Location in SIP/IP core Requirements

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Open Mobile Alliance

OMA-RD-LOCSIP-V1_0-20120117-A

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1. Scope (Informative)

The scope of the document is to identify the use cases and requirements for LOCSIP enabler, taking into considerations the demands of end-users, service providers, and system implementers.

2. References

2.1 Normative References

[RFC2119]	"Key words for use in RFCs to Indicate Requirement Levels", S. Bradner, March 1997, URL:http://www.ietf.org/rfc/rfc2119.txt
[PRIVACY RD]	Privacy Requirements for Mobile Services: Open Mobile Alliance™, OMA-RD-Privacy-V1.0.1, URL:http://www.openmobilealliance.org/
[IMSARCH]	IMS in OMA Architecture Document: Open Mobile Alliance™, OMA-AD-IMS-V1_0, URL:http://www.openmobilealliance.org/
[RFC4119]	"Presence-based GEOPRIV Location Object Format", J. Peterson, Dec. 2005, RFC 4119, URL: http://www.ietf.org/rfc/rfc4119.txt
[RFC5139]	"Revised Civic Location Format for Presence Information Data Format Location Object (PIDF-LO)", M. Thomson J. Winterbottom February 2008, RFC 5139, URL: http://www.ietf.org/rfc/rfc5139.txt
[RFC5491]	"GEOPRIV Presence Information Data Format Location Object (PIDF-LO) Usage Clarification, Considerations, and Recommendations", J. Winterbottom M. Thomson H. Tschofenig, March 2009, RFC 5491, URL: http://www.ietf.org/rfc/rfc5491.txt

2.2 Informative References

[OMADICT]	"Dictionary for OMA Specifications", Version 2.8, Open Mobile Alliance™, OMA-ORG-Dictionary-V2_8, URL:http://www.openmobilealliance.org/
[RFC 3261]	"Session Initiation Protocol (SIP) " URL: http://www.ietf.org/rfc/rfc3261.txt
[SUPL 2.0 AD]	" Secure User Plane Location Architecture", Open Mobile Alliance™, OMA-AD-SUPL-V2_0 URL: http://www.openmobilealliance.org/
[3GPP TS 23.271]	"3rd Generation Partnership Project; Technical Specification Group Services and Systems Aspects; Functional stage 2 description of LCS" URL: http://www.3gpp.org/ftp/Specs/latest/Rel-8/23_series/

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

Civic address	Description of a location by means of e.g. Street name, Street number, Town and Country.
Commercial Services	LOCSIP location requests to support a commercial offering.
Emergency Services	LOCSIP location requests that support an emergency services communication.
Location Server	Functional entity that handles location service subscription request and retrieves the location information of the target.
Location Client	Functional entity that subscribes to an Location Server in order to obtain location information for one or more targets.
PoC Server	The PoC Server implements the 3GPP IMS and 3GPP2 MMD application level network functionality for the PoC Service.
Presence Service	The capability to support management of Presence Information between Watchers and Presentities, in order to enable applications and services to make use of Presence Information.
Presence Information	Dynamic set of information pertaining to a Presentity that may include presence elements such as the status, reachability, willingness, and capabilities of that Presentity.
Target	The device or the user associated with a device whose location is requested.

3.3 Abbreviations

IP	Internet Protocol
OMA	Open Mobile Alliance
GMLC	Gateway Mobile Location Center
LOCSIP	Location in SIP/IP Core
SIP	Session Initiation Protocol
SLP	SUPL Location Platform
UE	User Equipment
VoIP	Voice over IP

4. Introduction (Informative)

The Location Service in SIP/IP core network (LOCSIP) provides a SIP based interface to expose the location information of targets.   The location information may be processed and utilized by other applications or enablers in the SIP/IP core network to enrich the end user experience. Examples of enablers that may utilize location information are Presence and PoC.

 Position determination functionalities are out of scope of LOCSIP. It is assumed that positioning determination is performed by other enablers such as OMA SUPL.

LOCSIP will support both Commercial Services and Emergency Services location requests.

5. Use Cases   (Informative)

5.1   Immediate Location Delivery

5.1.1   Short Description

This use case shows how a Location Client in a VoIP SIP Application Server requests location information of a user and uses location to apply the location based charging; VoIP SIP Application server may send an advice of charging to a call originator.

5.1.2   Actors

- Ally – Wishing to set up an Telephone call to Bent using her location dependent tariff plan

- Bent – Receiver of the call

- VoIP provider running VoIP SIP Application Server.

- Location Server

5.1.2.1   Actor Specific Issues

The VoIP provider needs more flexibility on applying charging to his customers, making available at SIP/IP core network level customers location information. This emulates legacy PSTN tariffs and reduces tariffs for mobile calls made at home.

5.1.2.2   Actor Specific Benefits

The VoIP provider may apply charging depending on location of the originator/receiver of the call.

5.1.3   Pre-conditions

The VoIP SIP Application Server is authorized to retrieve location information on Ally and Bent from the Location Server.

5.1.4   Post-conditions

The VoIP SIP Application Server has received location information on Ally and Bent and has used it for location-based charging.

5.1.5   Normal Flow

1) Ally initiates a Call to Bent with her VoIP provider. The VoIP provider has a tariff plan that depends on the location of Bent and Ally.

2) The VoIP SIP Application Server receives a call request from Ally. The Server determines the need of location information in terms of accuracy, delivery time and age of information. It then submits a request for such location information on Ally and Bent to the Location Server.

3) The Location Server receives the request for location information. It checks that the VoIP SIP Application Server is authorized to receive this information and then utilizes underlying positioning mechanisms to determine the location of Ally and Bent.

4) The Location Server returns the location of Ally and Bent to the VoIP SIP Application Server.

5) The VoIP SIP Application Server sets up the call applying the location-based charging. This may include sending an advice of charging to Ally.

5.1.6   Alternative Flow

1) At step 3 in Normal Flow the underlying positioning mechanisms is unable to determine location with requested accuracy.

2) The Location Server returns the best available location of Ally and Bent to the VoIP SIP Application Server.

3) The VoIP SIP Application Server has applied the location-based charging.

5.1.7   Operational and Quality of Experience Requirements

By allowing expression of QoS parameters for the requested location information the Quality of Experience to cost ratio can be optimized.

5.2   Periodic Location Delivery

5.2.1   Short Description

This use case shows how a Location Client in a presence SIP Application Server subscribes to periodic notification of location information group defined by a Presence user. For the sake of simplicity, we suppose that all the users are customers of the same Presence Service provider.

5.2.2   Actors

* Ally – Wanting to have her Presence application to show the location of the members of her buddy list

* Presence service

* Location Server

5.2.2.1   Actor Specific Issues

Ally has subscribed to a presence service with a guaranteed maximum age of the location information.

5.2.2.2   Actor Specific Benefits

Ally gets timely updated location information of her buddies at reasonable cost.

The Location Server can optimize resource usage by not having to receive and interpret a subscription for each positioning.

5.2.3   Pre-conditions

The presence service is authorized to retrieve location information on the members of Ally's buddy list.

5.2.4   Post-conditions

The Presence service has received location information during the time period it subscribed to it.

5.2.5   Normal Flow

1) Ally starts her presence service on her terminal.

2) The presence service subscribes to the location information of the group defined by Ally's buddy list. The Presence Service specifies the required accuracy and interval.

3) The Location Server receives the subscription for location information. It checks that the presence service and Ally are authorized to receive this information and then it utilizes underlying positioning mechanisms to determine location of the buddies.

4) The Location Server notifies periodically the presence service of the location of buddies.

5) The presence service sends periodic location information to Ally as Presence information.

6) Ally closes her presence service on her terminal.

7) The presence service unsubscribes to the Location Server.

5.2.6   Alternative Flow

1) The Location Server is unable to position one of the targets (i.e. buddies).

2) The Location Server sends an error indication instead of location information to the presence service for that target.

3) The presence service informs Ally that the location of the specific target is unknown.

5.2.7   Operational and Quality of Experience Requirements

By allowing subscription with periodic notification the presence service does not have to implement timers.

5.3   Area Trigger Location Delivery

5.3.1   Short Description

This use case shows how a Location Client in a PoC Server subscribes to be notified when a target that is member of a group moves inside or outside a geographical area.

Note that this Use Case is not intended as an description of how PoC or other enabler are defined.

5.3.2   Actors

- Technician A – Works in a large industry plant and wants the help of a colleague but only if someone happens to be close.

- Technician B – Is close to A.

- Technician C – Is close to A but is driving to another part of the plant

- PoC Server

- Location Server

5.3.2.1 Actor Specific Issues

Technician A has defined a group list for his PoC service that includes a rule that only colleagues that are within 500 m shall be called.

5.3.2.2 Actor Specific Benefits

Technician A can call a close colleague for help without disturbing the other colleagues.

5.3.3 Pre-conditions

The Location Client in PoC server is authorized to retrieve location information on the members of the group list of technician A.

5.3.4 Post-conditions

The PoC session with the closest colleagues in the group list is established.

5.3.5 Normal Flow

1) Technician A requests a PoC session to the group "nearby colleagues" from his terminal.

2) The PoC server checks who is available among the colleagues.

3) The PoC server then subscribes to the Location Server to get notification about who, among the colleagues, is available within an area of 500 m from a position that corresponds to the location of technician A.

4) The Location Server returns to the PoC Server that Technician B and C are within that area and the PoC Server sends a session invitation to Technicians B and C.

5) A multiparty PoC session is set up between Technicians A, B and C.

6) Technician C moves outside the area defined in the subscription.

7) PoC Server gets notified from Location Server that Technician C has left the area.

8) Technician C is removed from the session.

9) The PoC session is closed by technician A.

10) The PoC Server unsubscribes to the Location Server.

5.3.6 Alternative Flow

N/A

5.3.7 Operational and Quality of Experience Requirements

By allowing subscription with Area Event the task of checking the area condition can be delegated to the Location Server.

5.4   Area Trigger Location Delivery – Find Friends

5.4.1   Short Description

This use case shows how a Location Client residing in a UE subscribes to be notified when any target of a group moves inside or outside a geographical area.

5.4.2   Actors

- Student A – Goes to school on a large campus and wants help from the nearest classmate.

- Student B – Is close to Student A.

- Student C – Is close to A but is walking to another part of the campus.

- Location Server

- UE comprising a Location Client

5.4.2.1   Actor Specific Issues

Student A has defined a group list in her UE that includes a rule to be notified when classmates are within 500 m of Student A's location.

5.4.2.2   Actor Specific Benefits

Student A can contact close by students for help without disturbing students who are far away.

5.4.3   Pre-conditions

The UE is authorized to retrieve location information on the members of the classmate group list of student A.

5.4.4   Post-conditions

The UE displays the location of the closest student, Student B.

5.4.5   Normal Flow

1) Student A initiates a query to the UE for the group "nearby student friends".

2) The UE checks which of the student friends are available.

3) The UE then subscribes to the location server for notification of the available student friends who are within an area of 500 m from a position that corresponds to the location of Student A.

4) The UE gets a notification that Student B and Student C are within the area.

5) While Student A ponders who to contact, the UE receives notification that Student C has left the area.

6) Student A sends an SMS to Student B and walks to Student B based on the location displayed on the UE.

5.4.6   Alternative Flow

N/A

5.4.7   Operational and Quality of Experience Requirements

By allowing a subscription with an Area Event, the task of checking the area condition can be delegated to the location server.

6. Requirements   (Normative)

6.1   High-Level Functional Requirements

Label	Description	Enabler Release
HLFR-01	LOCSIP SHALL support immediate location request (i.e. fetching location of target UE), which is a one time polling of target UE's location.	LOCSIP V1.0
HLFR-02	LOCSIP SHALL support subscription based request so that notifications are sent periodically with a specified period.	LOCSIP V1.0
HLFR-03	LOCSIP SHALL support subscription based request, specifying filter conditions for notification triggers, so that notifications are sent to the requester when the conditions in the notification triggers occur.	LOCSIP V1.0
HLFR-04	LOCSIP SHALL support filter conditions for notification contents such as accuracy, response time, age of location, etc.	LOCSIP V1.0
HLFR-05	The Location Client SHALL be able to request the location information for a pre defined list of targets.	LOCSIP V1.0
HLFR-06	The Location Client MAY be able to request the location information for a request-contained list of targets.	LOCSIP V1.0
HLFR-07	The Location service subscription SHALL have an expiration time. The subscription is terminated upon expiration.	LOCSIP V1.0
HLFR-08	LOCSIP SHALL allow Location Client to renew the service subscription before its expiration.	LOCSIP V1.0
HLFR-09	LOCSIP SHALL inform the location client upon termination of location subscription.	LOCSIP V1.0
HLFR-10	LOCSIP SHALL provide the mechanism to cancel subscriptions (both for periodic and condition-based subscriptions).	LOCSIP V1.0
HLFR-11	LOCSIP SHALL provide location information together with timestamp.	LOCSIP V1.0
HLFR-12	LOCSIP SHALL support geographic location information in a format compliant to RFC 4119 [RFC4119] and to RFC 5491 [RFC5491].	LOCSIP V1.0
HLFR-13	LOCSIP MAY support location information in civic address format compliant to RFC 4119 [RFC4119] and RFC 5139 [RFC5139].	LOCSIP V1.0
HLFR-14	LOCSIP MAY support filter condition for event "target has moved a specific distance", if supported by the underlying positioning mechanism.	LOCSIP V1.0
HLFR-15	LOCSIP MAY support a filter condition for event "target enters or exits certain geographical area", if supported by the underlying positioning mechanism.	LOCSIP V1.0
HLFR-16	LOCSIP MAY support a filter condition for event "change of civic address" , if supported by the underlying positioning mechanism.	LOCSIP V1.0
HLFR-17	LOCSIP MAY support a filter condition for event "one or more of a list of targets are inside or outside a specified distance from a specified target" if supported by the underlying positioning mechanism.	LOCSIP V1.0
HLFR-18	LOCSIP SHALL support targets belonging to external domains.	LOCSIP V1.0

| HLFR-19 | LOCSIP SHALL support groups and resource lists that include targets belonging to different domains. | LOCSIP V1.0 |
| HLFR-20 | The LOCSIP SHALL not limit the technology of the access network, as well as the positioning determination technology. | LOCSIP V1.0 |

Table 1: High-Level Functional Requirements

6.1.1   Security

6.1.1.1   Authentication

Label	Description	Enabler Release
AUTHE-01	LOCSIP SHALL support mutual authentication for the Location Client and Location Server	LOCSIP V1.0

Table 2: High-Level Functional Requirements – Authentication Items

6.1.1.2   Authorization

Label	Description	Enabler Release
AUTHO-01	LOCSIP SHALL only allow authorized Location Clients to access the service.	LOCSIP V1.0
AUTHO-02	LOCSIP SHALL support a mechanism to manage policies that defines what information a Location Client is authorized to receive for each target.	LOCSIP V1.0
AUTHO-03	LOCSIP SHALL obey the target policy when delivering location information.	LOCSIP V1.0

Table 3: High-Level Functional Requirements – Authorization Items

6.1.1.3   Data Integrity

Label	Description	Enabler Release
INT-01	LOCSIP SHOULD be able to provide data integrity, protecting against accidental or intentional changes to the data, by ensuring that changes to the data are detectable. For location information the data integrity applies between Location Server and Location Client.	LOCSIP V1.0

Table 4: High-Level Functional Requirements – Data Integrity Items

6.1.1.4   Confidentiality

Label	Description	Enabler Release
CONF-01	LOCSIP SHOULD support data confidentiality between Location Server and Location Client that ensures that location information is not made available or disclosed to unauthorised individuals, entities, or processes.	LOCSIP V1.0

Table 5: High-Level Functional Requirements – Confidentiality Items

6.1.2   Charging

Label	Description	Enabler Release
CHG-01	LOCSIP SHALL support the use of the Offline Charging mechanism. (E.g. facilitates post-paid charging, or other payment schemes where credit authorization prior to service delivery is not needed.)	LOCSIP V1.0
CHG-02	LOCSIP SHALL support the use of the Online Charging mechanism. (E.g. facilitates pre-paid charging, or other payments schemes, such as implementing a credit threshold for post-paying user.)	LOCSIP V1.0

CHG-03	LOCSIP SHALL support charging on following aspects or features:
	
	   – Delivery of location information
	   – Request for delivery of location information
	
	   – The number of targets for which the location is requested
		LOCSIP V1.0

CHG-04	LOCSIP SHALL provide:
	
	   - Identification of the service provided
	
	   - Means for identification of the user using the service
		LOCSIP V1.0

CHG-05	LOCSIP MAY provide
	
	   - Information for enabling correlation between charging information generated by LOCSIP and charging information generated by other entities involved in the service delivery
	
	   - Identification of the party to be charged for
		LOCSIP V1.0

CHG-06	LOCSIP SHALL provide all the necessary information for rating the charging events.	LOCSIP V1.0

Table 6: High-Level Functional Requirements – Charging Items

6.1.3   Administration and Configuration

Label	Description	Enabler Release
ADM-01	LOCSIP SHALL allow a service provider to manage the service subscription.	LOCSIP V1.0
ADM-02	LOCSIP MAY allow users to configure a service specific group list which represent multiple targets.	LOCSIP V1.0
ADM-03	LOCSIP MAY allow users to configure location specific policy settings.	LOCSIP V1.0

Table 7: High-Level Functional Requirements – Administration and Configuration Items

6.1.4   Privacy

Label	Description	Enabler Release
PRIV-01	LOCSIP SHALL fulfil requirements in [PRIVACY RD].	LOCSIP V1.0
PRIV-02	LOCSIP SHALL fulfil local, national and regional privacy regulations.	LOCSIP V1.0
PRIV-03	LOCSIP SHALL provide means to the UE subscriber to control privacy preferences.	LOCSIP V1.0
PRIV-04	Target SHALL be positioned only if it is permitted in the subscriber profile. In the absence of the permission the target SHALL not be positioned by default.	LOCSIP V1.0
PRIV-05	LOCSIP SHALL support conditional privacy checking based on target subscriber preferences (e.g. actual position, time of the day, VAS, real-time authorisation...)	LOCSIP V1.0
PRIV-06	The privacy checking SHALL be done in the home network of the target.	LOCSIP V1.0

Table 8: High-Level Functional Requirements – Privacy Items

6.1.5   Emergency Services

Label	Description	Enabler Release
EMER-01	LOCSIP SHALL support Emergency Services location requests where applicable by local regulatory requirements.	LOCSIP V1.0
EMER-02	It SHALL be possible to have Emergency Services location requests take a higher priority than Commercial Services requests.	LOCSIP V1.0

Table 9: High-Level Functional Requirements – Privacy Items

6.2   Overall System Requirements

Label	Description	Enabler Release
SYS-01	The application protocol SHALL be based on SIP [IMSARCH].	LOCSIP V1.0
SYS-02	LOCSIP SHALL reuse existing standard protocols and data formats to the extent possible.	LOCSIP V1.0
SYS-03	LOCSIP SHALL treat the SIP/IP Core Network [IMSARCH], as a network capability providing IP transport, authentication and routing.	LOCSIP V1.0
SYS-04	LOCSIP MUST be able to interface to the SIP/IP Core Network [IMSARCH].	LOCSIP V1.0
SYS-05	The supported network interfaces SHALL be suitable for a variety of other enablers or applications e.g. Presence and POC to access the Location Server.	LOCSIP V1.0
SYS-06	LOCSIP SHALL allow a Location Client to reside within an SIP Application Server.	LOCSIP V1.0
SYS-07	LOCSIP SHALL allow a Location Client to reside within a terminal.	LOCSIP V1.0

Table 10: High-Level System Requirements

Appendix A.　　Change History　　　　　　　　　　　(Informative)

A.1　　Approved Version History

Reference	Date	Description
OMA-RD-LOCSIP-V1_0	17 Jan 2012	No prior version