable for each of these resources, and the element data structures, as well as support material including flow diagrams and examples using the various supported message body formats (i.e. XML, JSON, and application/x-www-form-urlencoded).

4.1 Version 1.0

The RESTful Network API for Terminal Location V1.0 is a republication of the ParlayREST Terminal Location API V1.0 [ParlayREST_TS_Location] as part of the suite of OMA RESTful Network APIs. Only bug fixes and structural changes to fit that suite, but no functional changes have been applied.

Version 1.0 of this specification supports the following operations:

- Obtain the current terminal location
- Obtain the terminal distance from a given location
- Obtain the distance between two terminals
- Manage client-specific subscriptions to periodic notifications
- Manage client-specific subscriptions to area (circle) notifications
- Manage client-specific subscriptions to distance notifications

The following new functionality has been introduced:

- Support for scope values used with authorization framework defined in [Autho4API_10]
- Support for Anonymous Customer Reference (ACR) as an end user identifier
- Support for “acr:auth” as a reserved keyword in a resource URL variable that identifies an end user

5. Terminal Location API definition

This section is organized to support a comprehensive understanding of the Terminal Location API design. It specifies the definition of all resources, definition of all data structures, and definitions of all operations permitted on the specified resources.

The Terminal Location API will allow applications to get information about geographical location of a terminal. Applications can subscribe to notifications of location changes for one or more devices.

Common data types, naming conventions, fault definitions and namespaces are defined in [REST_NetAPI_Common].

The remainder of this document is structured as follows:

Section 5 starts with a diagram representing the resources hierarchy, followed by a table listing all the resources (and their URL) used by this API, along with the data structure and the supported HTTP verbs (section 5.1). What follows are the data structures (section 1.1). A sample of typical use cases is included in section 5.3, described as high level flow diagrams.

Section 6 contains detailed specification for each of the resources. Each such subsection defines the resource, the request URL variables that are common for all HTTP commands, and the supported HTTP verbs. For each supported HTTP verb, a description of the functionality is provided, along with an example of a request and an example of a response. For each unsupported HTTP verb, the returned HTTP error status is specified, as well as what should be returned in the Allow header.

All examples in section 6 use XML as the format for the message body. Application/x-www-form-urlencoded examples are provided in Appendix C, while JSON examples are provided in Appendix D. Section 7 contains fault definition details such as Service Exceptions and Policy Exceptions. Appendix B provides the Static Conformance Requirements (SCR). Appendix E lists the Parlay X equivalent operation for each supported REST resource and method combination. Appendix F provides a list of all light-weight resources, where applicable. Appendix G defines authorization aspects to control access to the resources defined in this specification.

Note: Throughout this document client and application can be used interchangeably.

Note: Throughout this document device and terminal can be used interchangeably.

5.1 Resources Summary

This section summarizes all the resources used by the RESTful Network API for Terminal Location.

The "apiVersion" URL variable SHALL have the value “v1” to indicate that the API corresponds to this version of the specification. See [REST_NetAPI_Common] which specifies the semantics of this variable.

The figure below visualizes the resource structure defined by this specification. Note that those nodes in the resource tree which have associated HTTP methods defined in this specification are depicted by solid boxes.

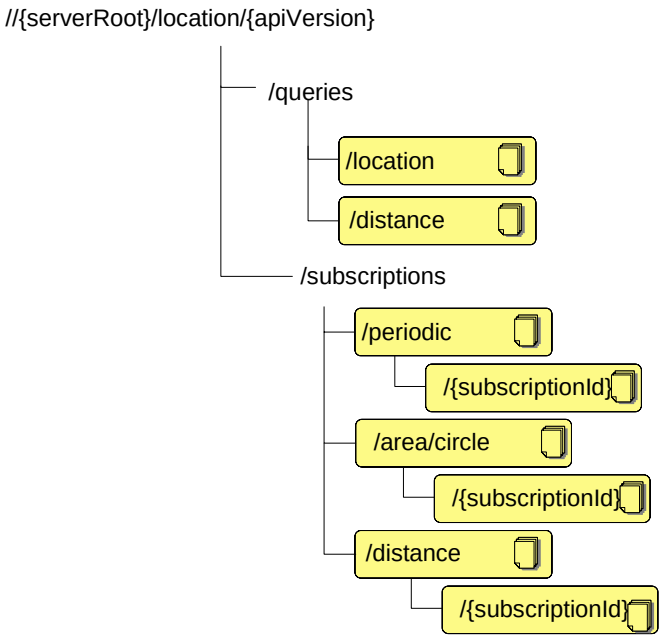

Figure 1 Resource structure defined by this specification

The following tables give a detailed overview of the resources defined in this specification, the data type of their representation and the allowed HTTP methods.

Purpose: poll terminal location and poll terminal distance

Resource	URL Base URL: http://{serverRoot}/location/{apiVersion}/queries	Data Structures	HTTP verbs			
			GET	PUT	POST	DELETE
Terminal location	/location	TerminalLocationList	return current location of the terminal or multiple terminals	no	no	no
Terminal distance	/distance	TerminalDistance	return current distance from terminal to the specified location or between two terminals	no	no	no

Purpose: location subscriptions

Resource	URL Base URL: http://{serverRoot}/location/{apiVersion}/subscriptions	Data Structures	HTTP verbs			
			GET	PUT	POST	DELETE
Periodic location notification subscriptions	/periodic	NotificationSubscriptionList (used for GET) PeriodicNotificationSubscription (used for POST) common:ResourceReference (optional alternative for POST response)	return all subscriptions	no	create new subscription	no

Resource	URL Base URL: http://{serverRoot}/location/{apiVersion}/subscriptions	Data Structures	HTTP verbs			
			GET	PUT	POST	DELETE
Individual periodic location notification subscription	/periodic/{subscriptionId}	PeriodicNotificationSubscription	return one subscription	update subscription	no	delete one subscription
Area (circle) notification subscriptions	/area/circle	NotificationSubscriptionList (used for GET) CircleNotificationSubscription (used for POST) common:ResourceReference (optional alternative for POST response)	return all subscriptions	no	create new subscription	no
Area (circle) individual notification subscription	/area/circle/{subscriptionId}	CircleNotificationSubscription	return one subscription	update subscription	no	delete one subscription
Distance notification subscriptions	/distance	NotificationSubscriptionList (used for GET) DistanceNotificationSubscription (used for POST) common:ResourceReference (optional alternative for POST response)	return all subscriptions	no	create new subscription	no
Distance individual notification subscription	/distance/{subscriptionId}	DistanceNotificationSubscription	return one subscription	update subscription	no	delete one subscription

Purpose: client notification

Resource	URL	Data Structures	HTTP verbs			
			GET	PUT	POST	DELETE
Client notifications on terminal location changes	{provided by client}	SubscriptionNotification SubscriptionCancellationNotification	no	no	notification on location changes	no

5.2 Data Types

5.2.1 XML Namespaces

The XML namespace for the Terminal Location data types is:

urn:oma:xml:rest:netapi:terminallocation:1

The 'xsd' namespace prefix is used in the present document to refer to the XML Schema data types defined in XML Schema [XMLSchema1, XMLSchema2]. The 'common' namespace prefix is used in the present document to refer to the data types defined in [REST_NetAPI_Common]. The use of namespace prefixes such as 'xsd' is not semantically significant.

The XML schema for the data structures defined in the section below is given in [REST_SUP_TERMLOC].

Applications following the RESTful Network API for Terminal Location V 1.0 specification SHALL use the namespace urn:oma:xml:rest:netapi:terminallocation:1.

Note: Server implementations can choose to also support the legacy namespace urn:oma:xml:rest:terminallocation:1 for the Terminal Location data types, in order to allow backwards-compatibility with [ParlayREST_TS_Location] applications. Use of this legacy namespace is deprecated and support is foreseen to be withdrawn in future versions of this specification. In messages sent from the server to the application, the legacy namespace is suggested to be used by the server if it was used by a legacy application in the corresponding request or subscription message.

5.2.2 Structures

The subsections of this section define the data structures used in the Terminal Location API.

Some of the structures can be instantiated as so-called root elements.

For structures that contain elements which describe a user identifier, the statements in section 6 regarding 'tel', 'sip' and 'acr' URI schemes apply.

5.2.2.1 Type: TerminalLocation

A type containing device address, retrieval status and location information. As this can be related to a query of a group of terminal devices, the locationRetrievalStatus element is used to indicate whether the information for the device was retrieved or not, or if an error occurred.

Element	Type	Optional	Description
address	xsd:anyURI	No	Address of the terminal to which the location information applies (e.g., 'sip' URI, 'tel' URI, 'acr' URI).
locationRetrievalStatus	common:RetrievalStatus	No	Status of retrieval for this terminal address.
currentLocation	LocationInfo	Yes	Location of terminal. It is only provided if locationRetrievalStatus=Retrieved.
errorInformation	common:ServiceError	Yes	Must be included when locationRetrievalStatus=Error. This is the reason for the error.

5.2.2.2 Type: TerminalLocationList

A type containing a list of terminal locations.

Element	Type	Optional	Description
terminalLocation	TerminalLocation [1..unbounded]	No	Collection of the terminal locations.

A root element named terminalLocationList of type TerminalLocationList is allowed in request and/or response bodies.

5.2.2.3 Type: SubscriptionNotification

A type containing the notification subscription.

Element	Type	Optional	Description
callbackData	xsd:string	Yes	CallbackData if passed by the application in the receiptRequest element during the associated subscription operation. See [REST_NetAPI_Common] for details.
terminalLocation	TerminalLocation [1..unbounded]	No	Collection of the terminal locations.
enteringLeavingCriteria	EnteringLeavingCriteria	Yes	Indicates whether the notification was caused by the terminal entering or leaving the target area. (This element is provided for distance notifications).
distanceCriteria	DistanceCriteria	Yes	Indicates which distance criteria that caused the notification. (This element is provided for distance notifications).
isFinalNotification	xsd:boolean	Yes	Will be set to true if it is a final notification about location change.
link	common:Link [0..unbounded]	Yes	Link to other resources that are in relationship with the resource.

A root element named subscriptionNotification of type SubscriptionNotification is allowed in request and/or response bodies.

5.2.2.4 Type: SubscriptionCancellationNotification

A type containing the subscription cancellation notification.

Element	Type	Optional	Description
callbackData	xsd:string	Yes	CallbackData if passed by the application in the receiptRequest element during the associated subscription operation. See [REST_NetAPI_Common] for details.
address	xsd:anyURI	Yes	Address of terminal if the error applies to an individual terminal, or not specified if it applies to the whole notification (e.g., 'sip' URI, 'tel' URI, 'acr' URI).
reason	common:ServiceErro	No	Reason notification is being discontinued.

Element	Type	Optional	Description
	r		
link	common:Link[0..unbounded]	Yes	Link to other resources that are in relationship with the resource.

A root element named subscriptionCancellationNotification of type SubscriptionCancellationNotification is allowed in request and/or response bodies.

5.2.2.5 Type: TerminalDistance

A type containing information about the distance from a terminal to a location or between two terminals, in addition the accuracy and a timestamp of the information are provided.

Element	Type	Optional	Description
distance	xsd:int	No	Distance from terminal to a location or between two terminals specified in meters.
accuracy	xsd:int	Yes	Accuracy of the provided distance in meters.
timestamp	xsd:dateTime	Yes	Date and time that location from which distance is calculated was collected.

A root element named terminalDistance of type TerminalDistance is allowed in request and/or response bodies.

5.2.2.6 Type: LocationInfo

A type containing location information with latitude, longitude and altitude, in addition the accuracy and a timestamp of the information are provided.

Element	Type	Optional	Description
latitude	xsd:float	No	Location latitude.
longitude	xsd:float	No	Location longitude.
altitude	xsd:float	Yes	Location altitude.
accuracy	xsd:int	No	Accuracy of location provided in meters.
timestamp	xsd:dateTime	No	Date and time that location was collected.

A root element named locationInfo of type LocationInfo is allowed in request and/or response bodies.

5.2.2.7 Type: NotificationSubscriptionList

A type containing the different subscriptions.

Element	Type	Optional	Description
circleNotificationSubscription	CircleNotificationSubscription [0..unbound]	Choice	Collection of CircleNotificationSubscription elements.
periodicNotificationSubscription	PeriodicNotificationSubscription [0..unbound]	Choice	Collection of PeriodicNotificationSubscription elements.

Element	Type	Optional	Description
distanceNotificationSubscription	DistanceNotificationSubscription [0..unbound]	Choice	Collection of DistanceNotificationSubscription elements.

XSD modelling use a “choice” to select one of the element lists only. An empty list is permitted.

A root element named notificationSubscriptionList of type NotificationSubscriptionList is allowed in response bodies.

5.2.2.8 Type: CircleNotificationSubscription

A type containing data for notification, when the area is defined as a circle.

Element	Type	Optional	Description
clientCorrelator	xsd:string	Yes	A correlator that the client can use to tag this particular resource representation during a request to create a resource on the server. This element MAY be present. Note: 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.
resourceURL	xsd:anyURI	Yes	Self referring URL. The resourceURL SHALL NOT be included in POST requests by the client, but MUST be included in POST requests representing notifications by the server to the client, when a complete representation of the resource is embedded in the notification. The resourceURL MUST also be included in responses to any HTTP method that returns an entity body, and in PUT requests.
link	common:Link[0..unbounded]	Yes	Link to other resources that are in relationship with the resource.
callbackReference	common:CallbackReference	No	Notification callback definition.
requester	xsd:anyURI	Yes	It identifies the entity that is requesting the information (e.g., 'sip' URI, 'tel' URI, 'acr' URI). The application invokes this operation on behalf of this entity. However, it does not imply that the application has authenticated the requester. If this element is not present, the requesting entity is the application itself.

Element	Type	Optional	Description
			If this element is present, and the requester is not authorized to retrieve location info, a policy exception will be returned.
address	xsd:anyURI [1..unbounded]	No	Addresses of terminals to monitor (e.g., 'sip' URI, 'tel' URI, 'acr' URI). Reference to a group could be provided here if supported by implementation.
latitude	xsd:float	No	Latitude of center point.
longitude	xsd:float	No	Longitude of center point.
radius	xsd:float	No	Radius of circle around center point in meters.
trackingAccuracy	xsd:float	No	Number of meters of acceptable error in tracking distance.
enteringLeavingCriteria	EnteringLeavingCriteria	No	Indicates whether the notification should occur when the terminal enters or leaves the target area.
checkImmediate	xsd:boolean	No	Check location immediately after establishing notification.
frequency	xsd:int	No	Maximum frequency (in seconds) of notifications per subscription (can also be considered minimum time between notifications).
duration	xsd:int	Yes	Period of time (in seconds) notifications are provided for. If set to “0” (zero), a default duration time, which is specified by the service policy, will be used. If the parameter is omitted, the notifications will continue until the maximum duration time, which is specified by the service policy, unless the notifications are stopped by deletion of subscription for notifications.
count	xsd:int	Yes	Maximum number of notifications per individual address. For no maximum, either do not include this element or specify a value of zero. Default value is 0.

A root element named circleNotificationSubscription of type CircleNotificationSubscription is allowed in request and/or response bodies.

Note that the clientCorrelator is used for purposes of error recovery as specified in of [REST_NetAPI_Common], and internal client purposes. The server is NOT REQUIRED to use the clientCorrelator value in any form in the creation of the URL of the resource. [REST_NetAPI_Common] provides a recommendation regarding the generation of the value of this element.

5.2.2.9 Type: PeriodicNotificationSubscription

A type containing data for periodic subscription.

Element	Type	Optional	Description
clientCorrelator	xsd:string	Yes	A correlator that the client can use to tag this particular resource representation during a request to create a resource on the server. This element MAY be present. Note: 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.
resourceURL	xsd:anyURI	Yes	Self referring URL. The resourceURL SHALL NOT be included in POST requests by the client, but MUST be included in POST requests representing notifications by the server to the client, when a complete representation of the resource is embedded in the notification. The resourceURL MUST also be included in responses to any HTTP method that returns an entity body, and in PUT requests.
link	common:Link[0..unbounded]	Yes	Link to other resources that are in relationship with the resource.
callbackReference	common:CallbackReference	No	Notification callback definition.
requester	xsd:anyURI	Yes	It identifies the entity that is requesting the information (e.g., 'sip' URI, 'tel' URI, 'acr' URI). The application invokes this operation on behalf of this entity. However, it does not imply that the application has authenticated the requester. If this element is not present, the requesting entity is the application itself. If this element is present, and the requester is not authorized to retrieve location info, a policy exception will be returned.
address	xsd:anyURI [1..unbounded]	No	Addresses of terminals to monitor (e.g., 'sip' URI, 'tel' URI, 'acr' URI). Reference to a group could be provided here if supported by implementation.
requestedAccuracy	xsd:int	No	Accuracy of the provided distance in meters.
frequency	xsd:int	No	Maximum frequency (in seconds) of notifications (can also be considered minimum time between notifications) **per subscription.**

Element	Type	Optional	Description
duration	xsd:int	Yes	Period of time (in seconds) notifications are provided for. If set to “0” (zero), a default duration time, which is specified by the service policy, will be used. If the parameter is omitted, the notifications will continue until the maximum duration time, which is specified by the service policy, unless the notifications are stopped by deletion of subscription for notifications.

A root element named periodicNotificationSubscription of type PeriodicNotificationSubscription is allowed in request and/or response bodies.

Note that the clientCorrelator is used for purposes of error recovery as specified in [REST_NetAPI_Common], and internal client purposes. The server is NOT REQUIRED to use the clientCorrelator value in any form in the creation of the URL of the resource. [REST_NetAPI_Common] provides a recommendation regarding the generation of the value of this element.

5.2.2.10 Type: DistanceNotificationSubscription

A type containing data for distance subscription, with reference to other devices.

Element	Type	Optional	Description
clientCorrelator	xsd:string	Yes	A correlator that the client can use to tag this particular resource representation during a request to create a resource on the server. This element MAY be present. Note: 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.
resourceURL	xsd:anyURI	Yes	Self referring URL. The resourceURL SHALL NOT be included in POST requests by the client, but MUST be included in POST requests representing notifications by the server to the client, when a complete representation of the resource is embedded in the notification. The resourceURL MUST also be included in responses to any HTTP method that returns an entity body, and in PUT requests.
link	common:Link [0..unbounded]	Yes	Link to other resources that are in relationship with the resource.
callbackReference	common:CallbackReference	No	Notification callback definition.
requester	xsd:anyURI	Yes	It identifies the entity that is requesting the

Element	Type	Optional	Description
			information (e.g., 'sip' URI, 'tel' URI, 'acr' URI). The application invokes this operation on behalf of this entity. However, it does not imply that the application has authenticated the requester. If this element is not present, the requesting entity is the application itself. If this element is present, and the requester is not authorized to retrieve location info, a policy exception will be returned.
referenceAddress	xsd:anyURI [0..unbounded]	Yes	If specified, indicates address of each device that will be used as reference devices from which the distances towards monitored devices 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	xsd:anyURI [1..unbounded]	No	Contains addresses of devices 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 device and reference device(s) will be monitored. If the ReferenceAddress is not present, then the distance between each pair of the monitored devices will be monitored. Note that in that case there must be at least two addresses specified here.
distance	xsd:float	No	Distance between devices that shall be monitored.
trackingAccuracy	xsd:float	No	Number of meters of acceptable error in tracking distance.
criteria	DistanceCriteria	No	Indicates whether the notification should occur when the geographical relationship between monitored and referenced devices changes.
checkImmediate	xsd:boolean	No	Check location immediately after establishing notification.
frequency	xsd:int	No	Maximum frequency (in seconds) of notifications per subscription (can also be considered minimum time between notifications).
duration	xsd:int	Yes	Period of time (in seconds) notifications are provided for. If set to “0” (zero), a default duration time, which is specified by the service policy, will be used. If the element is omitted, the notifications will continue until the maximum

Element	Type	Optional	Description
			duration time, which is specified by the service policy, unless the notifications are stopped by deletion of subscription for notifications.
count	xsd:int	Yes	Maximum number of notifications per individual address. For no maximum, either do not include this element or specify a value of zero. Default value is 0.

A root element named distanceNotificationSubscription of type DistanceNotificationSubscription is allowed in request and/or response bodies.

Note that the clientCorrelator is used for purposes of error recovery as specified in [REST_NetAPI_Common], and internal client purposes. The server is NOT REQUIRED to use the clientCorrelator value in any form in the creation of the URL of the resource. [REST_NetAPI_Common] provides a recommendation regarding the generation of the value of this element.

5.2.3 Enumerations

5.2.3.1 Enumeration: EnteringLeavingCriteria

An enumeration, defining the direction of a terminal.

Enumeration	Description
Entering	Terminal is entering an area.
Leaving	Terminal is leaving an area.

5.2.3.2 Enumeration: DistanceCriteria

An enumeration, defining the distance criteria between devices.

Enumeration	Description
AllWithinDistance	All monitored devices are within the specified distance.
AnyWithinDistance	Any of monitored devices gets within the specified distance.
AllBeyondDistance	All monitored devices are beyond the specified distance.
AnyBeyondDistance	Any of monitored devices gets beyond the specified distance.

5.2.3.3 Enumeration: DelayTolerance

An enumeration for what delay is acceptable.

Enumeration	Description
NoDelay	The server should immediately return any location estimate that it currently has. If no estimate is available, the server shall return the failure indication and may optionally initiate procedures to obtain a location estimate (e.g. to be available for a later request).
LowDelay	Fulfilment of the response time requirement takes precedence over fulfilment of the accuracy requirement. The server shall return any current location estimate with minimum delay. The server shall attempt to fulfil any accuracy requirement, but in doing so shall not add any additional delay (i.e. a quick response with lower accuracy is more desirable than waiting for a more accurate response).

DelayTolerant	Fulfilment of the accuracy requirement takes precedence over fulfilment of the response time requirement. If necessary, the server should delay providing a response until the accuracy requirement of the requesting application is met. The server shall obtain a current location with regard to fulfilling the accuracy requirement.

5.2.4 Values of the Link "rel" attribute

The "rel" attribute of the Link element is a free string set by the server implementation, to indicate a relationship between the current resource and an external resource. The following are possible strings (list is non-exhaustive, and can be extended):

- TerminalLocationList
- TerminalDistance
- LocationInfo
- NotificationPeriodicSubscriptionList
- NotificationCircleSubscriptionList
- NotificationDistanceSubscriptionList
- SubscriptionNotification
- SubscriptionCancellationNotification
- CircleNotificationSubscription
- PeriodicNotificationSubscription
- DistanceNotificationSubscription

These values indicate the kind of resource that the link points to.

5.3 Sequence Diagrams

The following subsections describe the resources, methods and steps involved in typical scenarios.

In a sequence diagram, a step which involves delivering a notification is labeled with "POST or NOTIFY", where "POST" refers to delivery via the HTTP POST method, and "NOTIFY" refers to delivery using the Notification Channel [REST_NetAPI_NotificationChannel].

5.3.1 Location query

This figure below shows a scenario to return location for a single terminal or a group of terminals.

The resource:

- To get the location information for a single terminal or a group of terminals, read the resource below with the URL parameters containing terminal address or addresses

  http://{serverRoot}/location/{apiVersion}/queries/location

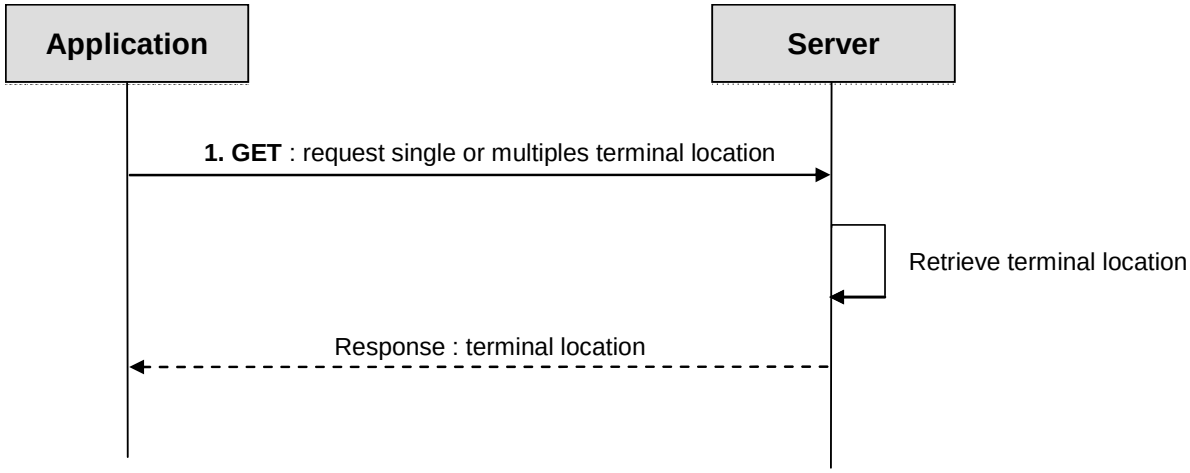

Figure 2 Location query

Outline of flow:

1. An application requests **terminal location for a single terminal or a group of terminals** with Request URL parameters **containing** terminal address or addresses (i.e. group) and desired accuracy using GET and receives the terminal location information.

5.3.2 Query for distance from a location

This figure below shows a scenario to return the distance of a terminal from a location.

The resource:

To get the distance between a terminal and a geographical location, read the resource below, while passing appropriate query parameters.

http://{serverRoot}/location/{apiVersion}/queries/distance

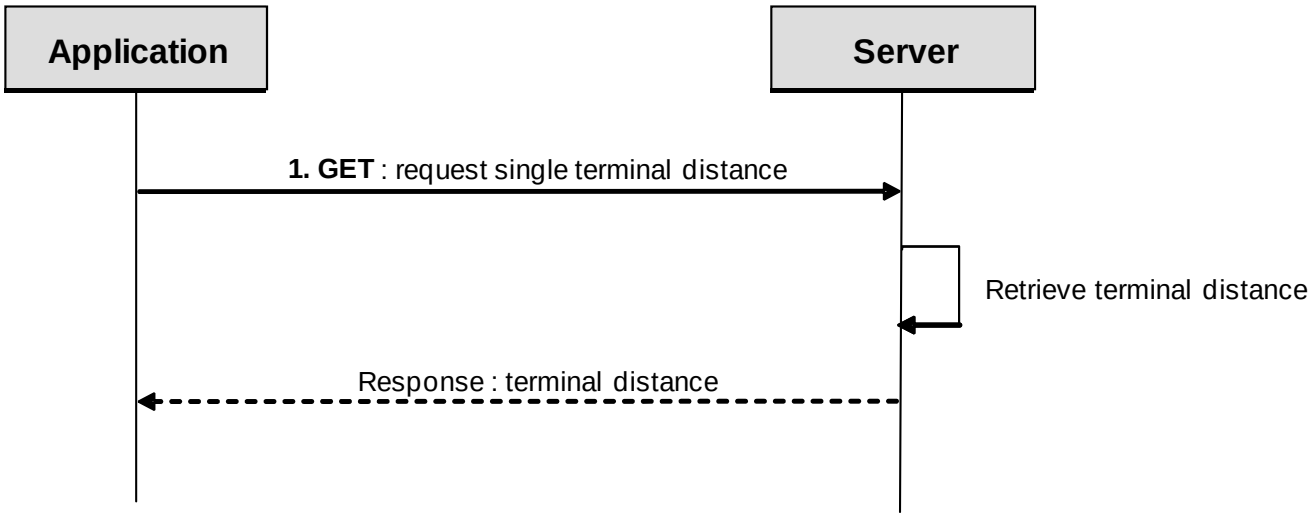

Figure 3 Distance from location query

Outline of flow:

1. An application requests the distance between a terminal and a geographical location by using GET with resource URL and request URL parameters such as terminal address and longitude/latitude of the geographical location. It receives the terminal distance information.

5.3.3 Query for distance between two terminals

This figure below shows a scenario to return the distance between two terminals.

The resource:

- To get the distance between two terminals, read the resource below, while passing appropriate query parameters

  http://{serverRoot}/location/{apiVersion}/queries/distance

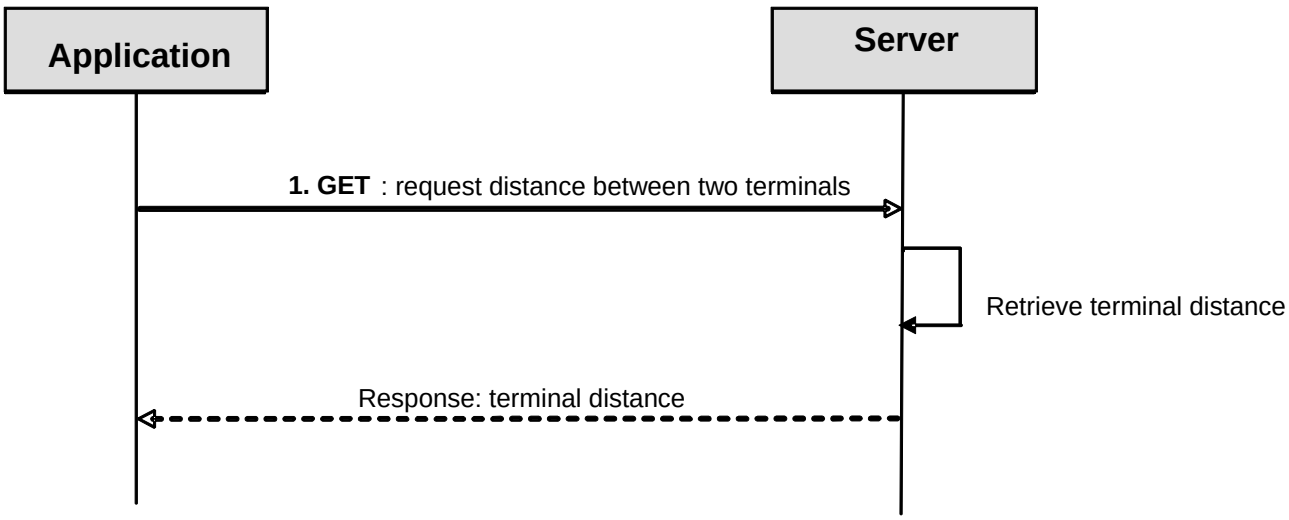

Figure 4 Distance between two terminals query

Outline of flow:

1. An application requests the distance between two terminals by using GET with the resource URL and providing two different terminal addresses as Request URL parameters. It receives the terminal distance information.

5.3.4 Periodic location notification

This figure below shows a scenario to control subscriptions for periodic notifications about terminal location for a particular client.

The notification URL passed by the client during the subscription step can be a Client-side Notification URL, or a Server-side Notification URL. Refer to [REST_NetAPI_NotificationChannel] for sequence flows illustrating the creation of a Notification Channel and obtaining a Server-side Notification URL on the server-side, and the use of that Notification Channel by the client.

The resource:

- To start subscription to periodic notifications about terminal location for a particular client, create new resource under

  http://{serverRoot}/location/{apiVersion}/subscriptions/periodic

- To update or delete an individual subscription for periodic notifications about terminal location for a particular client, use the resource

  http://{serverRoot}/location/{apiVersion}/subscriptions/periodic/{subscriptionId}

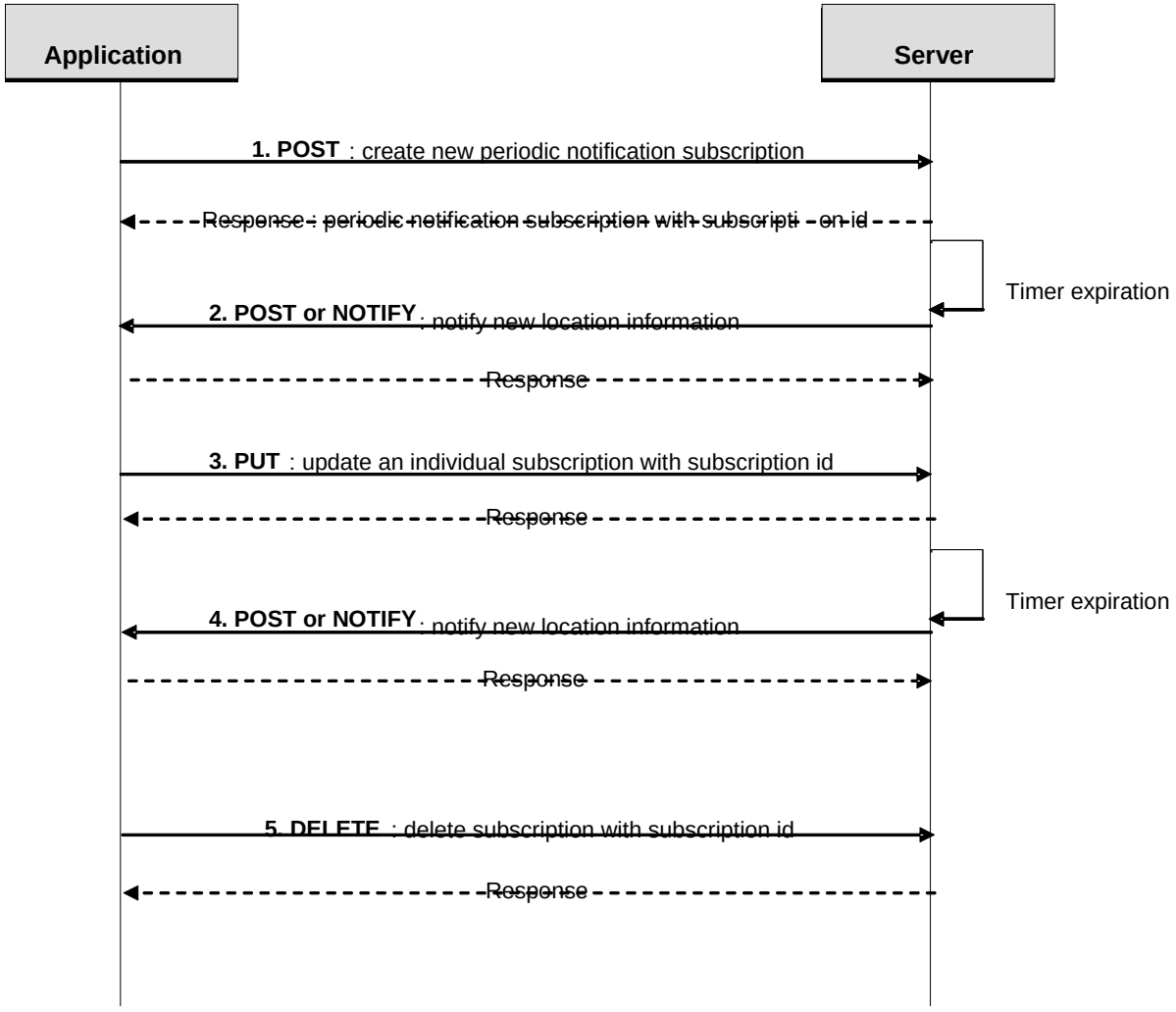

Figure 5 Periodic location notification

Outline of flow:

1. An application creates a new periodic notification subscription for the requesting client by using POST and receives the resulting resource URL containing subscriptionId.
2. When the set up timer expires, the REST service on the server notifies the application of current location information using POST to the application supplied notifyURL. Alternatively, the application obtains the notifications using a Notification Channel [REST_NetAPI_NotificationChannel]. This is repeated at specific frequency.
3. An application updates an individual subscription for periodic location notification for the requesting client by using PUT to resource URL containing subscriptionId.
4. When the set up timer expires, the REST service on the server notifies the application of current location information using POST to the application supplied notifyURL. Alternatively, the application obtains the

notifications using a Notification Channel [REST_NetAPI_NotificationChannel]. This is repeated at specific frequency.

5. An application deletes a subscription for periodic location notification and stops notifications for a particular client by using DELETE to resource URL containing subscriptionId.

5.3.5 Area (circle) location notification

This figure below shows a scenario to control subscriptions for notification about terminal movement in relation to the geographic area (circle), crossing in and out, for a particular client.

The notification URL passed by the client during the subscription step can be a Client-side Notification URL, or a Server-side Notification URL. Refer to [REST_NetAPI_NotificationChannel] for sequence flows illustrating the creation of a Notification Channel and obtaining a Server-side Notification URL on the server-side, and the use of that Notification Channel by the client.

The resource:

- To start subscription to notifications about terminal movements in relation to the geographic area (circle), crossing in and out, for a particular client, create new resource under

  http://{server root}/location/{apiVersion}/subscriptions/area/circle

- To update or delete an individual subscription for notifications about terminal movements in relation to the geographic area (circle), crossing in and out, for a particular client, use the resource

  http://{server root}/location/{apiVersion}/subscriptions/area/circle/{subscriptionId}

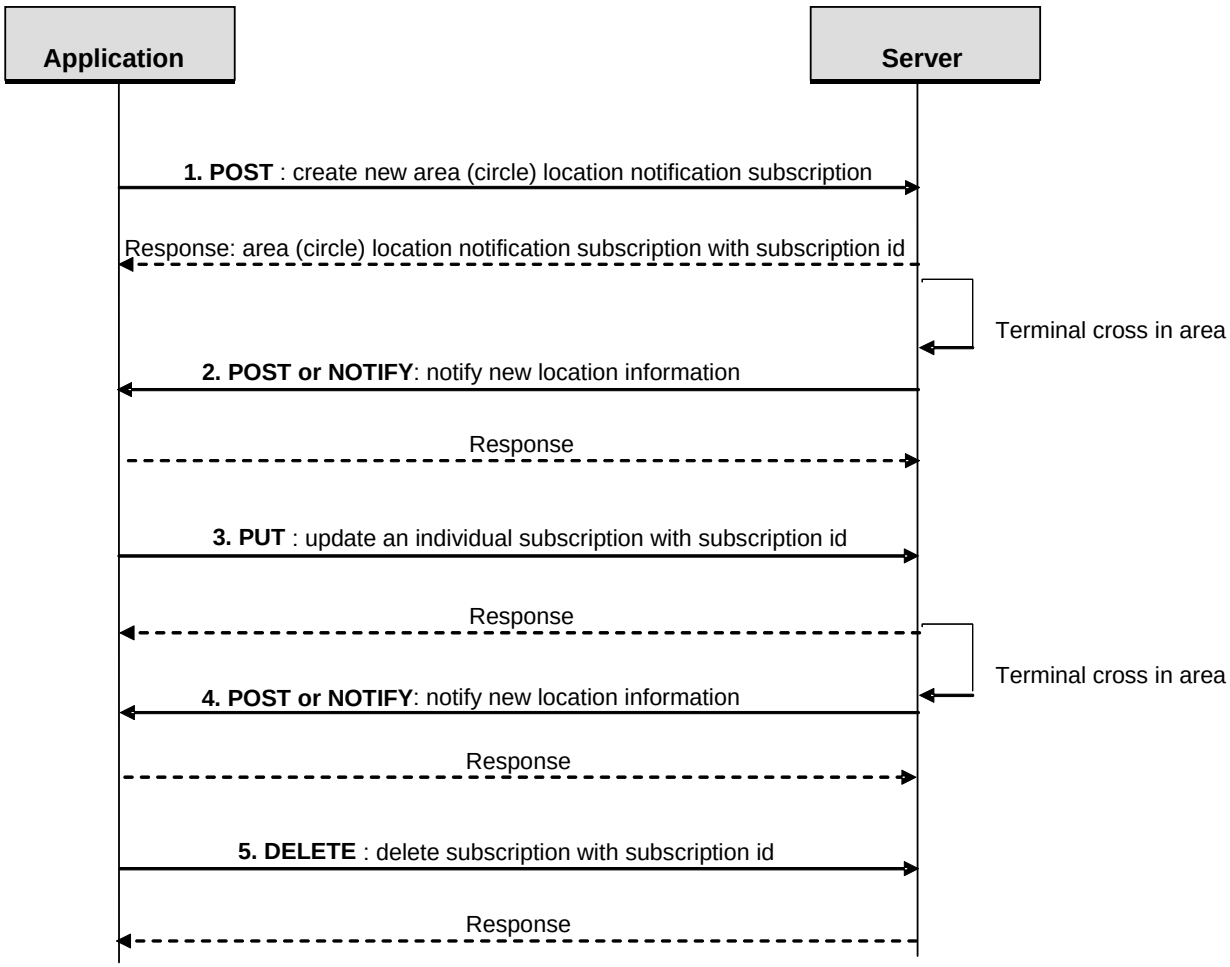

Figure 6 Area (circle) location notification

Outline of flow:

1. An application creates a new area (circle) notification subscription for the requesting client by using POST and receives the resulting resource URL containing subscriptionId.
2. When the terminal crosses in or out the specified area (circle) the REST service on the server notifies the application using POST to the application supplied notifyURL. Alternatively, the application obtains the notifications using a Notification Channel [REST_NetAPI_NotificationChannel].
3. An application updates an individual subscription for area (circle) notification for the requesting client by using PUT to resource URL containing subscriptionId.
4. When the terminal crosses in or out the updated specified area (circle) the REST service on the server notifies the application using POST to the application supplied notifyURL. Alternatively, the application obtains the notifications using a Notification Channel [REST_NetAPI_NotificationChannel].
5. An application deletes a subscription for area (circle) notification and stops notifications for the requesting client by using DELETE to resource URL containing subscriptionId.

5.3.6 Distance location notification

This figure below shows a scenario to control subscriptions for notifications about changes in the geographical relationships between terminals (a client has passed a border by either approaching or leaving another referenced client).

The notification URL passed by the client during the subscription step can be a Client-side Notification URL, or a Server-side Notification URL. Refer to [REST_NetAPI_NotificationChannel] for sequence flows illustrating the creation of a Notification Channel and obtaining a Server-side Notification URL on the server-side, and the use of that Notification Channel by the client.

The resource and operation used

- To start subscription to notifications about changes in the geographical relationships between terminals, create new resource under

  http://{serverRoot}/location/{apiVersion}/subscriptions/distance

- To update or delete an individual subscription for notifications about changes in the geographical relationships between terminals for a particular client, use the resource

  http://{serverRoot}/location/{apiVersion}/subscriptions/distance/{subscriptionId}

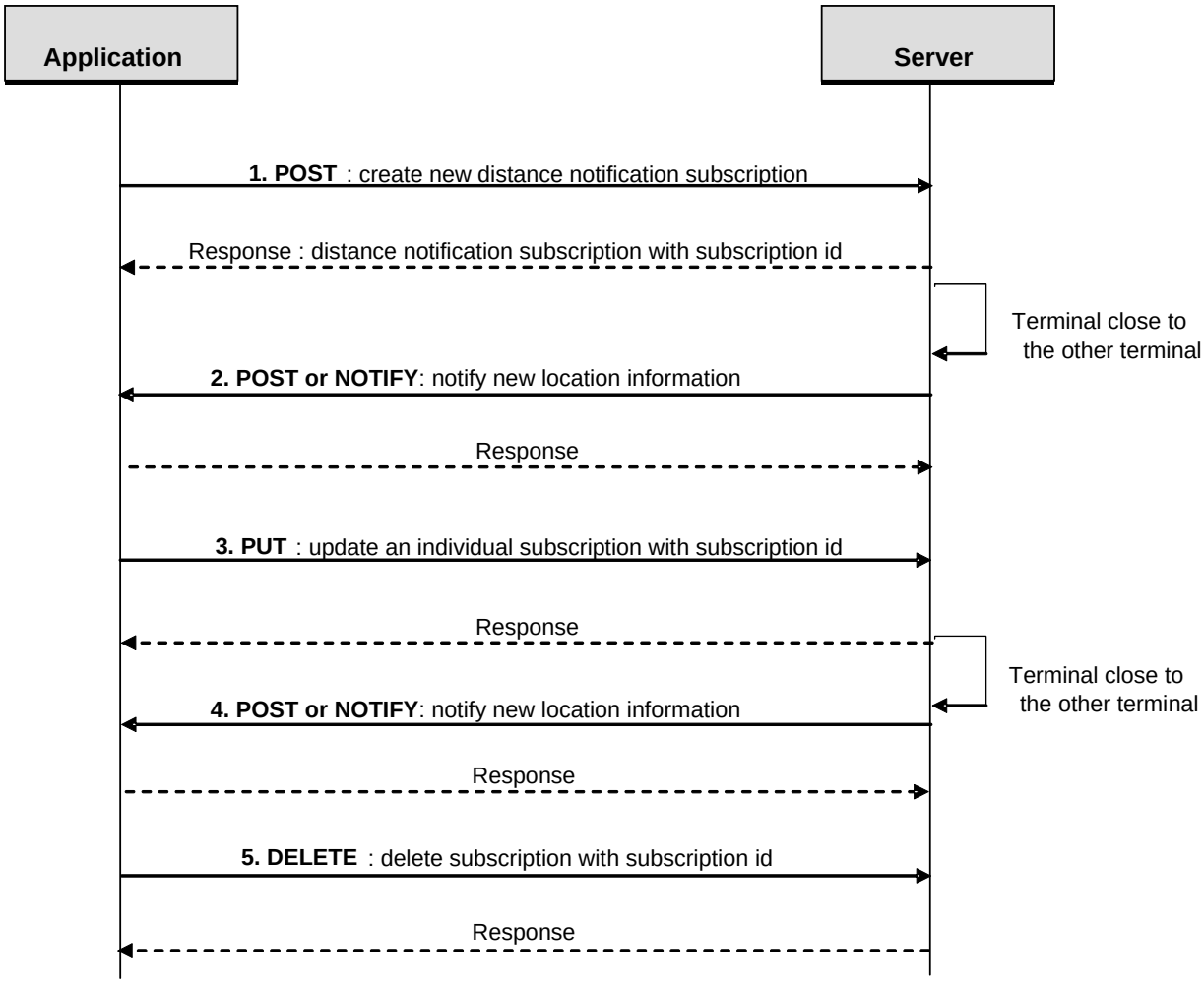

Figure 7 Distance location notification

Outline of flow:

1. An application creates a new distance notification subscription for the requesting client by using POST and receives the resulting resource URL containing subscriptionId.
2. When a terminal passes the border by either approaching or leaving the referenced terminal, the REST service on the server notifies the application by using POST to the application supplied notifyURL. Alternatively, the application obtains the notifications using a Notification Channel [REST_NetAPI_NotificationChannel].
3. An application updates an individual subscription for distance notification for the requesting terminal by using PUT to resource URL containing subscriptionId.
4. When a terminal passes the border by either approaching or leaving the referenced terminal, the REST service on the server notifies the application by using POST to the application supplied notifyURL. Alternatively, the application obtains the notifications using a Notification Channel [REST_NetAPI_NotificationChannel].
5. An application deletes a subscription for distance notification and stops notifications for the requesting client by using DELETE to resource URL containing subscriptionId.

6. Detailed specification of the resources

The following applies to all resources defined in this specification regardless of the representation format (i.e. XML, JSON, application/x-www-form-urlencoded):

- Reserved characters in URL variables (parts of a URL denoted below by a name in curly brackets) MUST be percent-encoded according to [RFC3986]. Note that this always applies, no matter whether the URL is used as a Request URL or inside the representation of a resource (such as in "resourceURL" and "link" elements).
- If a user identifier (e.g. address, userId, etc) of type anyURI is in the form of an MSISDN, it MUST be defined as a global number according to [RFC3966] (e.g. tel:+19585550100) and the use of characters other than digits and the leading "+" sign SHOULD be avoided in order to ensure uniqueness of the resource URL. This applies regardless of whether the user identifier appears in a URL variable or in a parameter in the body of an HTTP message.
- If a user identifier (e.g. address, userId, etc) of type anyURI is in the form of a SIP URI, it MUST be defined according to [RFC3261].
- If a user identifier (e.g. address, userId, etc) of type anyURI is in the form of an Anonymous Customer Reference (ACR), it MUST be defined according to [IETF_ACR_draft], i.e. it MUST include the protocol prefix 'acr:' followed by the ACR.
    - The ACR 'auth' is a supported reserved keyword, and MUST NOT be assigned as an ACR to any particular end user. See **Error! Reference source not found.** for details regarding the use of this reserved keyword.
- For requests and responses that have a body, the following applies: in the requests received, the server SHALL support JSON and XML encoding of the parameters in the body, and MAY support application/x-www-form-urlencodedparameters in the body. The Server SHALL return either JSON or XML encoded parameters in the response body, according to the result of the content type negotiation as specified in [REST_NetAPI_Common]. In notifications to the Client, the server SHALL use either XML or JSON encoding, depending on which format the client has specified in the related subscription. The generation and handling of the JSON representations SHALL follow the rules for JSON encoding in HTTP Requests/Responses as specified in [REST_ NetAPI_Common].

6.1 Resource: Terminal location

The resource used is: **http://{serverRoot}/location/{apiVersion}/queries/location**

This resource is used to return location for single terminal or group of terminals.

6.1.1 Request URL variables

The following request URL variables are common for all HTTP commands:

Name	Description
serverRoot	Server base url: hostname+port+base path. Example: example.com/exampleAPI
apiVersion	Version of the API client wants to use. The value of this variable is defined in section 5.1.

See section 6 for a statement on the escaping of reserved characters in URL variables.

6.1.2 Response Codes and Error Handling

For HTTP response codes, see [REST_NetAPI_Common].

For Policy Exception and Service Exception fault codes applicable to Terminal Location, see section 7.

6.1.3 GET

This operation is used to read terminal location information. If the requester parameter is present and the requester is not authorized, PolicyException (POL0002) will be returned.

Request URL parameters are:

Name	Type/value	Optional	Description
requester	xsd:anyURI	Yes	It identifies the entity that is requesting the information. The application invokes this operation on behalf of this entity. However, it does not imply that the application has authenticated the requester. If this element is not present, the requesting entity is the application itself. If this element is present, and the requester is not authorized to retrieve location info, a policy exception will be returned. Examples: (e.g. tel:+19585550100, acr:pseudonym123)
address	xsd:anyURI[1..unbounded]	No	Address(es) of the terminal device(s) for which the location information is requested. Examples: (e.g. tel:+19585550100, acr:pseudonym123).
requestedAccuracy	xsd:int	No	Accuracy of location information requested.
acceptableAccuracy	xsd:int	No	Accuracy that is acceptable for a response.
maximumAge	xsd:int	Yes	Maximum acceptable age (in seconds) of the location information that is returned.
responseTime	xsd:int	Yes	Indicates the maximum time (in seconds) that the application can accept to wait for a response.
tolerance	DelayTolerance	No	Indicates the priority of response time versus accuracy.

6.1.3.1 Example 1: Get location for single address (Informative)

6.1.3.1.1 Request

```
GET /exampleAPI/location/v1/queries/location?address=tel%3A%2B19585550100&tolerance=LowDelay&requestedAccuracy=1000
&acceptableAccuracy=1000&maximumAge=180&responseTime=300 HTTP/1.1
Accept: application/xml
Host: example.com
```

6.1.3.1.2 Response

```
HTTP/1.1 200 OK
Content-Type: application/xml
Content-Length: nnnn
Date: Thu, 02 Jun 2011 02:51:59 GMT

<?xml version="1.0" encoding="UTF-8"?>
<tl:terminalLocationList xmlns:tl="urn:oma:xml:rest:netapi:terminallocation:1">
  <terminalLocation>
    <address>tel:+19585550100</address>
    <locationRetrievalStatus>Retrieved</locationRetrievalStatus>
    <currentLocation>
```

```
    <latitude>-80.86302</latitude>
    <longitude>41.277306</longitude>
    <altitude>1001.0</altitude>
    <accuracy>100</accuracy>
    <timestamp>2011-06-02T02:53:23.000Z</timestamp>
   </currentLocation>
  </terminalLocation>
</tl:terminalLocationList>
```

6.1.3.2 Example 2: Get location for multiple terminal addresses (Informative)

6.1.3.2.1 Request

```
GET /exampleAPI/location/v1/queries/location?address=tel%3A%2B19585550100&address=tel%3A%2B19585550101&tolerance=
LowDelay&requestedAccuracy=1000&acceptableAccuracy=1000 HTTP/1.1
Accept: application/xml
Host: example.com
```

6.1.3.2.2 Response

```
HTTP/1.1 200 OK
Content-Type: application/xml
Content-Length: nnnn
Date: Thu, 02 Jun 2011 02:51:59 GMT

<?xml version="1.0" encoding="UTF-8"?>
<tl:terminalLocationList xmlns:tl="urn:oma:xml:rest:netapi:terminallocation:1">
  <terminalLocation>
    <address>tel:+19585550100</address>
    <locationRetrievalStatus>Retrieved</locationRetrievalStatus>
    <currentLocation>
      <latitude>-80.86302</latitude>
      <longitude>41.277306</longitude>
      <altitude>1001.0</altitude>
      <accuracy>100</accuracy>
      <timestamp>2011-06-02T00:27:23.000Z</timestamp>
    </currentLocation>
  </terminalLocation>
  <terminalLocation>
    <address>tel:+19585550101</address>
    <locationRetrievalStatus>Error</locationRetrievalStatus>
    <errorInformation>
      <messageId>SVC2002</messageId>
      <text>Requested information not available for address %1.</text>
      <variables>tel:+19585550101</variables>
    </errorInformation>
  </terminalLocation>
```

```
</tl:terminalLocationList>
```

6.1.3.3 Example 3: Location with unsupported accuracy (Informative)

6.1.3.3.1 Request

```
GET /exampleAPI/location/v1/queries/location?address=tel%3A%2B19585550100&tolerance=LowDelay&requestedAccuracy=10&
acceptableAccuracy=100 HTTP/1.1
Accept: application/xml
Host: example.com
```

6.1.3.3.2 Response

```
HTTP/1.1 403 Forbidden
Content-Type: application/xml
Content-Length: nnnn
Date: Thu, 02 Jun 2011 02:51:59 GMT

<?xml version="1.0" encoding="UTF-8"?>
<common:requestError xmlns:common="urn:oma:xml:rest:netapi:common:1">
<link rel="TerminalLocationList" href="http://example.com/exampleAPI/location/v1/queries/location"/>
  <policyException>
    <messageId>POL0230</messageId>
    <text>The requested accuracy %1 is not supported by the policy</text>
    <variables>10</variables>
  </policyException>
</common:requestError>
```

6.1.3.4 Example 4: Location with unauthorized requester (Informative)

6.1.3.4.1 Request

```
GET /exampleAPI/location/v1/queries/location?requester=tel%3A%2B19585550100&address=
tel%3A%2B19585550100&tolerance=LowDelay&requestedAccuracy=10&acceptableAccuracy=100 HTTP/1.1
Accept: application/xml
Host: example.com
```

6.1.3.4.2 Response

```
HTTP/1.1 403 Forbidden
Content-Type: application/xml
Content-Length: nnnn
Date: Thu, 02 Jun 2011 02:51:59 GMT

<?xml version="1.0" encoding="UTF-8"?>
<common:requestError xmlns:common="urn:oma:xml:rest:netapi:common:1">
  <policyException>
    <messageId>POL0002</messageId>
    <text>Privacy error.</text>
  </policyException>
</common:requestError>
```

6.1.3.5 Example 5: Get location for single address, using ACR (Informative)

6.1.3.5.1 Request

```
GET /exampleAPI/location/v1/queries/location?address=acr%3Apseudonym123&tolerance=LowDelay&requestedAccuracy=1000
&acceptableAccuracy=1000&maximumAge=180&responseTime=300 HTTP/1.1
Accept: application/xml
Host: example.com
```

6.1.3.5.2 Response

```
HTTP/1.1 200 OK
Content-Type: application/xml
Content-Length: nnnn
Date: Thu, 02 Jun 2011 02:51:59 GMT

<?xml version="1.0" encoding="UTF-8"?>
<tl:terminalLocationList xmlns:tl="urn:oma:xml:rest:netapi:terminallocation:1">
  <terminalLocation>
    <address>acr:pseudonym123</address>
    <locationRetrievalStatus>Retrieved</locationRetrievalStatus>
    <currentLocation>
      <latitude>-80.86302</latitude>
      <longitude>41.277306</longitude>
      <altitude>1001.0</altitude>
      <accuracy>100</accuracy>
      <timestamp>2011-06-02T02:53:23.000Z</timestamp>
    </currentLocation>
  </terminalLocation>
</tl:terminalLocationList>
```

6.1.4 PUT

Method not supported by the resource. The returned HTTP error status is 405. The server should also include the 'Allow: GET' field in the response as per section 14.7 of [RFC2616].

6.1.5 POST

Method not supported by the resource. The returned HTTP error status is 405. The server should also include the 'Allow: GET' field in the response as per section 14.7 of [RFC2616].

6.1.6 DELETE

Method not supported by the resource. The returned HTTP error status is 405. The server should also include the 'Allow: GET' field in the response as per section 14.7 of [RFC2616].

6.2 Resource: Terminal distance

The resource used is: **http://{serverRoot}/location/{apiVersion}/queries/distance**

This resource is used to return distance between either:

- A terminal and a geographical location

- Two terminals

6.2.1 Request URL variables

The following request URL variables are common for all HTTP commands:

Name	Description
serverRoot	Server base url: hostname+port+base path. Example: example.com/exampleAPI
apiVersion	Version of the API client wants to use. The value of this variable is defined in section 5.1.

See section 6 for a statement on the escaping of reserved characters in URL variables.

6.2.2 Response Codes and Error Handling

For HTTP response codes, see [REST_NetAPI_Common].

For Policy Exception and Service Exception fault codes applicable to Terminal Location, see section 7.

6.2.3 GET

This operation is used to return the distance between either:

- A terminal and a geographical location
- Two terminals

If the requester parameter is present and the requester is not authorized, PolicyException (POL0002) will be returned.

Supported parameters in the query string of the request URL are:

Name	Type/value	Optional	Description
requester	xsd:anyURI	Yes	It identifies the entity that is requesting the information. The application invokes this operation on behalf of this entity. However, it does not imply that the application has authenticated the requester. If this element is not present, the requesting entity is the application itself. If this element is present, and the requester is not authorized to retrieve location info, a policy exception will be returned. Examples: (e.g. tel:+19585550100, acr:pseudonym123).
address	xsd:anyURI[1..2]	No	One or two terminal addresses of terminal to check. The second “address” parameter SHALL NOT be included when the distance between a terminal and a location is requested. Examples: (e.g. tel:+19585550100, acr:pseudonym123). The second “address” parameter SHALL be included when a location is not provided.
latitude	xsd:float	Yes	Latitude of the location to measure from. SHALL NOT be included when the distance between two terminals is requested. SHALL be included when the distance between a terminal and a location is requested.
longitude	xsd:float	Yes	Longitude of the location to measure from. SHALL NOT

			be included when the distance between two terminals is requested. SHALL be included when the distance between a terminal and a location is requested.

6.2.3.1 Example 1: (distance between a terminal and a location) (Informative)

6.2.3.1.1 Request

This example shows also an alternative way to indicate desired content type in response from the server, by using URL query parameter "?resFormat" which is described in [OMA_REST_NetAPI_Common].

```
GET /exampleAPI/location/v1/queries/distance?resFormat=XML&address=tel%3A%2B19585550100&latitude=50&longitude=125
HTTP/1.1
Accept: application/xml
Host: example.com
```

6.2.3.1.2 Response:

```
HTTP/1.1 200 OK
Content-Type: application/xml
Content-Length: nnnn
Date: Thu, 02 Jun 2011 02:51:59 GMT

<?xml version="1.0" encoding="UTF-8"?>
<tl:terminalDistance xmlns:tl="urn:oma:xml:rest:netapi:terminallocation:1">
  <distance>100</distance>
</tl:terminalDistance>
```

6.2.3.2 Example 2: (distance between two terminals) (Informative)

6.2.3.2.1 Request

```
GET /exampleAPI/location/v1/queries/distance?address=tel%3A%2B19585550100&address=tel%3A%2B19585550101 HTTP/1.1
Accept: application/xml
Host: example.com
```

6.2.3.2.2 Response

```
HTTP/1.1 200 OK
Content-Type: application/xml
Content-Length: nnnn
Date: Thu, 02 Jun 2011 02:51:59 GMT

<?xml version="1.0" encoding="UTF-8"?>
<tl:terminalDistance xmlns:tl="urn:oma:xml:rest:netapi:terminallocation:1">
  <distance>100</distance>
</tl:terminalDistance>
```

6.2.3.3 Example 3: (invalid address) (Informative)

6.2.3.3.1 Request

```
GET /exampleAPI/location/v1/queries/distance?address=tel%3A%2B19585550100&latitude=50&longitude=125 HTTP/1.1
Accept: application/xml
Host: example.com
```


6.2.3.3.2 Response

```
HTTP/1.1 400 Bad Request
Content-Type: application/xml
Content-Length: nnnn
Date: Thu, 02 Jun 2011 02:51:59 GMT

<?xml version="1.0" encoding="UTF-8"?>
<common:requestError xmlns:common="urn:oma:xml:rest:netapi:common:1">
   <link rel="TerminalDistance" href="http://example.com/exampleAPI/location/v1/queries/distance"/>
   <serviceException>
   <messageId>SVC0002</messageId>
   <text> Invalid input value for message part %1</text>
   <variables>tel:+19585550100</variables>
 </serviceException>
</common:requestError>
```

6.2.3.4 Example 4: (too many addresses) (Informative)

6.2.3.4.1 Request

```
GET /exampleAPI/location/v1/queries/distance?address=tel%3A%2B19585550100&address=tel%3A%2B19585550101
&address=tel%3A%2B19585550102 HTTP/1.1
Accept: application/xml
Host: example.com
```

6.2.3.4.2 Response

```
HTTP/1.1 403 Forbidden
Content-Type: application/xml
Content-Length: nnnn
Date: Thu, 02 Jun 2011 02:51:59 GMT

<?xml version="1.0" encoding="UTF-8"?>
<common:requestError xmlns:common="urn:oma:xml:rest:netapi:common:1">
  <link rel="TerminalDistance" href="http://example.com/exampleAPI/location/v1/queries/distance"/>
 <policyException>
      <messageId>POL0003</messageId>
      <text>Too many addresses specified in message part %1</text>
      <variables>addresses</variables>
  </policyException>
</common:requestError>
```

6.2.4 PUT

Method not supported by the resource. The returned HTTP error status is 405. The server should also include the 'Allow: GET' field in the response as per section 14.7 of [RFC2616].

6.2.5 POST

Method not supported by the resource. The returned HTTP error status is 405. The server should also include the 'Allow: GET' field in the response as per section 14.7 of [RFC2616].

6.2.6 DELETE

Method not supported by the resource. The returned HTTP error status is 405. The server should also include the 'Allow: GET' field in the response as per section 14.7 of [RFC2616].

6.3 Resource: Periodic location notification subscriptions

The resource used is:

http://{serverRoot}/location/{apiVersion}/subscriptions/periodic

This resource is used to control subscriptions for periodic location notification for a particular client.

This resource can be used in conjunction with a Client-side Notification URL, or in conjunction with a Server-side Notification URL. In this latter case, the application MUST first create a Notification Channel (see [REST_NetAPI_NotificationChannel]) before creating a subscription.

6.3.1 Request URL variables

The following request URL variables are common for all HTTP commands:

Name	Description
serverRoot	Server base url: hostname+port+base path. Example: example.com/exampleAPI
apiVersion	Version of the API client wants to use. The value of this variable is defined in section 5.1.

See section 6 for a statement on the escaping of reserved characters in URL variables.

6.3.2 Response Codes and Error Handling

For HTTP response codes, see [REST_NetAPI_Common].

For Policy Exception and Service Exception fault codes applicable to Terminal Location, see section 7.

6.3.3 GET

Read all active subscriptions for periodic location notifications for the requesting client.

No URL parameters.

6.3.3.1 Example (Informative)

6.3.3.1.1 Request

```
GET /exampleAPI/location/v1/subscriptions/periodic HTTP/1.1
Accept: application/xml
Host: example.com
```

6.3.3.1.2 Response

```
HTTP/1.1 200 OK
Content-Type: application/xml
Content-Length: nnnn
Date: Thu, 02 Jun 2011 02:51:59 GMT
```

```
<?xml version="1.0" encoding="UTF-8"?>
<tl:notificationSubscriptionList xmlns:tl="urn:oma:xml:rest:netapi:terminallocation:1">
  <periodicNotificationSubscription>
    <clientCorrelator>0001</clientCorrelator>
    <resourceURL>http://example.com/exampleAPI/location/v1/subscriptions/periodic/sub123</resourceURL>
    <callbackReference>
      <notifyURL>http://application.example.com/notifications/LocationNotification</notifyURL>
      <callbackData>1234</callbackData>
    </callbackReference>
    <address>tel:+19585550101</address>
    <requestedAccuracy>10</requestedAccuracy>
    <frequency>10</frequency>
  </periodicNotificationSubscription>
  <periodicNotificationSubscription>
    <clientCorrelator>0002</clientCorrelator>
    <resourceURL>http://example.com/exampleAPI/location/v1/subscriptions/periodic/sub124</resourceURL>
    <callbackReference>
      <notifyURL>http://application.example.com/notifications/LocationNotification</notifyURL>
      <callbackData>5678</callbackData>
    </callbackReference>
    <address>tel:+19585550100</address>
    <address>tel:+19585550101</address>
    <requestedAccuracy>10</requestedAccuracy>
    <frequency>10</frequency>
  </periodicNotificationSubscription>
</tl:notificationSubscriptionList>
```

6.3.4 PUT

Method not supported by the resource. The returned HTTP error status is 405. The server should also include the 'Allow: GET, POST' field in the response as per section 14.7 of [RFC2616].

6.3.5 POST

This operation is used to create a new periodic location notification subscription for the requesting client.

The notifyURL in the callbackReference either contains the Client-side Notification URL (as defined by the client) or the Server-side Notification URL (as obtained during the creation of the Notification Channel [REST_NetAPI_NotificationChannel]).

If the requester parameter is present and the requester is not authorized, PolicyException (POL0002) will be returned.

Note: server implementation MAY use clientCorrelator value, if provided by client, as {subscriptionId}. Otherwise, sequence number should be generated for {subscriptionId}. This is to make sure that client can have a stable and predictable URL for online subscriptions. May be required when multiple client instances are used for performance reasons.

6.3.5.1 Example 1: returning a representation of created resource (Informative)

6.3.5.1.1 Request

```
POST /exampleAPI/location/v1/subscriptions/periodic HTTP/1.1
Content-Type: application/xml
Accept: application/xml
Host: example.com
Content-Length: nnnn
```

```
<?xml version="1.0" encoding="UTF-8"?>
<tl:periodicNotificationSubscription xmlns:tl="urn:oma:xml:rest:netapi:terminallocation:1">
  <clientCorrelator>0001</clientCorrelator>
  <callbackReference>
    <notifyURL>http://application.example.com/notifications/LocationNotification</notifyURL>
    <callbackData>1234</callbackData>
  </callbackReference>
  <address>tel:+19585550100</address>
  <requestedAccuracy>10</requestedAccuracy>
  <frequency>10</frequency>
</tl:periodicNotificationSubscription>
```

6.3.5.1.2 Response

```
HTTP/1.1 201 Created
Content-Type: application/xml
Location: http://example.com/exampleAPI/location/v1/subscriptions/periodic/sub123
Content-Length: nnnn
Date: Thu, 02 Jun 2011 02:51:59 GMT

<?xml version="1.0" encoding="UTF-8"?>
<tl:periodicNotificationSubscription xmlns:tl="urn:oma:xml:rest:netapi:terminallocation:1">
  <clientCorrelator>0001</clientCorrelator>
  <resourceURL>http://example.com/exampleAPI/location/v1/subscriptions/periodic/sub123</resourceURL>
  <callbackReference>
    <notifyURL>http://application.example.com/notifications/LocationNotification</notifyURL>
    <callbackData>1234</callbackData>
  </callbackReference>
  <address>tel:+19585550100</address>
  <requestedAccuracy>10</requestedAccuracy>
  <frequency>10</frequency>
</tl:periodicNotificationSubscription>
```

6.3.5.2 Example 2: returning the location of created resource (Informative)

6.3.5.2.1 Request

```
POST /exampleAPI/location/v1/subscriptions/periodic HTTP/1.1
Content-Type: application/xml
Accept: application/xml
Host: example.com
Content-Length: nnnn

<?xml version="1.0" encoding="UTF-8"?>
<tl:periodicNotificationSubscription xmlns:tl="urn:oma:xml:rest:netapi:terminallocation:1">
  <clientCorrelator>0001</clientCorrelator>
  <callbackReference>
    <notifyURL>http://application.example.com/notifications/LocationNotification</notifyURL>
    <callbackData>1234</callbackData>
  </callbackReference>
  <address>tel:+19585550100</address>
  <requestedAccuracy>10</requestedAccuracy>
  <frequency>10</frequency>
</tl:periodicNotificationSubscription>
```


6.3.5.2.2 Response

```
HTTP/1.1 201 Created
Content-Type: application/xml
Location: http://example.com/exampleAPI/location/v1/subscriptions/periodic/sub123
Content-Length: nnnn
Date: Thu, 02 Jun 2011 02:51:59 GMT

<?xml version="1.0" encoding="UTF-8"?>
<common:resourceReference xmlns:common="urn:oma:xml:rest:netapi:common:1">
  <resourceURL>http://example.com/exampleAPI/location/v1/subscriptions/periodic/sub123</resourceURL>
</common:resourceReference>
```

6.3.6 DELETE

Method not supported by the resource. The returned HTTP error status is 405. The server should also include the 'Allow: GET, POST' field in the response as per section 14.7 of [RFC2616].

6.4 Resource: Individual periodic location notification subscription

The resource used is:

http://{serverRoot}/location/{apiVersion}/subscriptions/periodic/{subscriptionId}

This resource is used to control individual subscription for periodic location notifications for a particular client.

6.4.1 Request URL variables

The following request URL variables are common for all HTTP commands:

Name	Description
serverRoot	Server base url: hostname+port+base path. Example: example.com/exampleAPI
apiVersion	Version of the API client wants to use. The value of this variable is defined in section 5.1.
subscriptionId	Identifier of the subscription.

See section 6 for a statement on the escaping of reserved characters in URL variables.

6.4.2 Response Codes and Error Handling

For HTTP response codes, see [REST_NetAPI_Common].

For Policy Exception and Service Exception fault codes applicable to Terminal Location, see section 7.

6.4.3 GET

This operation is used to read an individual subscription for periodic location notifications for the requesting client.

No URL parameters.

6.4.3.1 Example (Informative)

6.4.3.1.1 Request

```
GET /exampleAPI/location/v1/subscriptions/periodic/sub123 HTTP/1.1
Accept: application/xml
Host: example.com
```

6.4.3.1.2 Response

```
HTTP/1.1 200 OK
Content-Type: application/xml
Content-Length: nnnn
Date: Thu, 02 Jun 2011 02:51:59 GMT

<?xml version="1.0" encoding="UTF-8"?>
<tl:periodicNotificationSubscription xmlns:tl="urn:oma:xml:rest:netapi:terminallocation:1">
  <clientCorrelator>0001</clientCorrelator>
  <resourceURL>http://example.com/exampleAPI/location/v1/subscriptions/periodic/sub123</resourceURL>
  <callbackReference>
    <notifyURL>http://application.example.com/notifications/LocationNotification</notifyURL>
    <callbackData>1234</callbackData>
  </callbackReference>
  <address>tel:+19585550100</address>
  <requestedAccuracy>10</requestedAccuracy>
  <frequency>10</frequency>
</tl:periodicNotificationSubscription>
```

6.4.4 PUT

This operation is used to update an individual subscription for periodic location notifications for the requesting client.

If the requester parameter is present and the requester is not authorized, PolicyException (POL0002) will be returned.

6.4.4.1 Example (Informative)

6.4.4.1.1 Request

```
PUT /exampleAPI/location/v1/subscriptions/periodic/sub123HTTP/1.1
Content-Type: application/xml
Accept: application/xml
Host: example.com
Content-Length: nnnn

<?xml version="1.0" encoding="UTF-8"?>
<tl:periodicNotificationSubscription xmlns:tl="urn:oma:xml:rest:netapi:terminallocation:1">
  <clientCorrelator>0001</clientCorrelator>
  <resourceURL>http://example.com/exampleAPI/location/v1/subscriptions/periodic/sub123</resourceURL>
  <callbackReference>
    <notifyURL>http://application.example.com/notifications/LocationNotification</notifyURL>
    <callbackData>1234</callbackData>
  </callbackReference>
  <address>tel:+19585550100</address>
  <requestedAccuracy>5</requestedAccuracy>
  <frequency>60</frequency>
</tl:periodicNotificationSubscription>
```

6.4.4.1.2 Response

```
HTTP/1.1 200 OK
Content-Type: application/xml
Content-Length: nnnn
Date: Thu, 02 Jun 2011 02:51:59 GMT

<?xml version="1.0" encoding="UTF-8"?>
<tl:periodicNotificationSubscription xmlns:tl="urn:oma:xml:rest:netapi:terminallocation:1">
  <clientCorrelator>0001</clientCorrelator>
  <resourceURL>http://example.com/exampleAPI/location/v1/subscriptions/periodic/sub123</resourceURL>
  <callbackReference>
    <notifyURL>http://application.example.com/notifications/LocationNotification</notifyURL>
    <callbackData>1234</callbackData>
  </callbackReference>
  <address>tel:+19585550100</address>
  <requestedAccuracy>5</requestedAccuracy>
  <frequency>60</frequency>
</tl:periodicNotificationSubscription>
```

6.4.5 POST

Method not supported by the resource. The returned HTTP error status is 405. The server should also include the 'Allow: GET, PUT, DELETE' field in the response as per section 14.7 of [RFC2616].

6.4.6 DELETE

This operation is used to delete a subscription for periodic location notifications and stop notifications for a particular client.

No URL parameters.

6.4.6.1 Example (Informative)

6.4.6.1.1 Request

```
DELETE /exampleAPI/location/v1/subscriptions/periodic/sub123 HTTP/1.1
Accept: application/xml
Host: example.com
```

6.4.6.1.2 Response

```
 HTTP/1.1 204 No Content
Date: Thu, 02 Jun 2011 02:51:59 GMT
```

6.5 Resource: Area (circle) notification subscriptions

The resource used is:

http://{serverRoot}/location/{apiVersion}/subscriptions/area/circle

This resource is used to control subscriptions for notification about terminal movements in relation to the geographic area (circle), crossing in and out, for a particular client.

This resource can be used in conjunction with a Client-side Notification URL, or in conjunction with a Server-side Notification URL. In this latter case, the application MUST first create a Notification Channel (see [REST_NetAPI_NotificationChannel]) before creating a subscription.

6.5.1 Request URL variables

The following request URL variables are common for all HTTP commands:

Name	Description
serverRoot	Server base url: hostname+port+base path. Example: example.com/exampleAPI
apiVersion	Version of the API client wants to use. The value of this variable is defined in section 5.1.

See section 6 for a statement on the escaping of reserved characters in URL variables.

6.5.2 Response Codes and Error Handling

For HTTP response codes, see [REST_NetAPI_Common].

For Policy Exception and Service Exception fault codes applicable to Terminal Location, see section 7.

6.5.3 GET

This operation is used to read all active movement notifications subscriptions for the requesting client.

No URL parameters.

6.5.3.1 Example (Informative)

6.5.3.1.1 Request

```
GET /exampleAPI/location/v1/subscriptions/area/circle HTTP/1.1
Accept: application/xml
Host: example.com
```

6.5.3.1.2 Response

```
HTTP/1.1 200 OK
Content-Type: application/xml
Content-Length: nnnn
Date: Thu, 02 Jun 2011 02:51:59 GMT

<?xml version="1.0" encoding="UTF-8"?>
<tl:notificationSubscriptionList xmlns:tl="urn:oma:xml:rest:netapi:terminallocation:1">
  <circleNotificationSubscription>
    <clientCorrelator>0003</clientCorrelator>
    <resourceURL>http://example.com/exampleAPI/location/v1/subscriptions/area/circle/sub123</resourceURL>
    <callbackReference>
      <notifyURL>http://application.example.com/notifications/LocationNotification</notifyURL>
      <callbackData>4444</callbackData>
    </callbackReference>
    <address>tel:+19585550100</address>
    <latitude>100.23</latitude>
    <longitude>-200.45</longitude>
    <radius>500</radius>
    <trackingAccuracy>10</trackingAccuracy>
    <enteringLeavingCriteria>Entering</enteringLeavingCriteria>
    <checkImmediate>true</checkImmediate>
```

```
    <frequency>10</frequency>
  </circleNotificationSubscription>
  <circleNotificationSubscription>
    <clientCorrelator>0004</clientCorrelator>
    <resourceURL>http://example.com/exampleAPI/location/v1/subscriptions/area/circle/sub124</resourceURL>
    <callbackReference>
      <notifyURL>http://application.example.com/notifications/LocationNotification</notifyURL>
      <callbackData>5555</callbackData>
    </callbackReference>
    <address>tel:+19585550100</address>
    <address>tel:+19585550101</address>
    <latitude>100.23</latitude>
    <longitude>-200.45</longitude>
    <radius>500</radius>
    <trackingAccuracy>10</trackingAccuracy>
    <enteringLeavingCriteria>Entering</enteringLeavingCriteria>
    <checkImmediate>true</checkImmediate>
    <frequency>10</frequency>
  </circleNotificationSubscription>
</tl:notificationSubscriptionList>
```

6.5.4 PUT

Method not supported by the resource. The returned HTTP error status is 405. The server should also include the 'Allow: GET, POST' field in the response as per section 14.7 of [RFC2616].

6.5.5 POST

This operation is used to create new movement notification subscription for the requesting client.

If the requester parameter is present and the requester is not authorized, PolicyException (POL0002) will be returned.

The notifyURL in the callbackReference either contains the Client-side Notification URL (as defined by the client) or the Server-side Notification URL (as obtained during the creation of the Notification Channel [REST_NetAPI_NotificationChannel]).

Note: server implementation MAY use clientCorrelator value, if provided by client, as {subscriptionId}. Otherwise, sequence number should be generated for {subscriptionId}. This is to make sure that client can have a stable and predictable URL for online subscriptions. May be required when multiple client instances are used for performance reasons.

6.5.5.1 Example (Informative)

6.5.5.1.1 Request

```
POST /exampleAPI/location/v1/subscriptions/area/circle HTTP/1.1
Content-Type: application/xml
Accept: application/xml
Host: example.com
Content-Length: nnnn

<?xml version="1.0" encoding="UTF-8"?>
<tl:circleNotificationSubscription
  xmlns:tl="urn:oma:xml:rest:netapi:terminallocation:1">
<clientCorrelator>0003</clientCorrelator>
  <callbackReference>
    <notifyURL>http://application.example.com/notifications/LocationNotification</notifyURL>
```

```
    <callbackData>4444</callbackData>
  </callbackReference>
  <address>tel:+19585550100</address>
  <latitude>100.23</latitude>
  <longitude>-200.45</longitude>
  <radius>500</radius>
  <trackingAccuracy>10</trackingAccuracy>
  <enteringLeavingCriteria>Entering</enteringLeavingCriteria>
  <checkImmediate>true</checkImmediate>
  <frequency>10</frequency>
</tl:circleNotificationSubscription>
```

6.5.5.1.2 Response

```
HTTP/1.1 201 Created
Content-Type: application/xml
Location: http://example.com/exampleAPI/location/v1/subscriptions/area/circle/sub123
Content-Length: nnnn
Date: Thu, 02 Jun 2011 02:51:59 GMT

<?xml version="1.0" encoding="UTF-8"?>
<tl:circleNotificationSubscription xmlns:tl="urn:oma:xml:rest:netapi:terminallocation:1">
  <clientCorrelator>0003</clientCorrelator>
  <resourceURL>http://example.com/exampleAPI/location/v1/subscriptions/area/circle/sub123</resourceURL>
  <callbackReference>
    <notifyURL>http://application.example.com/notifications/LocationNotification</notifyURL>
    <callbackData>4444</callbackData>
  </callbackReference>
  <address>tel:+19585550100</address>
  <latitude>100.23</latitude>
  <longitude>-200.45</longitude>
  <radius>500</radius>
  <trackingAccuracy>10</trackingAccuracy>
  <enteringLeavingCriteria>Entering</enteringLeavingCriteria>
  <checkImmediate>true</checkImmediate>
  <frequency>10</frequency>
</tl:circleNotificationSubscription>
```

6.5.6 DELETE

Method not supported by the resource. The returned HTTP error status is 405. The server should also include the ‘Allow: GET, POST’ field in the response as per section 14.7 of [RFC2616].

6.6 Resource: Area (circle) individual notification subscription

The resource used is:

http://{serverRoot}/location/{apiVersion}/subscriptions/area/circle/{subscriptionId}

This resource is used to control individual subscription for notifications about terminal movement in relation to the geographic area (circle), crossing in and out, for a particular client.

6.6.1 Request URL variables

The following request URL variables are common for all HTTP commands:

Name	Description
serverRoot	Server base url: hostname+port+base path. Example: example:80/exampleAPI
apiVersion	Version of the API client wants to use. The value of this variable is defined in section 5.1.
subscriptionId	Identifier of the subscription. Example: sub123.

See section 6 for a statement on the escaping of reserved characters in URL variables.

6.6.2 Response Codes and Error Handling

For HTTP response codes, see [REST_NetAPI_Common].

For Policy Exception and Service Exception fault codes applicable to Terminal Location, see section 7.

6.6.3 GET

This operation is used to read an individual subscription for movement notification for the requesting client.

No URL parameters.

6.6.3.1 Example (Informative)

6.6.3.1.1 Request

```
GET /exampleAPI/location/v1/subscriptions/area/circle/sub123 HTTP/1.1
Accept: application/xml
Host: example.com
```

6.6.3.1.2 Response

```
HTTP/1.1 200 OK
Content-Type: application/xml
Content-Length: nnnn
Date: Thu, 02 Jun 2011 02:51:59 GMT

<?xml version="1.0" encoding="UTF-8"?>
<tl:circleNotificationSubscription xmlns:tl="urn:oma:xml:rest:netapi:terminallocation:1">
  <clientCorrelator>0003</clientCorrelator>
  <resourceURL>http://example.com/exampleAPI/location/v1/subscriptions/area/circle/sub123</resourceURL>
  <callbackReference>
    <notifyURL>http://application.example.com/notifications/LocationNotification</notifyURL>
    <callbackData>4444</callbackData>
  </callbackReference>
  <address>tel:+19585550100</address>
  <latitude>100.23</latitude>
  <longitude>-200.45</longitude>
  <radius>500</radius>
  <trackingAccuracy>10</trackingAccuracy>
  <enteringLeavingCriteria>Entering</enteringLeavingCriteria>
  <checkImmediate>true</checkImmediate>
  <frequency>10</frequency>
</tl:circleNotificationSubscription>
```


6.6.4 PUT

This operation is used to update the subscription for movement notification for the requesting client.

If the requester parameter is present and the requester is not authorized, PolicyException (POL0002) will be returned.

6.6.4.1 Example: update radius (Informative)

6.6.4.1.1 Request

```
PUT /exampleAPI/location/v1/subscriptions/area/circle/sub123 HTTP/1.1
Content-Type: application/xml
Accept: application/xml
Host: example.com
Content-Length: nnnn

<?xml version="1.0" encoding="UTF-8"?>
<tl:circleNotificationSubscription xmlns:tl="urn:oma:xml:rest:netapi:terminallocation:1">
  <clientCorrelator>0003</clientCorrelator>
  <resourceURL>http://example.com/exampleAPI/location/v1/subscriptions/area/circle/sub123</resourceURL>
  <callbackReference>
    <notifyURL>http://application.example.com/notifications/LocationNotification</notifyURL>
    <callbackData>4444</callbackData>
  </callbackReference>
  <address>tel:+19585550100</address>
  <latitude>100.23</latitude>
  <longitude>-200.45</longitude>
  <radius>50</radius>
  <trackingAccuracy>10</trackingAccuracy>
  <enteringLeavingCriteria>Entering</enteringLeavingCriteria>
  <checkImmediate>true</checkImmediate>
  <frequency>10</frequency>
</tl:circleNotificationSubscription>
```

6.6.4.1.2 Response

```
HTTP/1.1 200 OK
Content-Type: application/xml
Content-Length: nnnn
Date: Thu, 02 Jun 2011 02:51:59 GMT

<?xml version="1.0" encoding="UTF-8"?>
<tl:circleNotificationSubscription xmlns:tl="urn:oma:xml:rest:netapi:terminallocation:1">
  <clientCorrelator>0003</clientCorrelator>
  <resourceURL>http://example.com/exampleAPI/location/v1/subscriptions/area/circle/sub123</resourceURL>
<callbackReference>
    <notifyURL>http://application.example.com/notifications/LocationNotification</notifyURL>
    <callbackData>4444</callbackData>
  </callbackReference>
  <address>tel:+19585550100</address>
  <latitude>100.23</latitude>
  <longitude>-200.45</longitude>
  <radius>50</radius>
  <trackingAccuracy>10</trackingAccuracy>
  <enteringLeavingCriteria>Entering</enteringLeavingCriteria>
  <checkImmediate>true</checkImmediate>
  <frequency>10</frequency>
```

```
</tl:circleNotificationSubscription>
```

6.6.5 POST

Method not supported by the resource. The returned HTTP error status is 405. The server should also include the 'Allow: GET, PUT, DELETE' field in the response as per section 14.7 of [RFC2616].

6.6.6 DELETE

This operation is used to delete subscription for movement notifications and stop notifications for the requesting client.

No URL parameters.

6.6.6.1 Example (Informative)

6.6.6.1.1 Request

```
DELETE /exampleAPI/location/v1/subscriptions/area/circle/sub123 HTTP/1.1
Accept: application/xml
Host: example.com
```

6.6.6.1.2 Response

```
HTTP/1.1 204 No Content
Date: Thu, 02 Jun 2011 02:51:59 GMT
```

6.7 Resource: Distance notification subscriptions

The resource used is:

http://{serverRoot}/location/{apiVersion}/subscriptions/distance

This resource is used to control subscriptions for notification about changes in the geographical relationships between terminals (a client has passed a border by either approaching or leaving another referenced client).

This resource can be used in conjunction with a Client-side Notification URL, or in conjunction with a Server-side Notification URL. In this latter case, the application MUST first create a Notification Channel (see [REST_NetAPI_NotificationChannel]) before creating a subscription.

6.7.1 Request URL variables

The following request URL variables are common for all HTTP commands:

Name	Description
serverRoot	Server base url: hostname+port+base path. Example: example.com/exampleAPI
apiVersion	Version of the API client wants to use. The value of this variable is defined in section 5.1.

See section 6 for a statement on the escaping of reserved characters in URL variables.

6.7.2 Response Codes and Error Handling

For HTTP response codes, see [REST_NetAPI_Common].

For Policy Exception and Service Exception fault codes applicable to Terminal Location, see section 7.

6.7.3 GET

This operation is used to read all active distance notifications subscriptions for the requesting client.

No URL parameters.

6.7.3.1 Example (Informative)

6.7.3.1.1 Request

```
GET /exampleAPI/location/v1/subscriptions/distance HTTP/1.1
Accept: application/xml
Host: example.com
```

6.7.3.1.2 Response

```
HTTP/1.1 200 OK
Content-Type: application/xml
Content-Length: nnnn
Date: Thu, 02 Jun 2011 02:51:59 GMT

<?xml version="1.0" encoding="UTF-8"?>
<tl:notificationSubscriptionList
xmlns:tl="urn:oma:xml:rest:netapi:terminallocation:1">
 <distanceNotificationSubscription>
  <clientCorrelator>0006</clientCorrelator>
  <resourceURL>http://example.com/exampleAPI/location/v1/subscriptions/distance/sub123</resourceURL>
  <callbackReference>
   <notifyURL>http://application.example.com/notifications/LocationNotification</notifyURL>
   <callbackData>6666</callbackData>
  </callbackReference>
  <referenceAddress>tel:+19585550100</referenceAddress>
  <monitoredAddress>tel:+19585550101</monitoredAddress>
  <monitoredAddress>tel:+19585550102</monitoredAddress>
  <distance>100</distance>
  <trackingAccuracy>10</trackingAccuracy>
  <criteria>AllWithinDistance</criteria>
  <checkImmediate>true</checkImmediate>
  <frequency>10</frequency>
 </distanceNotificationSubscription>
 <distanceNotificationSubscription>
  <clientCorrelator>0007</clientCorrelator>
  <resourceURL>http://example.com/exampleAPI/location/v1/subscriptions/distance/sub124</resourceURL>
  <callbackReference>
   <notifyURL>http://application.example.com/notifications/LocationNotification</notifyURL>
   <callbackData>7777</callbackData>
  </callbackReference>
  <monitoredAddress>tel:+19585550100</monitoredAddress>
  <monitoredAddress>tel:+19585550101</monitoredAddress>
  <monitoredAddress>tel:+19585550102</monitoredAddress>
  <distance>1000</distance>
  <trackingAccuracy>50</trackingAccuracy>
  <criteria>AnyBeyondDistance</criteria>
  <checkImmediate>true</checkImmediate>
```



```
  <frequency>10</frequency>
 </distanceNotificationSubscription>
</tl:notificationSubscriptionList>
```

6.7.4 PUT

Method not supported by the resource. The returned HTTP error status is 405. The server should also include the 'Allow: GET, POST' field in the response as per section 14.7 of [RFC2616].

6.7.5 POST

This operation is used to create new distance notification subscription for the requesting client.

If the requester parameter is present and the requester is not authorized, PolicyException (POL0002) will be returned.

The notifyURL in the callbackReference either contains the Client-side Notification URL (as defined by the client) or the Server-side Notification URL (as obtained during the creation of the Notification Channel [REST_NetAPI_NotificationChannel]).

Note: server implementation MAY use clientCorrelator value, if provided by client, as {subscriptionId}. Otherwise, sequence number should be generated for {subscriptionId}. This is to make sure that client can have a stable and predictable URL for online subscriptions. May be required when multiple client instances are used for performance reasons.

6.7.5.1 Example (Informative)

6.7.5.1.1 Request

```
POST /exampleAPI/location/v1/subscriptions/distance HTTP/1.1
Content-Type: application/xml
Accept: application/xml
Host: example.com
Content-Length: nnnn

<?xml version="1.0" encoding="UTF-8"?>
<tl:distanceNotificationSubscription
xmlns:tl="urn:oma:xml:rest:netapi:terminallocation:1">
<clientCorrelator>0006</clientCorrelator>
  <callbackReference>
    <notifyURL>http://application.example.com/notifications/LocationNotification</notifyURL>
    <callbackData>6666</callbackData>
  </callbackReference>
  <referenceAddress>tel:+19585550100</referenceAddress>
  <monitoredAddress>tel:+19585550101</monitoredAddress>
  <monitoredAddress>tel:+19585550102</monitoredAddress>
  <distance>100</distance>
  <trackingAccuracy>10</trackingAccuracy>
  <criteria>AllWithinDistance</criteria>
  <checkImmediate>true</checkImmediate>
  <frequency>10</frequency>
</tl:distanceNotificationSubscription>
```

6.7.5.1.2 Response

```
HTTP/1.1 201 Created
Content-Type: application/xml
Location: http://example.com/exampleAPI/location/v1/subscriptions/distance/sub123
```



```
Date: Thu, 02 Jun 2011 02:51:59 GMT

<?xml version="1.0" encoding="UTF-8"?>
<tl:distanceNotificationSubscription xmlns:tl="urn:oma:xml:rest:netapi:terminallocation:1" >
  <clientCorrelator>0006</clientCorrelator>
<resourceURL>http://example.com/exampleAPI/location/v1/subscriptions/distance/sub123</resourceURL>
  <callbackReference>
    <notifyURL>http://application.example.com/notifications/LocationNotification</notifyURL>
    <callbackData>6666</callbackData>
  </callbackReference>
  <referenceAddress>tel:+19585550100</referenceAddress>
  <monitoredAddress>tel:+19585550101</monitoredAddress>
  <monitoredAddress>tel:+19585550102</monitoredAddress>
  <distance>100</distance>
  <trackingAccuracy>10</trackingAccuracy>
  <criteria>AllWithinDistance</criteria>
  <checkImmediate>true</checkImmediate>
  <frequency>10</frequency>
</tl:distanceNotificationSubscription>
```

6.7.6 DELETE

Method not supported by the resource. The returned HTTP error status is 405. The server should also include the 'Allow: GET, POST' field in the response as per section 14.7 of [RFC2616].

6.8 Resource: Distance individual notification subscription

The resource used is:

http://{serverRoot}/location/{apiVersion}/subscriptions/distance/{subscriptionId}

This resource is used to control individual subscription for notifications about changes in the geographical relationships between terminals (a client has passed a border by either approaching or leaving another referenced client).

6.8.1 Request URL variables

The following request URL variables are common for all HTTP commands:

Name	Description
serverRoot	Server base url: hostname+port+base path. Example: example:80/exampleAPI
apiVersion	Version of the API client wants to use. The value of this variable is defined in section 5.1.
subscriptionId	Identifier of the subscription. Example: sub123.

See section 6 for a statement on the escaping of reserved characters in URL variables.

6.8.2 Response Codes and Error Handling

For HTTP response codes, see [REST_NetAPI_Common].

For Policy Exception and Service Exception fault codes applicable to Terminal Location, see section 7.

6.8.3 GET

This operation is used to read an individual subscription for distance notification for the requesting client.

No URL parameters.

6.8.3.1 Example (Informative)

6.8.3.1.1 Request

```
GET /exampleAPI/location/v1/subscriptions/distance/sub123 HTTP/1.1
Accept: application/xml
Host: example.com
```

6.8.3.1.2 Response

```
HTTP/1.1 200 OK
Content-Type: application/xml
Content-Length: nnnn
Date: Thu, 02 Jun 2011 02:51:59 GMT

<?xml version="1.0" encoding="UTF-8"?>
<tl:distanceNotificationSubscription xmlns:tl="urn:oma:xml:rest:netapi:terminallocation:1">
  <clientCorrelator>0006</clientCorrelator>
  <resourceURL>http://example.com/exampleAPI/location/v1/subscriptions/distance/sub123</resourceURL>
<callbackReference>
    <notifyURL>http://application.example.com/notifications/LocationNotification</notifyURL>
    <callbackData>6666</callbackData>
  </callbackReference>
  <referenceAddress>tel:+19585550100</referenceAddress>
  <monitoredAddress>tel:+19585550101</monitoredAddress>
  <monitoredAddress>tel:+19585550102</monitoredAddress>
  <distance>100</distance>
  <trackingAccuracy>10</trackingAccuracy>
  <criteria>AllWithinDistance</criteria>
  <checkImmediate>true</checkImmediate>
  <frequency>10</frequency>
</tl:distanceNotificationSubscription>
```

6.8.4 PUT

This operation is used to update the subscription for distance notification for the requesting client.

If the requester parameter is present and the requester is not authorized, PolicyException (POL0002) will be returned.

6.8.4.1 Example: add a monitored address (Informative)

6.8.4.1.1 Request

```
PUT ./exampleAPI/location/v1/subscriptions/distance/sub123 HTTP/1.1
Content-Type: application/xml
Accept: application/xml
Host: example.com
Content-Length: nnnn

<?xml version="1.0" encoding="UTF-8"?>
```

```
<tl:distanceNotificationSubscription xmlns:tl="urn:oma:xml:rest:netapi:terminallocation:1">
  <clientCorrelator>0006</clientCorrelator>
  <resourceURL>http://example.com/exampleAPI/location/v1/subscriptions/distance/sub123</resourceURL>
  <callbackReference>
    <notifyURL>http://application.example.com/notifications/LocationNotification</notifyURL>
    <callbackData>6666</callbackData>
  </callbackReference>
  <referenceAddress>tel:+19585550100</referenceAddress>
  <monitoredAddress>tel:+19585550101</monitoredAddress>
  <monitoredAddress>tel:+19585550102</monitoredAddress>
  <monitoredAddress>tel:+19585550103</monitoredAddress>
  <distance>100</distance>
  <trackingAccuracy>10</trackingAccuracy>
  <criteria>AllWithinDistance</criteria>
  <checkImmediate>true</checkImmediate>
  <frequency>10</frequency>
</tl:distanceNotificationSubscription>
```

6.8.4.1.2 Response

```
HTTP/1.1 200 OK
Content-Type: application/xml
Content-Length: nnnn
Date: Thu, 02 Jun 2011 02:51:59 GMT

<?xml version="1.0" encoding="UTF-8"?>
<tl:distanceNotificationSubscription xmlns:tl="urn:oma:xml:rest:netapi:terminallocation:1">
  <clientCorrelator>0006</clientCorrelator>
  <resourceURL>http://example.com/exampleAPI/location/v1/subscriptions/distance/sub123</resourceURL>
  <callbackReference>
    <notifyURL>http://application.example.com/notifications/LocationNotification</notifyURL>
    <callbackData>6666</callbackData>
  </callbackReference>
  <referenceAddress>tel:+19585550100</referenceAddress>
  <monitoredAddress>tel:+19585550101</monitoredAddress>
  <monitoredAddress>tel:+19585550102</monitoredAddress>
  <monitoredAddress>tel:+19585550103</monitoredAddress>
  <distance>100</distance>
  <trackingAccuracy>10</trackingAccuracy>
  <criteria>AllWithinDistance</criteria>
  <checkImmediate>true</checkImmediate>
  <frequency>10</frequency>
</tl:distanceNotificationSubscription>
```

6.8.5 POST

Method not supported by the resource. The returned HTTP error status is 405. The server should also include the ‘Allow: GET, POST, DELETE’ field in the response as per section 14.7 of [RFC2616].

6.8.6 DELETE

This operation is used to delete subscription for distance notifications and stop notifications for the requesting client.

No URL parameters.

6.8.6.1 Example (Informative)

6.8.6.1.1 Request

```
DELETE /exampleAPI/location/v1/subscriptions/distance/sub123 HTTP/1.1
Accept: application/xml
Host: example.com
```

6.8.6.1.2 Response:

```
HTTP/1.1 204 No Content
Date: Thu, 02 Jun 2011 02:51:59 GMT
```

6.9 Resource: Client notifications on terminal location changes

This resource is a callback URL provided by the client for notification about Terminal Location events.

The RESTful TerminalLocation API does not make any assumption about the structure of this URL. If this URL is a Client-side Notification URL, the server will POST notifications directly to it. If this URL is a Server-side Notification URL, the server uses it to determine the address of the Notification Server to which the notifications will subsequently be POSTed. The way the server determines the address of the Notification Server is out of scope of this specification.

Note: In the case when the client has set up a Notification Channel to obtain the notifications, the client needs to use the mechanisms described in [REST_NetAPI_NotificationChannel], instead of the mechanism described below in section 6.9.5

6.9.1 Request URL variables

Client provided.

6.9.2 Response Codes and Error Handling

For HTTP response codes, see [REST_NetAPI_Common].

For Policy Exception and Service Exception fault codes applicable to Terminal Location, see section 7.

6.9.3 GET

Method not supported by the resource. The returned HTTP error status is 405. The server should also include the ‘Allow: POST’ field in the response as per section 14.7 of [RFC2616].

6.9.4 PUT

Method not supported by the resource. The returned HTTP error status is 405. The server should also include the ‘Allow: POST’ field in the response as per section 14.7 of [RFC2616].

6.9.5 POST

This operation is used to notify client about terminal location changes.

6.9.5.1 Example 1: Circle area notification (one terminal) (Informative)

6.9.5.1.1 Request

```
POST /notifications/LocationNotification HTTP/1.1
Content-Type: application/xml
```

```
Accept: application/xml
Host: application.example.com
Content-Length: nnnn

<?xml version="1.0" encoding="UTF-8"?>
<tl:subscriptionNotification xmlns:tl="urn:oma:xml:rest:netapi:terminallocation:1">
  <callbackData>4444</callbackData>
  <terminalLocation>
    <address>tel:+19585550100</address>
    <locationRetrievalStatus>Retrieved</locationRetrievalStatus>
    <currentLocation>
      <latitude>-80.86302</latitude>
      <longitude>41.277306</longitude>
      <altitude>1001.0</altitude>
      <accuracy>100</accuracy>
      <timestamp>2011-06-02T00:27:23.000Z</timestamp>
    </currentLocation>
  </terminalLocation>
  <enteringLeavingCriteria>Entering</enteringLeavingCriteria>
  <isFinalNotification>false</isFinalNotification>
  <link rel="CircleNotificationSubscription"
        href="http://example.com/exampleAPI/location/v1/subscriptions/area/circle/sub123"/>
</tl:subscriptionNotification>
```

6.9.5.1.2 Response

```
HTTP/1.1 204 No Content
Date: Thu, 02 Jun 2011 02:51:59 GMT
```

6.9.5.2 Example 2: Periodic location notification (one terminal) (Informative)

6.9.5.2.1 Request

```
POST /notifications/LocationNotification HTTP/1.1
Content-Type: application/xml
Accept: application/xml
Host: application.example.com
Content-Length: nnnn

<?xml version="1.0" encoding="UTF-8"?>
<tl:subscriptionNotification xmlns:tl="urn:oma:xml:rest:netapi:terminallocation:1">
  <callbackData>1234</callbackData>
  <terminalLocation>
    <address>tel:+19585550100</address>
    <locationRetrievalStatus>Retrieved</locationRetrievalStatus>
    <currentLocation>
      <latitude>-80.86302</latitude>
      <longitude>41.277306</longitude>
      <altitude>1001.0</altitude>
      <accuracy>100</accuracy>
      <timestamp>2011-06-02T00:27:23.000Z</timestamp>
    </currentLocation>
  </terminalLocation>
  <isFinalNotification>false</isFinalNotification>
  <link rel="PerodicNotificationSubscription"
```



```
        href="http://example.com/exampleAPI/location/v1/subscriptions/periodic/sub123"/>
</tl:subscriptionNotification>
```

6.9.5.2.2 Response:

```
HTTP/1.1 204 No Content
Date: Thu, 02 Jun 2011 02:51:59 GMT
```

6.9.5.3 Example 3: Distance location notification (one terminal) (Informative)

6.9.5.3.1 Request

```
POST /notifications/LocationNotification HTTP/1.1
Content-Type: application/xml
Accept: application/xml
Host: application.example.com
Content-Length: nnnn

<?xml version="1.0" encoding="UTF-8"?>
<tl:subscriptionNotification xmlns:tl="urn:oma:xml:rest:netapi:terminallocation:1">
  <callbackData>6666</callbackData>
  <terminalLocation>
    <address>tel:+19585550100</address>
    <locationRetrievalStatus>Retrieved</locationRetrievalStatus>
    <currentLocation>
      <latitude>-80.86302</latitude>
      <longitude>41.277306</longitude>
      <altitude>1001.0</altitude>
      <accuracy>100</accuracy>
      <timestamp>2011-06-02T00:27:23.000Z</timestamp>
    </currentLocation>
  </terminalLocation>
  <distanceCriteria>AllBeyondDistance</distanceCriteria>
  <isFinalNotification>false</isFinalNotification>
  <link rel="DistanceNotificationSubscription"
        href="http://example.com/exampleAPI/location/v1/subscriptions/distance/sub123"/>
</tl:subscriptionNotification>
```

6.9.5.3.2 Response

```
HTTP/1.1 204 No Content
Date: Thu, 02 Jun 2011 02:51:59 GMT
```

6.9.5.4 Example 4: Final periodic location notification (Informative)

6.9.5.4.1 Request

```
POST /notifications/LocationNotification HTTP/1.1
Accept: application/xml
Content-Type: application/xml
Host: application.example.com
Content-Length: nnnn

<?xml version="1.0" encoding="UTF-8"?>
```



```
<tl:subscriptionNotification xmlns:tl="urn:oma:xml:rest:netapi:terminallocation:1">
  <callbackData>1234</callbackData>
  <terminalLocation>
    <address>tel:+19585550100</address>
    <locationRetrievalStatus>Retrieved</locationRetrievalStatus>
    <currentLocation>
      <latitude>-80.86302</latitude>
      <longitude>41.277306</longitude>
      <altitude>1001.0</altitude>
      <accuracy>100</accuracy>
      <timestamp>2011-06-02T00:27:23.000Z</timestamp>
    </currentLocation>
  </terminalLocation>
  <isFinalNotification>true</isFinalNotification>
  <link rel="FinalDistanceNotificationSubscription"
        href="http://example.com/exampleAPI/location/v1/subscriptions/periodic/sub123"/>
</tl:subscriptionNotification>
```

6.9.5.4.2 Response:

```
HTTP/1.1 204 No Content
Date: Thu, 02 Jun 2011 02:51:59 GMT
```

6.9.5.5 Example 5: Subscription cancellation notification (Informative)

6.9.5.5.1 Request

```
POST /notifications/LocationNotification HTTP/1.1
Content-Type: application/xml
Accept: application/xml
Host: application.example.com
Content-Length: nnnn

<?xml version="1.0" encoding="UTF-8"?>
<tl:subscriptionCancellationNotification xmlns:tl="urn:oma:xml:rest:netapi:terminallocation:1">
  <callbackData>6666</callbackData>
  <address>tel:+19585550100</address>
  <reason>
     <messageId>SVC2002</messageId>
     <text>Requested information not available for address %1.</text>
     <variables>tel:+19585550100</variables>
  </reason>
  <link rel="DistanceNotificationSubscription"
       href="http://example.com/exampleAPI/location/v1/subscriptions/distance/sub123"/>
</tl:subscriptionCancellationNotification>
```

6.9.5.5.2 Response

```
HTTP/1.1 204 No Content
Date: Thu, 02 Jun 2011 02:51:59 GMT
```

6.9.6 DELETE

Method not supported by the resource. The returned HTTP error status is 405. The server should also include the ‘Allow: POST’ field in the response as per section 14.7 of [RFC2616].

7. Fault definitions

7.1 Service Exceptions

For common Service Exceptions refer to [REST_NetAPI_Common]. The following additional Service Exception codes are defined for the RESTful Terminal Location API.

7.1.1 SVC0200: Accuracy out of limit

Name	Description
MessageID	SVC0200
Text	Accuracy of location is not within acceptable limit
Variables	None
HTTP status code(s)	403 Forbidden

7.2 Policy Exceptions

For common Policy Exceptions refer to [REST_NetAPI_Common]. The following additional Policy Exception codes are defined for the RESTful Terminal Location API.

7.2.1 POL0230: Requested accuracy not supported

Name	Description
MessageID	POL0230
Text	Requested accuracy is not supported
Variables	None
HTTP status code(s)	403 Forbidden

7.2.2 POL0231: Geographic notification not available

Name	Description
MessageID	POL0231
Text	Geographic notification is not available
Variables	None
HTTP status code(s)	403 Forbidden

7.2.3 POL0232: Periodic notification not available

Name	Description
MessageID	POL0232
Text	Periodic notification is not available

Variables	None
HTTP status code(s)	403 Forbidden

7.2.4 POL0233: Distance notification not available

Name	**Description**
MessageID	POL0233
Text	Distance notification is not available
Variables	None
HTTP status code(s)	403 Forbidden

Appendix A. Change History (Informative)

A.1 Approved Version History

Reference	Date	Description
OMA-TS-REST_NetAPI_TerminalLocation-V1_0-20130924-A	24 Sep 2013	Status changed to Approved by TP TP Ref # OMA-TP-2013-0283-INP_REST_NetAPI_TerminalLocation_V1_0_ERP_for_Final_Approval

Appendix B. Static Conformance Requirements (Normative)

The notation used in this appendix is specified in [SCRRULES].

B.1 SCR for REST.TerminalLocation Server

Item	Function	Reference	Requirement
REST-LOC-SUPPORT-S-001-M	Support for the TERMINALLOCATION REST API	5, 6	
REST-LOC-SUPPORT-S-002-M	Support for the XML request & response format	6	
REST-LOC-SUPPORT-S-003-M	Support for the JSON request & response format	6	
REST-LOC-SUPPORT-S-004-O	Support for the application/x-www-form-urlencoded format	Appendix C	

B.1.1 SCR for REST.TerminalLocation.TerminalLocation Server

Item	Function	Reference	Requirement
REST-LOC-LOC-S-001-M	Support for returning current location of terminals	6.1	
REST-LOC-LOC-S-002-M	Read terminal location information for a single address - GET	6.1.3	
REST-LOC-LOC-S-003-M	Read terminal location information for a group of addresses - GET	6.1.3	

B.1.2 SCR for REST.TerminalLocation.TerminalDistanceFromLocation Server

Item	Function	Reference	Requirement
REST-LOC-LOC-DIST-S-001-O	Support for returning distance from terminal current location	6.2	REST-LOC- LOC-DIST-S-002-O
REST-LOC- LOC-DIST-S-002-O	Read distance between a terminal and a location - GET	6.2.3	
REST-LOC- LOC-DIST-S-003-O	Read distance between two terminals - GET	6.2.3	

B.1.3 SCR for REST.TerminalLocation. PeriodicLocationNotificationSubscriptions Server

Item	Function	Reference	Requirement
REST-LOC-LOC-NOTIF-SUBSCR-S-	Support for controlling subscriptions for periodic	6.3	REST-LOC-LOC-NOTIF-SUBSCR-S-003-O

Item	Function	Reference	Requirement
001-O	location notification for a particular client.		
REST-LOC-LOC-NOTIF-SUBSCR-S-002-O	Read all active subscriptions for periodic notifications for the requesting client - GET	6.3.3	
REST-LOC-LOC-NOTIF-SUBSCR-S-003-O	Create a new periodic notification subscription for the requesting client - POST	6.3.5, C.1	

B.1.4 SCR for REST.TerminalLocation. IndividualPeriodicNotificationSubscr Server

Item	Function	Reference	Requirement
REST-LOC-IND-NOTIF-SUBSCR-S-001-O	Support for controlling individual subscription for periodic location notifications for a particular client.	6.4	REST-LOC-IND-NOTIF-SUBSCR-S-003-O REST-LOC-IND-NOTIF-SUBSCR-S-004-O
REST-LOC-IND-NOTIF-SUBSCR-S-002-O	Read an individual subscription for periodic location notifications for the requesting client.- GET	6.4.3	
REST-LOC-IND-NOTIF-SUBSCR-S-003-O	Update an individual subscription for periodic location notifications for the requesting client.- PUT	6.4.4	
REST-LOC-IND-NOTIF-SUBSCR-S-004-O	Delete a subscription for periodic location notifications and stop notifications for a particular client. - DELETE	6.4.6	

B.1.5 SCR for REST.TerminalLocation. AreaCircleNotificationSubscriptions Server

Item	Function	Reference	Requirement
REST-LOC-AREA-CIR-NOTIF-SUBSCR-S-001-O	Support for controlling subscriptions for notification about terminal movements in relation to the geographic area (circle), crossing in and out, for a particular client.	6.5	REST-LOC-AREA-CIR-NOTIF-SUBSCR-S-003-O
REST-LOC-AREA-CIR-NOTIF-SUBSCR-	Read all active movement notifications	6.5.3	

Item	Function	Reference	Requirement
S-002-O	subscriptions for the requesting client - GET		
REST-LOC-AREA-CIR-NOTIF-SUBSCR-S-003-O	Create new movement notification subscription for the requesting client. - POST	6.5.5, C.2	

B.1.6 SCR for REST.TerminalLocation. AreaCircleIndividualNotificationSubscription Server

Item	Function	Reference	Requirement
REST-LOC-AREA-CIR-IND-NOTIF-SUBSCR-S-001-O	Support for controlling individual subscription for notifications about terminal movements in relation to the geographic area (circle), crossing in and out, for a particular client.	6.6	REST-LOC-AREA-CIR-IND-NOTIF-SUBSCR-S-003-O REST-LOC-AREA-CIR-IND-NOTIF-SUBSCR-S-004-O
REST-LOC-AREA-CIR-IND-NOTIF-SUBSCR-S-002-O	Read an individual subscription for movement notification for the requesting client. - GET	6.6.3	
REST-LOC-AREA-CIR-IND-NOTIF-SUBSCR-S-003-O	Update the subscription for movement notification for the requesting client.- PUT	6.6.4	
REST-LOC-AREA-CIR-IND-NOTIF-SUBSCR-S-004-O	Delete subscription for movement notifications and stop notifications for the requesting client.- DELETE	6.6.6	

B.1.7 SCR for REST.TerminalLocation. DistanceNotificationSubscriptions Server

Item	Function	Reference	Requirement
REST-LOC-DIST-NOTIF-SUBSCR-S-001-O	Support for controlling subscriptions for notification about changes in the geographical relationships between terminals.	6.7	REST-LOC-DIST-NOTIF-SUBSCR-S-003-O
REST-LOC-DIST-NOTIF-SUBSCR-S-002-O	Read all active distance notifications subscriptions for the requesting client.- GET	6.7.3	
REST-LOC-DIST-NOTIF-SUBSCR-S-	Create new distance notification subscription	6.7.5, C.3	

Item	Function	Reference	Requirement
003-O	for the requesting client.- POST		

B.1.8 SCR for REST.TerminalLocation. DistanceIndividualNotificationSubscription Server

Item	Function	Reference	Requirement
REST-LOC-DIST-IND-NOTIF-SUBSCR-S-001-O	Support for controlling individual subscription for notifications about changes in the geographical relationships between terminals.	6.8	REST-LOC-DIST-IND-NOTIF-SUBSCR-S-003-O REST-LOC-DIST-IND-NOTIF-SUBSCR-S-004-O
REST-LOC-DIST-IND-NOTIF-SUBSCR-S-002-O	Read an individual subscription for distance notification for the requesting client.- GET	6.8.3	
REST-LOC-DIST-IND-NOTIF-SUBSCR-S-003-O	Update the subscription for distance notification for the requesting client - PUT	6.8.4	
REST-LOC-DIST-IND-NOTIF-SUBSCR-S-004-O	Delete subscription for distance notifications and stop notifications for the requesting client. - DELETE	6.8.6	

B.1.9 SCR for ParlayREST. TerminalLocation. ClientNotificationCallbackResource Server

Item	Function	Reference	Requirement
REST-LOC-CLIENT-NOTIF-CALLB-S-001-O	Support for callback URL for notification about location changes	6.9	REST-LOC-CLIENT-NOTIF-CALLB-S-002-O
REST-LOC-CLIENT-NOTIF-CALLB-S-002-O	Notify client about message arrival - POST	6.9.5	

Appendix C. Application/x-www-form-urlencoded Request Format for POST Operations (Normative)

This section defines a format for RESTful Terminal Location API requests where the body of the request is encoded using the application/x-www-form-urlencoded MIME type.

Note: only the request body is encoded as application/x-www-form-urlencoded, the response is still encoded as XML or JSON depending on the preference of the client and the capabilities of the server.

Names and values MUST follow the application/x-www-form-urlencoded character escaping rules from [W3C_URLENC].

The encoding is defined below for the following Terminal Location REST operations which are based on POST requests:

- Create a subscription for Terminal Location periodic location notification
- Create a subscription for Terminal Location area (circle) notification
- Create a subscription for Terminal Location distance notification

C.1 Terminal Location periodic notification subscriptions

This operation is used to create a new periodic location notification subscription for the requesting client, see section 6.3.5.

The notifyURL either contains the Client-side Notification URL (as defined by the client) or the Server-side Notification URL (as obtained during the creation of the Notification Channel [REST_NetAPI_NotificationChannel]).

The following parameters are as follows:

Name	Type/Values	Optional	Description
address	xsd:anyURI [1..unbounded]	No	Addresses of terminals to monitor (e.g., 'sip' URI, 'tel' URI, 'acr' URI).
requestedAccuracy	xsd:int	No	Accuracy of the provided distance in meters
frequency	xsd:int	No	Maximum frequency (in seconds) of notifications (can also be considered minimum time between notifications).
notifyURL	xsd:anyURI	No	Notify Callback URL.
callbackData	xsd:string	Yes	Data the application can register with the server when subscribing to notifications, and that are passed back unchanged in each of the related notifications. These data can be used by the application in the processing of the notification, e.g. for correlation purposes.
notificationFormat	NotificationFormat	Yes	Default: XML. Application can specify format of the resource representation in notifications that are related to this subscription. The choice is between {XML, JSON}.
clientCorrelator	xsd:string	Yes	A correlator that the client can use to tag this particular resource representation during a request to create a resource on the server.

			This element MAY be present. Note: 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.
requester	xsd:anyURI	Yes	It identifies the entity that is requesting the information (e.g., 'sip' URI, 'tel' URI, 'acr' URI). The application invokes this operation on behalf of this entity. However, it does not imply that the application has authenticated the requester. If this element is not present, the requesting entity is the application itself. If this element is present, and the requester is not authorized to retrieve location info, a policy exception will be returned.
duration	xsd:int	Yes	Period of time (in seconds) notifications are provided for. If set to “0” (zero), a default duration time, which is specified by the service policy, will be used. If the parameter is omitted, the notifications will continue until the maximum duration time, which is specified by the service policy, unless the notifications are stopped by deletion of subscription for notifications.

C.1.1 Example 1, using tel URI (Informative)

C.1.1.1 Request

```
POST /exampleAPI/location/v1/subscriptions/periodic HTTP/1.1
Accept: application/xml
Host: example.com
Content-Type: application/x-www-form-urlencoded
Content-Length: nnnn

clientCorrelator=0001&
notifyURL=http%3A%2F%2Fapplication.example.com%2Fnotifications%2FLocationNotification&
callbackData=1234&
address=tel%3A%2B19585550100&
requestedAccuracy=10&
frequency=10
```

C.1.1.2 Response

```
HTTP/1.1 201 Created
Content-Type: application/xml
Location: http://example.com/exampleAPI/location/v1/subscriptions/periodic/sub123
Date: Thu, 02 Jun 2011 02:51:59 GMT

<?xml version="1.0" encoding="UTF-8"?>
<tl:periodicNotificationSubscription xmlns:tl="urn:oma:xml:rest:netapi:terminallocation:1">
  <clientCorrelator>0001</clientCorrelator>
  <resourceURL>http://example.com/exampleAPI/location/v1/subscriptions/periodic/sub123</resourceURL>
  <callbackReference>
    <notifyURL>http://application.example.com/notifications/LocationNotification</notifyURL>
    <callbackData>1234</callbackData>
  </callbackReference>
  <address>tel:+19585550100</address>
  <requestedAccuracy>10</requestedAccuracy>
  <frequency>10</frequency>
</tl:periodicNotificationSubscription>
```

C.2 Terminal Location area (circle) notification subscriptions

This operation is used to create a new movement notification subscription for the requesting client, see section 6.5.5.

The notifyURL in the callbackReference either contains the Client-side Notification URL (as defined by the client) or the Server-side Notification URL (as obtained during the creation of the Notification Channel [REST_NetAPI_NotificationChannel]).

The following parameters are as follows:

Name	Type/Values	Optional	Description
clientCorrelator	xsd:string	Yes	A correlator that the client can use to tag this particular resource representation during a request to create a resource on the server. This element MAY be present. Note: 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.
notifyURL	xsd:anyURI	No	Notify Callback URL.
callbackData	xsd:string	Yes	Data the application can register with the server when subscribing to notifications, and that are passed back unchanged in each of the related notifications. These data can be used by the application in the processing of the notification, e.g. for correlation purposes.

notificationFormat	NotificationFormat	Yes	Default: XML. Application can specify format of the resource representation in notifications that are related to this subscription. The choice is between {XML, JSON}.
requester	xsd:anyURI	Yes	It identifies the entity that is requesting the information (e.g., 'sip' URI, 'tel' URI, 'acr' URI). The application invokes this operation on behalf of this entity. However, it does not imply that the application has authenticated the requester. If this element is not present, the requesting entity is the application itself. If this element is present, and the requester is not authorized to retrieve location info, a policy exception will be returned.
address	xsd:anyURI [1..unbounded]	No	Addresses of terminals to monitor (e.g., 'sip' URI, 'tel' URI, 'acr' URI). Reference to a group could be provided here if supported by implementation.
latitude	xsd:float	No	Latitude of center point.
longitude	xsd:float	No	Longitude of center point.
radius	xsd:float	No	Radius of circle around center point in meters.
trackingAccuracy	xsd:float	No	Number of meters of acceptable error in tracking distance.
enteringLeavingCriteria	EnteringLeavingCriteria	No	Indicates whether the notification should occur when the terminal enters or leaves the target area.
checkImmediate	xsd:boolean	No	Check location immediately after establishing notification.
frequency	xsd:int	No	Maximum frequency (in seconds) of notifications per subscription (can also be considered minimum time between notifications).
duration	xsd:int	Yes	Period of time (in seconds) notifications are provided for. If set to “0” (zero), a default duration time, which is specified by the service policy, will be used. If the parameter is omitted, the notifications will continue until the maximum duration time, which is specified by the service policy, unless the notifications are stopped by deletion of subscription for notifications.
count	xsd:int	Yes	Maximum number of notifications per individual address. For no maximum, either do not include this element or specify a value of zero. Default value is 0.

C.2.1 Example 1 (Informative)

C.2.1.1 Request

```
POST /exampleAPI/location/v1/subscriptions/area/circle HTTP/1.1
Accept: application/xml
Host: example.com
Content-Type: application/x-www-form-urlencoded
Content-Length: nnnn

 clientCorrelator=0003&
 notifyURL=http%3A%2F%2Fapplication.example.com%2Fnotifications%2FLocationNotification&
 callbackData=4444&
 address=tel%3A%2B19585550100&
 latitude=100.23&
 longitude=-200.45&
 radius=500&
 trackingAccuracy=10&
 enteringLeavingCriteria=Entering&
 checkImmediate=true&
 frequency=10
```

C.2.1.2 Response

```
HTTP/1.1 201 Created
Content-Type: application/xml
Location: http://example.com/exampleAPI/location/v1/subscriptions/area/circle/sub123
Date: Thu, 02 Jun 2011 02:51:59 GMT

<?xml version="1.0" encoding="UTF-8"?>
<tl:circleNotificationSubscription xmlns:tl="urn:oma:xml:rest:netapi:terminallocation:1">
  <clientCorrelator>0003</clientCorrelator>
  <resourceURL>http://example.com/exampleAPI/location/v1/subscriptions/area/circle/sub123</resourceURL>
  <callbackReference>
    <notifyURL>http://application.example.com/notifications/LocationNotification</notifyURL>
    <callbackData>4444</callbackData>
  </callbackReference>
  <address>tel:+19585550100</address>
  <latitude>100.23</latitude>
  <longitude>-200.45</longitude>
  <radius>500</radius>
  <trackingAccuracy>10</trackingAccuracy>
  <enteringLeavingCriteria>Entering</enteringLeavingCriteria>
  <checkImmediate>true</checkImmediate>
  <frequency>10</frequency>
</tl:circleNotificationSubscription>
```

C.3 Terminal Location distance notification subscriptions

This operation is used to create a new distance notification subscription for the requesting client, see section 6.7.5

The notifyURL in the callbackReference either contains the Client-side Notification URL (as defined by the client) or the Server-side Notification URL (as obtained during the creation of the Notification Channel [REST_NetAPI_NotificationChannel]).

The following parameters are as follows:

Name	Type/Values	Optional	Description
clientCorrelator	xsd:string	Yes	A correlator that the client can use to tag this particular resource representation during a request to create a resource on the server. This element MAY be present. Note: 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.
notifyURL	xsd:anyURI	No	Notify Callback URL.
callbackData	xsd:string	Yes	Data the application can register with the server when subscribing to notifications, and that are passed back unchanged in each of the related notifications. These data can be used by the application in the processing of the notification, e.g. for correlation purposes.
notificationFormat	NotificationFormat	Yes	Default: XML. Application can specify format of the resource representation in notifications that are related to this subscription. The choice is between {XML, JSON}.
requester	xsd:anyURI	Yes	It identifies the entity that is requesting the information (e.g., 'sip' URI, 'tel' URI, 'acr' URI). The application invokes this operation on behalf of this entity. However, it does not imply that the application has authenticated the requester. If this element is not present, the requesting entity is the application itself. If this element is present, and the requester is not authorized to retrieve location info, a policy exception will be returned.
referenceAddress	xsd:anyURI [0..unbounded]	Yes	If specified, indicates address of each device that will be used as reference devices from which the distances towards monitored devices 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	xsd:anyURI [1..unbounded]	No	Contains addresses of devices 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 device and reference device(s) will be monitored. If the ReferenceAddress is not present, then the distance between each pair of the monitored devices will be monitored. Note that in that case there must be at least two addresses specified here.
distance	xsd:float	No	Distance between devices that shall be monitored.
trackingAccuracy	xsd:float	No	Number of meters of acceptable error in tracking distance.
criteria	DistanceCriteria	No	Indicates whether the notification should occur when the geographical relationship between monitored and referenced devices changes.
checkImmediate	xsd:boolean	No	Check location immediately after establishing notification.
frequency	xsd:int	No	Maximum frequency (in seconds) of notifications per subscription (can also be considered minimum time between notifications).
duration	xsd:int	Yes	Period of time (in seconds) notifications are provided for. If set to “0” (zero), a default duration time, which is specified by the service policy, will be used. If the element is omitted, the notifications will continue until the maximum duration time, which is specified by the service policy, unless the notifications are stopped by deletion of subscription for notifications.
count	xsd:int	Yes	Maximum number of notifications per individual address. For no maximum, either do not include this element or specify a value of zero. Default value is 0.

C.3.1 Example 1 (Informative)

C.3.1.1 Request

```
POST /exampleAPI/location/v1/subscriptions/distance HTTP/1.1
Accept: application/xml
Host: example.com
Content-Type: application/x-www-form-urlencoded
Content-Length: nnnn

clientCorrelator=0006&
notifyURL=http%3A%2F%2Fapplication.example.com%2Fnotifications%2FLocationNotification&
callbackData=6666&
```

```
referenceAddress=tel%3A%2B19585550100&
monitoredAddress=tel%3A%2B19585550101&
monitoredAddress=tel%3A%2B19585550102&
distance=100&
trackingAccuracy=10&
criteria=AllWithinDistance&
checkImmediate=true&
frequency=10
```

C.3.1.2 Response

```
HTTP/1.1 201 Created
Content-Type: application/xml
Location: http://example.com/exampleAPI/location/v1/subscriptions/distance/sub123
Date: Thu, 02 Jun 2011 02:51:59 GMT

<?xml version="1.0" encoding="UTF-8"?>
<tl:distanceNotificationSubscription xmlns:tl="urn:oma:xml:rest:netapi:terminallocation:1" >
  <clientCorrelator>0006</clientCorrelator>
<resourceURL>http://example.com/exampleAPI/location/v1/subscriptions/distance/sub123</resourceURL>
  <callbackReference>
    <notifyURL>http://application.example.com/notifications/LocationNotification</notifyURL>
    <callbackData>6666</callbackData>
  </callbackReference>
  <referenceAddress>tel:+19585550100</referenceAddress>
  <monitoredAddress>tel:+19585550101</monitoredAddress>
  <monitoredAddress>tel:+19585550102</monitoredAddress>
  <distance>100</distance>
  <trackingAccuracy>10</trackingAccuracy>
  <criteria>AllWithinDistance</criteria>
  <checkImmediate>true</checkImmediate>
  <frequency>10</frequency>
</tl:distanceNotificationSubscription>
```


Appendix D. JSON examples (Informative)

JSON (JavaScript Object Notation) is a light-weight, text-based, language-independent data interchange format. It provides a simple means to represent basic name-value pairs, arrays and objects. JSON is relatively trivial to parse and evaluate using standard JavaScript libraries, and hence is suited for REST invocations from browsers or other processors with JavaScript engines. Further information on JSON can be found at [RFC4627].

The following examples show the request and response for various operations using the JSON data format. The examples follow the XML to JSON serialization rules in [REST_NetAPI_Common]. A JSON response can be obtained by using the content type negotiation mechanism specified in [REST_NetAPI_Common].

For full details on the operations themselves please refer to the section number indicated.

D.1 Get location for single address (section 6.1.3.1)

Request:

```
GET /exampleAPI/location/v1/queries/location?address=tel%3A%2B19585550100&tolerance=LowDelay&requestedAccuracy=1000
&acceptableAccuracy=1000 HTTP/1.1
Accept: application/json
Host: example.com
```

Response:

```
HTTP/1.1 200 OK
Content-Type: application/json
Content-Length: nnnn
Date: Thu, 04 Jun 2009 02:51:59 GMT

{"terminalLocationList": {"terminalLocation": {
    "address": "tel:+19585550100",
    "currentLocation": {
        "accuracy": "100",
        "altitude": "1001.0",
        "latitude": "-80.86302",
        "longitude": "41.277306",
        "timestamp": "2011-06-04T00:27:23.000Z"
    },
    "locationRetrievalStatus": "Retrieved"
}}}
```

D.2 Get location for multiple addresses (section 6.1.3.2)

Request:

```
GET /exampleAPI/location/v1/queries/location?address=tel%3A%2B19585550100&address=tel%3A%2B19585550101
&tolerance=LowDelay&requestedAccuracy=1000&acceptableAccuracy=1000 HTTP/1.1
Accept: application/json
Host: example.com
```

Response:

```
HTTP/1.1 200 OK
Content-Type: application/json
Content-Length: nnnn
```



```
Date: Thu, 04 Jun 2009 02:51:59 GMT

{"terminalLocationList": {"terminalLocation": [
   {
      "address": "tel:+19585550100",
      "currentLocation": {
         "accuracy": "100",
         "altitude": "1001.0",
         "latitude": "-80.86302",
         "longitude": "41.277306",
         "timestamp": "2011-06-04T00:27:23.000Z"
      },
      "locationRetrievalStatus": "Retrieved"
   },
   {
      "address": "tel:+19585550101",
      "errorInformation": {
         "messageId": "SVC2002",
         "text": "Requested information not available for address %1.",
         "variables": "tel:+19585550101"
      },
      "locationRetrievalStatus": "Error"
   }
]}}
```

D.3 Location with unsupported accuracy (section 6.1.3.3)

Request:

```
GET /exampleAPI/location/v1/queries/location?resFormat=JSON&address= tel%3A%2B19585550100
&tolerance=LowDelay&requestedAccuracy=10&acceptableAccuracy=100 HTTP/1.1
Accept: application/json
Host: example.com
```

Response:

```
HTTP/1.1 403 Forbidden
Content-Type: application/json
Content-Length: nnnn
Date: Thu, 04 Jun 2009 02:51:59 GMT

{"requestError": {
   "link": {
      "href": "http://example.com/exampleAPI/location/v1/queries/location",
      "rel": "TerminalLocationList"
   },
   "policyException": {
      "messageId": "POL0230",
      "text": "The requested accuracy %1 is not supported by the policy",
      "variables": "10"
   }
}}
```

D.4 Location with unauthorized requester (section 6.1.3.4)

Request:

```
GET /exampleAPI/location/v1/queries/location?requester=tel%3A%2B19585550102&address=tel%3A%2B19585550100
&tolerance=LowDelay&requestedAccuracy=10&acceptableAccuracy=100 HTTP/1.1
Accept: application/json
Host: example.com
```

Response:

```
HTTP/1.1 403 Forbidden
Content-Type: application/json
Content-Length: nnnn
Date: Thu, 04 Jun 2009 02:51:59 GMT

{"requestError": {"policyException": {
    "messageId": "POL0002",
    "text": "Privacy error."
}}}
```

D.5 Get location for single address, using ACR

Request:

```
GET /exampleAPI/location/v1/queries/location?address=acr%3Apseudonym123&tolerance=LowDelay&requestedAccuracy=1000
&acceptableAccuracy=1000&maximumAge=180&responseTime=300 HTTP/1.1
Accept: application/json
Host: example.com
```

Response:

```
HTTP/1.1 200 OK
Content-Type: application/json
Content-Length: nnnn
Date: Thu, 02 Jun 2011 02:51:59 GMT

{"terminalLocationList": {"terminalLocation": {
    "address": "acr:pseudonym123",
    "currentLocation": {
        "accuracy": "100",
        "altitude": "1001.0",
        "latitude": "-80.86302",
        "longitude": "41.277306",
        "timestamp": "2011-06-02T02:53:23.000Z"
    },
    "locationRetrievalStatus": "Retrieved"
}}}
```

D.6 Distance between a terminal and a location (section 6.2.3.1)

Request:

```
GET
/exampleAPI/location/v1/queries/distance?resFormat=JSON&address=tel%3A%2B19585550100&latitude=50&longitude=1
25 HTTP/1.1
Accept: application/json
Host: example.com
```

Response:

```
HTTP/1.1 200 OK
Content-Type: application/json
Content-Length: nnnn
Date: Thu, 04 Jun 2009 02:51:59 GMT

{"terminalDistance": {"distance": "100"}}
```

D.7 Distance between two terminals (section 6.2.3.2)

Request:

```
GET /exampleAPI/location/v1/queries/distance?address=tel%3A%2B19585550100&address=tel%3A%2B19585550101 HTTP/1.1
Accept: application/json
Host: example.com
```

Response:

```
HTTP/1.1 200 OK
Content-Type: application/json
Content-Length: nnnn
Date: Thu, 04 Jun 2009 02:51:59 GMT

{"terminalDistance": {"distance": "100"}}
```

D.8 Invalid address (section 6.2.3.3)

Request:

```
GET /exampleAPI/location/v1/queries/distance?address=tel%3A%2B19585550100&latitude=50&longitude=125 HTTP/1.1
Accept: application/json
Host: example.com
```

Response:

```
HTTP/1.1 400 Bad Request
Content-Type: application/json
Content-Length: nnnn
Date: Thu, 04 Jun 2009 02:51:59 GMT

{"requestError": {
   "link": {
      "href": "http://example.com/exampleAPI/location/v1/queries/distance",
      "rel": "TerminalDistance"
   },
```

```
   "serviceException": {
      "messageId": "SVC0002",
      "text": " Invalid input value for message part %1",
      "variables": "tel:+19585550100"
   }
}}
```

D.9 Too many addresses (section 6.2.3.4)

Request:

```
GET /exampleAPI/location/v1/queries/distance?address=tel%3A%2B19585550100
&address=tel%3A%2B19585550101&address=tel%3A%2B19585550102 HTTP/1.1
Accept: application/json
Host: example.com
```

Response:

```
HTTP/1.1 403 Forbidden
Content-Type: application/json
Content-Length: nnnn
Date: Thu, 04 Jun 2009 02:51:59 GMT

{"requestError": {
   "link": {
      "href": "http://example.com/exampleAPI/location/v1/queries/distance",
      "rel": "TerminalDistance"
   },
   "policyException": {
      "messageId": "POL0003",
      "text": "Too many addresses specified in message part %1",
      "variables": "addresses"
   }
}}
```

D.10 Get periodic notification subscriptions (section 6.3.3.1)

Request:

```
GET /exampleAPI/location/v1/subscriptions/periodic HTTP/1.1
Accept: application/json
Host: example.com
```

Response:

```
HTTP/1.1 200 OK
Content-Type: application/json
Content-Length: nnnn
Date: Thu, 04 Jun 2009 02:51:59 GMT

{"notificationSubscriptionList": {"periodicNotificationSubscription": [
   {
      "address": "tel:+19585550101",
      "callbackReference": {
```

```
            "callbackData": "1234",
            "notifyURL": "http://application.example.com/notifications/LocationNotification"
        },
        "clientCorrelator": "0001",
        "frequency": "10",
        "requestedAccuracy": "10",
        "resourceURL": "http://example.com/exampleAPI/location/v1/subscriptions/periodic/sub123"
    },
    {
        "address": [
            "tel:+19585550100",
            "tel:+19585550101"
        ],
        "callbackReference": {
            "callbackData": "5678",
            "notifyURL": "http://application.example.com/notifications/LocationNotification"
        },
        "clientCorrelator": "0002",
        "frequency": "10",
        "requestedAccuracy": "10",
        "resourceURL": "http://example.com/exampleAPI/location/v1/subscriptions/periodic/sub124"
    }
]}}
```

D.11 Create new periodic notification subscription, returning a representation of created resource (section 6.3.5.1)

Request:

```
POST /exampleAPI/location/v1/subscriptions/periodic HTTP/1.1
Content-Type: application/json
Accept: application/json
Host: example.com
Content-Length: nnnn

{"periodicNotificationSubscription": {
    "address": "tel:+19585550100",
    "callbackReference": {
        "callbackData": "1234",
        "notifyURL": "http://application.example.com/notifications/LocationNotification"
    },
    "clientCorrelator": "0001",
    "frequency": "10",
    "requestedAccuracy": "10"
}}
```

Response:

```
HTTP/1.1 201 Created
Content-Type: application/json
Location: http://example.com/exampleAPI/location/v1/subscriptions/periodic/sub123
Date: Thu, 04 Jun 2009 02:51:59 GMT

{"periodicNotificationSubscription": {
```

```
    "address": "tel:+19585550100",
    "callbackReference": {
        "callbackData": "1234",
        "notifyURL": "http://application.example.com/notifications/LocationNotification"
    },
    "clientCorrelator": "0001",
    "frequency": "10",
    "requestedAccuracy": "10",
    "resourceURL": "http://example.com/exampleAPI/location/v1/subscriptions/periodic/sub123"
}}
```

D.12 Create new periodic notification subscription, returning the location of created resource (section 6.3.5.2)

Request:

```
POST ./exampleAPI/location/v1/subscriptions/periodic HTTP/1.1
Content-Type: application/json
Accept: application/json
Host: example.com
Content-Length: nnnn

{"periodicNotificationSubscription": {
    "address": "tel:+19585550100",
    "callbackReference": {
        "callbackData": "1234",
        "notifyURL": "http://application.example.com/notifications/LocationNotification"
    },
    "clientCorrelator": "0001",
    "frequency": "10",
    "requestedAccuracy": "10"
}}
```

Response:

```
HTTP/1.1 201 Created
Content-Type: application/json
Location: http://example.com/exampleAPI/location/v1/subscriptions/periodic/sub123
Content-Length: nnnn
Date: Thu, 04 Jun 2009 02:51:59 GMT

{"resourceReference": {"resourceURL": "http://example.com/exampleAPI/location/v1/subscriptions/periodic/sub123"}}
```

D.13 Read individual notification subscription (section 6.4.3.1)

Request:

```
GET /exampleAPI/location/v1/subscriptions/periodic/sub123 HTTP/1.1
Accept: application/json
Host: example.com
```

Response:

```
HTTP/1.1 200 OK
Content-Type: application/JSON
Content-Length: nnnn
Date: Thu, 04 Jun 2009 02:51:59 GMT

{"periodicNotificationSubscription": {
   "address": "tel:+19585550100",
   "callbackReference": {
      "callbackData": "1234",
      "notifyURL": "http://application.example.com/notifications/LocationNotification"
   },
   "clientCorrelator": "0001",
   "frequency": "10",
   "requestedAccuracy": "10",
   "resourceURL": "http://example.com/exampleAPI/location/v1/subscriptions/periodic/sub123"
}}
```

D.14 Update individual notification subscription (section 6.4.4.1)

Request:

```
PUT /exampleAPI/location/v1/subscriptions/periodic/sub123 HTTP/1.1
Content-Type: application/json
Accept: application/json
Host: example.com
Content-Length: nnnn

{"periodicNotificationSubscription": {
   "address": "tel:+19585550100",
   "callbackReference": {
      "callbackData": "1234",
      "notifyURL": "http://application.example.com/notifications/LocationNotification"
   },
   "clientCorrelator": "0001",
   "frequency": "60",
   "requestedAccuracy": "5",
   "resourceURL": "http://example.com/exampleAPI/location/v1/subscriptions/periodic/sub123"
}}
```

Response:

```
HTTP/1.1 200 OK
Content-Type: application/json
Content-Length: nnnn
Date: Thu, 04 Jun 2009 02:51:59 GMT

{"periodicNotificationSubscription": {
   "address": "tel:+19585550100",
   "callbackReference": {
      "callbackData": "1234",
      "notifyURL": "http://application.example.com/notifications/LocationNotification"
   },
   "clientCorrelator": "0001",
   "frequency": "60",
   "requestedAccuracy": "5",
```

```
    "resourceURL": "http://example.com/exampleAPI/location/v1/subscriptions/periodic/sub123"
}}
```

D.15 Delete a notification subscription (section 6.4.6.1)

Request:

```
DELETE /exampleAPI/location/v1/subscriptions/periodic/sub123 HTTP/1.1
Accept: application/json
Host: example.com
```

Response:

```
HTTP/1.1 204 No Content
Date: Thu, 04 Jun 2009 02:51:59 GMT
```

D.16 Read all active area(circle) notification subscriptions (section 6.5.3.1)

Request:

```
GET /exampleAPI/location/v1/subscriptions/area/circle HTTP/1.1
Accept: application/json
Host: example.com
```

Response:

```
HTTP/1.1 200 OK
Content-Type: application/json
Content-Length: nnnn
Date: Thu, 04 Jun 2009 02:51:59 GMT

{"notificationSubscriptionList": {"circleNotificationSubscription": [
   {
      "address": "tel:+19585550100",
      "callbackReference": {
         "callbackData": "4444",
         "notifyURL": "http://application.example.com/notifications/LocationNotification"
      },
      "checkImmediate": "true",
      "clientCorrelator": "0003",
      "enteringLeavingCriteria": "Entering",
      "frequency": "10",
      "latitude": "100.23",
      "longitude": "-200.45",
      "radius": "500",
      "resourceURL": "http://example.com/exampleAPI/location/v1/subscriptions/area/circle/sub123",
      "trackingAccuracy": "10"
   },
   {
      "address": [
         "tel:+19585550100",
```

```
            "tel:+19585550101"
        ],
        "callbackReference": {
            "callbackData": "5555",
            "notifyURL": "http://application.example.com/notifications/LocationNotification"
        },
        "checkImmediate": "true",
        "clientCorrelator": "0004",
        "enteringLeavingCriteria": "Entering",
        "frequency": "10",
        "latitude": "100.23",
        "longitude": "-200.45",
        "radius": "500",
        "resourceURL": "http://example.com/exampleAPI/location/v1/subscriptions/area/circle/sub124",
        "trackingAccuracy": "10"
    }
]}}
```

D.17 Create new notification subscription (section 6.5.5.1)

Request:

```
POST /exampleAPI/location/v1/subscriptions/area/circle HTTP/1.1
Content-Type: application/json
Accept: application/json
Host: example.com
Content-Length: nnnn

{"circleNotificationSubscription": {
    "address": "tel:+19585550100",
    "callbackReference": {
        "callbackData": "4444",
        "notifyURL": "http://application.example.com/notifications/LocationNotification"
    },
    "checkImmediate": "true",
    "clientCorrelator": "0003",
    "enteringLeavingCriteria": "Entering",
    "frequency": "10",
    "latitude": "100.23",
    "longitude": "-200.45",
    "radius": "500",
    "trackingAccuracy": "10"
}}
```

Response:

```
HTTP/1.1 201 Created
Content-Type: application/json
Location: http://example.com/exampleAPI/location/v1/subscriptions/area/circle/sub123
Content-Length: nnnn
Date: Thu, 04 Jun 2009 02:51:59 GMT

{"circleNotificationSubscription": {
    "address": "tel:+19585550100",
    "callbackReference": {
```

```
        "callbackData": "4444",
        "notifyURL": "http://application.example.com/notifications/LocationNotification"
    },
    "checkImmediate": "true",
    "clientCorrelator": "0003",
    "enteringLeavingCriteria": "Entering",
    "frequency": "10",
    "latitude": "100.23",
    "longitude": "-200.45",
    "radius": "500",
    "resourceURL": "http://example.com/exampleAPI/location/v1/subscriptions/area/circle/sub123",
    "trackingAccuracy": "10"
}}
```

D.18 Get individual notification subscription (section 6.6.3.1)

Request:

```
GET /exampleAPI/location/v1/subscriptions/area/circle/sub123 HTTP/1.1
Accept: application/json
Host: example.com
```

Response:

```
HTTP/1.1 200 OK
Content-Type: application/json
Content-Length: nnnn
Date: Thu, 04 Jun 2009 02:51:59 GMT

{"circleNotificationSubscription": {
    "address": "tel:+19585550100",
    "callbackReference": {
        "callbackData": "4444",
        "notifyURL": "http://application.example.com/notifications/LocationNotification"
    },
    "checkImmediate": "true",
    "clientCorrelator": "0003",
    "enteringLeavingCriteria": "Entering",
    "frequency": "10",
    "latitude": "100.23",
    "longitude": "-200.45",
    "radius": "500",
    "resourceURL": "http://example.com/exampleAPI/location/v1/subscriptions/area/circle/sub123",
    "trackingAccuracy": "10"
}}
```

D.19 Update subscription for notification (section 6.6.4.1)

Request:

```
PUT /exampleAPI/location/v1/subscriptions/area/circle/sub123 HTTP/1.1
Content-Type: application/json
Accept: application/json
Host: example.com
```

```
Content-Length: nnnn

{"circleNotificationSubscription": {
    "address": "tel:+19585550100",
    "callbackReference": {
        "callbackData": "4444",
        "notifyURL": "http://application.example.com/notifications/LocationNotification"
    },
    "checkImmediate": "true",
    "clientCorrelator": "0003",
    "enteringLeavingCriteria": "Entering",
    "frequency": "10",
    "latitude": "100.23",
    "longitude": "-200.45",
    "radius": "50",
    "resourceURL": "http://example.com/exampleAPI/location/v1/subscriptions/area/circle/sub123",
    "trackingAccuracy": "10"
}}
```

Response:

```
HTTP/1.1 200 OK
Content-Type: application/json
Content-Length: nnnn
Date: Thu, 04 Jun 2009 02:51:59 GMT

{"circleNotificationSubscription": {
    "address": "tel:+19585550100",
    "callbackReference": {
        "callbackData": "4444",
        "notifyURL": "http://application.example.com/notifications/LocationNotification"
    },
    "checkImmediate": "true",
    "clientCorrelator": "0003",
    "enteringLeavingCriteria": "Entering",
    "frequency": "10",
    "latitude": "100.23",
    "longitude": "-200.45",
    "radius": "50",
    "resourceURL": "http://example.com/exampleAPI/location/v1/subscriptions/area/circle/sub123",
    "trackingAccuracy": "10"
}}
```

D.20 Delete a subscription for area(circle) notification (section 6.6.6.1)

Request:

```
DELETE /exampleAPI/location/v1/subscriptions/area/circle/sub123 HTTP/1.1
Accept: application/json
Host: example.com
```

Response:

```
HTTP/1.1 204 No Content
Date: Thu, 04 Jun 2009 02:51:59 GMT
```

D.21 Read distance notification subscription (section 6.7.3.1)

Request:

```
GET /exampleAPI/location/v1/subscriptions/distance HTTP/1.1
Accept: application/json
Host: example.com
```

Response:

```
HTTP/1.1 200 OK
Content-Type: application/json
Content-Length: nnnn
Date: Thu, 04 Jun 2009 02:51:59 GMT

{"notificationSubscriptionList": {"distanceNotificationSubscription": [
   {
      "callbackReference": {
         "callbackData": "6666",
         "notifyURL": "http://application.example.com/notifications/LocationNotification"
      },
      "checkImmediate": "true",
      "clientCorrelator": "0006",
      "criteria": "AllWithinDistance",
      "distance": "100",
      "frequency": "10",
      "monitoredAddress": [
         "tel:+19585550101",
         "tel:+19585550102"
      ],
      "referenceAddress": "tel:+19585550100",
      "resourceURL": "http://example.com/exampleAPI/location/v1/subscriptions/distance/sub123",
      "trackingAccuracy": "10"
   },
   {
      "callbackReference": {
         "callbackData": "7777",
         "notifyURL": "http://application.example.com/notifications/LocationNotification"
      },
      "checkImmediate": "true",
      "clientCorrelator": "0007",
      "criteria": "AnyBeyondDistance",
      "distance": "1000",
      "frequency": "10",
      "monitoredAddress": [
         "tel:+19585550100",
         "tel:+19585550101",
         "tel:+19585550102"
      ],
      "resourceURL": "http://example.com/exampleAPI/location/v1/subscriptions/distance/sub124",
      "trackingAccuracy": "50"
```

```
    }
]}}
```

D.22 Create new distance notification (section 6.7.5.1)

Request:

```
POST /exampleAPI/location/v1/subscriptions/distance HTTP/1.1
Content-Type: application/json
Accept: application/json
Host: example.com
Content-Length: nnnn

{"distanceNotificationSubscription": {
    "callbackReference": {
        "callbackData": "6666",
        "notifyURL": "http://application.example.com/notifications/LocationNotification"
    },
    "checkImmediate": "true",
    "clientCorrelator": "0006",
    "criteria": "AllWithinDistance",
    "distance": "100",
    "frequency": "10",
    "monitoredAddress": [
        "tel:+19585550101",
        "tel:+19585550102"
    ],
    "referenceAddress": "tel:+19585550100",
    "trackingAccuracy": "10"
}}
```

Response:

```
HTTP/1.1 201 Created
Content-Type: application/json
Location: http://example.com/exampleAPI/location/v1/subscriptions/distance/sub123
Date: Thu, 04 Jun 2009 02:51:59 GMT

{"distanceNotificationSubscription": {
    "callbackReference": {
        "callbackData": "6666",
        "notifyURL": "http://application.example.com/notifications/LocationNotification"
    },
    "checkImmediate": "true",
    "clientCorrelator": "0006",
    "criteria": "AllWithinDistance",
    "distance": "100",
    "frequency": "10",
    "monitoredAddress": [
        "tel:+19585550101",
        "tel:+19585550102"
    ],
    "referenceAddress": "tel:+19585550100",
    "resourceURL": "http://example.com/exampleAPI/location/v1/subscriptions/distance/sub123",
    "trackingAccuracy": "10"
```

```
}}
```

D.23 Read a subscription for distance notification (section 6.8.3.1)

Request:

```
GET /exampleAPI/location/v1/subscriptions/distance/sub123 HTTP/1.1
Accept: application/json
Host: example.com
```

Response:

```
HTTP/1.1 200 OK
Content-Type: application/json
Content-Length: nnnn
Date: Thu, 04 Jun 2009 02:51:59 GMT

{"distanceNotificationSubscription": {
    "callbackReference": {
        "callbackData": "6666",
        "notifyURL": "http://application.example.com/notifications/LocationNotification"
    },
    "checkImmediate": "true",
    "clientCorrelator": "0006",
    "criteria": "AllWithinDistance",
    "distance": "100",
    "frequency": "10",
    "monitoredAddress": [
        "tel:+19585550101",
        "tel:+19585550102"
    ],
    "referenceAddress": "tel:+19585550100",
    "resourceURL": "http://example.com/exampleAPI/location/v1/subscriptions/distance/sub123",
    "trackingAccuracy": "10"
}}
```

D.24 Update a distance notification subscription (section 6.8.4.1)

Request:

```
PUT /exampleAPI/location/v1/subscriptions/distance/sub123 HTTP/1.1
Content-Type: application/json
Accept: application/json
Host: example.com
Content-Length: nnnn

{"distanceNotificationSubscription": {
    "callbackReference": {
        "callbackData": "6666",
        "notifyURL": "http://application.example.com/notifications/LocationNotification"
    },
    "checkImmediate": "true",
```

```
    "clientCorrelator": "0006",
    "criteria": "AllWithinDistance",
    "distance": "100",
    "frequency": "10",
    "monitoredAddress": [
        "tel:+19585550101",
        "tel:+19585550102",
        "tel:+19585550103"
    ],
    "referenceAddress": "tel:+19585550100",
    "resourceURL": "http://example.com/exampleAPI/location/v1/subscriptions/distance/sub123",
    "trackingAccuracy": "10"
}}
```

Response:

```
HTTP/1.1 200 OK
Content-Type: application/json
Content-Length: nnnn
Date: Thu, 04 Jun 2009 02:51:59 GMT

{"distanceNotificationSubscription": {
    "callbackReference": {
        "callbackData": "6666",
        "notifyURL": "http://application.example.com/notifications/LocationNotification"
    },
    "checkImmediate": "true",
    "clientCorrelator": "0006",
    "criteria": "AllWithinDistance",
    "distance": "100",
    "frequency": "10",
    "monitoredAddress": [
        "tel:+19585550101",
        "tel:+19585550102",
        "tel:+19585550103"
    ],
    "referenceAddress": "tel:+19585550100",
    "resourceURL": "http://example.com/exampleAPI/location/v1/subscriptions/distance/sub123",
    "trackingAccuracy": "10"
}}
```

D.25 Delete a distance notification subscription (section 6.8.6.1)

Request:

```
DELETE /exampleAPI/location/v1/subscriptions/distance/sub123 HTTP/1.1
Accept: application/json
Host: example.com
```

Response:

```
HTTP/1.1 204 No Content
Date: Thu, 04 Jun 2009 02:51:59 GMT
```

D.26 Circle area notification – one terminal (section 6.9.5.1)

Request:

```
POST /notifications/LocationNotification HTTP/1.1
Content-Type: application/json
Accept: application/json
Host: application.example.com
Content-Length: nnnn

{"subscriptionNotification": {
   "callbackData": "4444",
   "enteringLeavingCriteria": "Entering",
   "isFinalNotification": "false",
   "link": {
      "href": "http://example.com/exampleAPI/location/v1/subscriptions/area/circle/sub123",
      "rel": "CircleNotificationSubscription"
   },
   "terminalLocation": {
      "address": "tel:+19585550100",
      "currentLocation": {
         "accuracy": "100",
         "altitude": "1001.0",
         "latitude": "-80.86302",
         "longitude": "41.277306",
         "timestamp": "2011-06-02T00:27:23.000Z"
      },
      "locationRetrievalStatus": "Retrieved"
   }
}}
```

Response:

```
HTTP/1.1 204 No Content
Date: Thu, 04 Jun 2009 02:51:59 GMT
```

D.27 Periodic location notification – one terminal (section 6.9.5.2)

Request:

```
POST /notifications/LocationNotification HTTP/1.1
Content-Type: application/json
Accept: application/json
Host: application.example.com
Content-Length: nnnn

{"subscriptionNotification": {
   "callbackData": "1234",
   "isFinalNotification": "false",
   "link": {
      "href": "http://example.com/exampleAPI/location/v1/subscriptions/periodic/sub123",
      "rel": "PerodicNotificationSubscription"
   },
   "terminalLocation": {
      "address": "tel:+19585550100",
```

```
      "currentLocation": {
         "accuracy": "100",
         "altitude": "1001.0",
         "latitude": "-80.86302",
         "longitude": "41.277306",
         "timestamp": "2011-06-04T00:27:23.000Z"
      },
      "locationRetrievalStatus": "Retrieved"
   }
}}
```

Response:

```
HTTP/1.1 204 No Content
Date: Thu, 04 Jun 2009 02:51:59 GMT
```

D.28 Distance notification – one terminal (section 6.9.5.3)

Request:

```
POST /notifications/LocationNotification HTTP/1.1
Content-Type: application/json
Accept: application/json
Host: application.example.com
Content-Length: nnnn

{"subscriptionNotification": {
   "callbackData": "6666",
   "distanceCriteria": "AllBeyondDistance",
   "isFinalNotification": "false",
   "link": {
      "href": "http://example.com/exampleAPI/location/v1/subscriptions/distance/sub123",
      "rel": "DistanceNotificationSubscription"
   },
   "terminalLocation": {
      "address": "tel:+19585550100",
      "currentLocation": {
         "accuracy": "100",
         "altitude": "1001.0",
         "latitude": "-80.86302",
         "longitude": "41.277306",
         "timestamp": "2011-06-02T00:27:23.000Z"
      },
      "locationRetrievalStatus": "Retrieved"
   }
}}
```

Response:

```
HTTP/1.1 204 No Content
Date: Thu, 04 Jun 2009 02:51:59 GMT
```

D.29 Final periodic location notification (section 6.9.5.4)

Request:

```
POST /notifications/LocationNotification HTTP/1.1
Content-Type: application/json
Accept: application/json
Host: application.example.com
Content-Length: nnnn

{"subscriptionNotification": {
   "callbackData": "1234",
   "isFinalNotification": "true",
   "link": {
      "href": "http://example.com/exampleAPI/location/v1/subscriptions/periodic/sub123",
      "rel": "FinalDistanceNotificationSubscription"
   },
   "terminalLocation": {
      "address": "tel:+19585550100",
      "currentLocation": {
         "accuracy": "100",
         "altitude": "1001.0",
         "latitude": "-80.86302",
         "longitude": "41.277306",
         "timestamp": "2011-06-04T00:27:23.000Z"
      },
      "locationRetrievalStatus": "Retrieved"
   }
}}
```

Response:

```
HTTP/1.1 204 No Content
Date: Thu, 04 Jun 2009 02:51:59 GMT
```

D.30 Subscription cancellation notification (section 6.9.5.5)

Request:

```
POST /notifications/LocationNotification HTTP/1.1
Content-Type: application/json
Accept: application/json
Host: application.example.com
Content-Length: nnnn

{"subscriptionCancellationNotification": {
   "address": "tel:+19585550100",
   "callbackData": "6666",
   "link": {
      "href": "http://example.com/exampleAPI/location/v1/subscriptions/distance/sub123",
      "rel": "DistanceNotificationSubscription"
   },
   "reason": {
      "messageId": "SVC2002",
      "text": "Requested information not available for address %1.",
```

```
        "variables": "tel:+19585550100"
    }
}}
```

Response:

```
HTTP/1.1 204 No Content
Date: Thu, 04 Jun 2009 02:51:59 GMT
```

Appendix E. Parlay X operations mapping (Informative)

The table below illustrates the mapping between REST resources/operations and Parlay X [3GPP 29.199-9] equivalent operations.

REST Resource	REST Method	REST Section reference	Parlay X equivalent operation
Terminal location	GET	6.1.3	GetLocation GetLocationForGroup
Terminal distance	GET	6.2.3	GetTerminalDistance
Periodic location notification subscriptions	POST	6.3.5	StartPeriodicNotification
Individual periodic location notification subscription	PUT	6.4.4	StartPeriodicNotification
Individual periodic location notification subscription	DELETE	6.4.6	EndNotification
Area (circle) notification subscriptions	POST	6.5.5	StartGeographicalNotification
Area (circle) individual notification subscription	PUT	6.6.4	StartGeographicalNotification
Area (circle) individual notification subscription	DELETE	6.6.6	EndNotification
Distance notification subscriptions	POST	6.7.5	StartDistanceNotification
Distance individual notification subscription	PUT	6.8.4	StartDistanceNotification
Distance individual notification subscription	DELETE	6.8.6	EndNotification
Client notifications on terminal location changes	POST POST POST POST	6.9.5	LocationNotification DistanceNotification LocationEnd LocationError

Table 1 Parlay X operations mapping

Appendix F. Light-weight resources (Informative)

As this version of the specification does not define any light-weight resources, this appendix is empty.

Appendix G. Authorization aspects (Normative)

This appendix specifies how to use the RESTful Terminal Location API in combination with some authorization frameworks.

G.1 Use with OMA Authorization Framework for Network APIs

The RESTful Terminal Location API MAY support the authorization framework defined in [Autho4API_10].

A RESTful Terminal Location API supporting [Autho4API_10]:

- SHALL conform to section D.1 of [REST_NetAPI_Common];
- SHALL conform to this section G.1.

G.1.1 Scope values

G.1.1.1 Definitions

In compliance with [Autho4API_10], an authorization server serving clients requests for getting authorized access to the resources exposed by the RESTful Terminal Location API:

- SHALL support the scope values defined in the table below;
- MAY support scope values not defined in this specification.

Scope value	Description	For one-time access token
oma_rest_terminallocation.all_{apiVersion}	Provide access to all defined operations on the resources in this version of the API. The {apiVersion} part of this identifier SHALL have the same value as the “apiVersion” URL variable which is defined in section 5.1.This scope value is the union of the other scope values listed in next rows of this table.	No
oma_rest_terminallocation.poll	Provide access to all defined operations on poll terminal location and poll terminal distance.	No
oma_rest_terminallocation.subscr	Provide access to all defined operations on location subscriptions.	No

Table 2: Scope values for RESTful Terminal Location API

G.1.1.2 Downscoping

In the case where the client requests authorization for “oma_rest_terminallocation.all_{apiVersion}” scope, the authorization server and/or resource owner MAY restrict the granted scope to some of the following scope values:

- “oma_rest_terminallocation.poll”
- “oma_rest_terminallocation.subscr”

G.1.1.3 Mapping with resources and methods

Tables in this section specify how the scope values defined in section G.1.1.1 for the RESTful Terminal Location API map to the REST resources and methods of this API. In these tables, the root "oma_rest_terminallocation." of scope values is omitted for readability reasons.

Resource	URL Base URL: http://{serverRoot}/location/{apiVersion}	Section reference	HTTP verbs			
			GET	PUT	POST	DELETE
Terminal location	/location	6.1	**all_{apiVersion}** or **poll**	n/a	n/a	n/a
Terminal distance	/distance	6.2	**all_{apiVersion}** or **poll**	n/a	n/a	n/a

Table 3: Required scope values for: poll terminal location and poll terminal distance

Resource	URL Base URL: http://{serverRoot}/location/{apiVersion}	Section reference	HTTP verbs			
			GET	PUT	POST	DELETE
Periodic location notification subscriptions	/periodic	6.3	**all_{apiVersion}** or **subscr**	n/a	**all_{apiVersion}** or **subscr**	n/a
Individual periodic location notification subscription	/periodic/{subscriptionId}	6.4	**all_{apiVersion}** or **subscr**	**all_{apiVersion}** or **subscr**	n/a	**all_{apiVersion}** or **subscr**
Area (circle) notification subscriptions	/area/circle	6.5	**all_{apiVersion}** or **subscr**	n/a	**all_{apiVersion}** or **subscr**	n/a
Area (circle) individual notification subscription	/area/circle/{subscriptionId}	6.6	**all_{apiVersion}** or **subscr**	**all_{apiVersion}** or **subscr**	n/a	**all_{apiVersion}** or **subscr**
Distance notification subscriptions	/distance	6.7	**all_{apiVersion}** or **subscr**	n/a	**all_{apiVersion}** or **subscr**	n/a

Distance individual notification subscription	/distance/{subscriptionId}	6.8	**all_{apiVersion}** or **subscr**	**all_{apiVersion}** or **subscr**	n/a	**all_{apiVersion}** or **subscr**

Table 4: Required scope values for: location subscriptions