



# **Mobile Location Service Architecture**

## **Candidate Version 1.2 – 27 Jun 2008**

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**Open Mobile Alliance**  
OMA-AD-MLS-V1\_2-20080627-C

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# 1. Scope

**(Informative)**

This document is the AD for the Mobile Location Service V1.2 (MLS V1.2), which consists of the Mobile Location Protocol (MLP) and Roaming Location Protocol (RLP).

Relative MLS V1.1 following functions are added:

- support of 3GPP Release 7 LCS Specification
- support of OMA SUPL V2.0
- support of the L3 interface in “TIA/EIA-41-D Location Services Enhancements”
- support of multiple responses with increasing accuracy to a location request
- support of capability to stop reporting for individual targets for a Triggered Location Reporting Request that included more than one target.
- support of civic address formats.

Relative MLS V1.1 following function is removed:

- The protocol specification for reference points Lid and Lpp is removed. The system entity PCE is thus not defined in MLS V1.2.

## 2. References

### 2.1 Normative References

- [OSE] “OMA Service Environment”, Open Mobile Alliance™, OMA-AD-Service\_Environment-V1\_0\_4, 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>
- [23.271 Rel-7] “Location Services (LCS); Service description; Stage 1”, 3GPP TS 23.271 Release 7, URL:[http://www.3gpp.org/ftp/Specs/latest/Rel-7/23\\_series/](http://www.3gpp.org/ftp/Specs/latest/Rel-7/23_series/)
- [MLP 3.3] “Mobile Location Protocol v3.2”, Open Mobile Alliance™, OMA-TS-MLP-V3\_2, URL: <http://www.openmobilealliance.org/>
- [MLS 1.2 RD] “Mobile Location Service Requirements”, Open Mobile Alliance™, OMA-RD-MLS-V1\_0, URL: <http://www.openmobilealliance.org/>
- [PRIVACY RD] “Privacy for Mobile Services Requirements”, Open Mobile Alliance™, OMA-RD-Privacy-V1\_0, URL: <http://www.openmobilealliance.org/>
- [RFC 2616] “Hypertext Transfer Protocol –HTTP/1.1” IETF, June 1999. URL: <http://www.ietf.org/rfc/rfc2616.txt>
- [RFC2119] “Key words for use in RFCs to Indicate Requirement Levels”, S. Bradner, March 1997, URL: <http://www.ietf.org/rfc/rfc2119.txt>
- [RLP 1.1] “Roaming Location Protocol v1.0”, Open Mobile Alliance™, OMA-TS-RLP-V1\_0, URL: <http://www.openmobilealliance.org/>
- [SUPL 2.0 RD] “Secure User Plane Location Requirements”, Open Mobile Alliance™, OMA-RD-SUPL-V2\_0 URL: <http://www.openmobilealliance.org/>
- [SUPL 2.0 AD] “Secure User Plane Location Architecture”, Open Mobile Alliance™, OMA-AD-SUPL-V2\_0 URL: <http://www.openmobilealliance.org/>
- [WSDL] Web Services Description Language 1.1, W3C Note, 15 March 2001, URL: <http://www.w3.org/TR/wsdl>
- [3GPP2 X.S0002-0 V2.0] “MAP Location Services Enhancements”, Version 2.0, May 2006 URL: [http://www.3gpp2.org/Public\\_html/specs/X.S0002-0\\_v2.0\\_060531.pdf](http://www.3gpp2.org/Public_html/specs/X.S0002-0_v2.0_060531.pdf)

### 2.2 Informative References

- [OMA-DICT] “OMA Dictionary”, OMA-Dictionary-V2\_6, 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

<b>Interface</b>	See [OMA-DICT].
<b>Location Privacy Checking Entity</b>	The Location Privacy Checking Entity is responsible for resolving IDs and for privacy checking. In 3GPP context this corresponds to the Privacy Profile Register (PPR). The PPR may be a part of the GMLC.
<b>Location Server</b>	Software and/or hardware entity offering location capabilities. In 3GPP context this corresponds to the Gateway Mobile Location Center (GMLC).
<b>MLS client</b>	Software and/or hardware entity requesting location. In 3GPP context this corresponds to the LoCation Services client (LCS Client).
<b>Mobile Location Service</b>	A service with location capability
<b>Reference Point</b>	See [OMA-DICT].
<b>SUPL Enabled Terminal (SET)</b>	A device that is capable of communicating with a SUPL network. Examples of this could be a UE in UMTS, a MS in GSM or IS-95, or a PC over an IP-based transport.
<b>SUPL Location Platform (SLP)</b>	Entity responsible for SUPL Service Management and Position Determination. SLP contains the SLC and SPC Functions.
<b>SUPL Provider</b>	Mobile Network Operator, provides location assistance data to the SUPL Agent and optionally calculates the SET location. See also SUPL 2.0 RD
<b>Civic address</b>	Description of a location by means of e.g. Street name, Street number, Town and Country.

### 3.3 Abbreviations

<b>3GPP</b>	3rd Generation Partnership Project
<b>AD</b>	Architecture Document
<b>GPS</b>	Global Positioning System
<b>GSM</b>	Global System for Mobile Communication
<b>HTTP</b>	Hyper Text Transport Protocol
<b>IP</b>	Internet Protocol
<b>LCS</b>	LoCation Service
<b>LS</b>	Location Server
<b>MLP</b>	Mobile Location Protocol
<b>MLS</b>	Mobile Location Service
<b>MS</b>	Mobile Station
<b>OMA</b>	Open Mobile Alliance

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<b>PCE</b>	Location Privacy Checking Entity
<b>PCP</b>	Location Privacy Checking Protocol
<b>RD</b>	Requirement Document
<b>RLP</b>	Roaming Location Protocol
<b>SET</b>	SUPL Enabled Terminal
<b>SLC</b>	SUPL Location Center
<b>SLP</b>	SUPL Location Platform
<b>SPC</b>	SUPL Positioning Center
<b>SUPL</b>	Secure User Plane Location
<b>TS</b>	Technical Specification
<b>UE</b>	User Equipment
<b>UMTS</b>	Universal Mobile Telecommunication System
<b>XML</b>	Extensible Markup Language

## 4. Introduction (Informative)

The OMA Mobile Location Service V1.2 (MLS V1.2) consists of a set of location specifications complying with 3GPP Release 7 LCS Specification [23.271 Rel-7]. The set of specifications in MLS V1.2 consist of MLP V3.3 [MLP 3.3] and RLP V1.1 [RLP 1.1].

MLP describes the protocol between an MLS client and the LS. In the 3GPP context, MLP was chosen to be an instantiation of the stage 3 specification for the Le reference point [23.271 Rel-7].

RLP describes the protocol between two LS. In the 3GPP context, RLP will be an instantiation of the stage 3 specification for the Lr reference point [23.271 Rel-7]. Additionally, RLP will be an instantiation of the reference point Lr as defined in [SUPL 2.0 AD] between two SLPs with the purpose to transport information between SLPs to enable positioning of roaming SUPL Enabled Terminals [SUPL 2.0 RD]. Examples of such information are coarse position used when generating GPS assistance data or the actual GPS assistance data.

The Lid/Lpp reference points as defined in [23.271 Rel-7] do not have any instantiation in MLS V1.2. The OMA Mobile Location Service V1.2 (MLS V1.2) will benefit the industry widely and not only 3GPP and more requirements have been added as needed for wireless technologies besides GSM and UMTS. One example of such an added requirement is the support of L3 interface in “TIA/EIA-41-D Location Services Enhancements” [3GPP2 X.S0002-0 V2.0].

Figure 1 shows an architectural diagram of MLS, its components and interfaces.

Figure 2 shows an architectural diagram of relevant components and interfaces in SUPL.

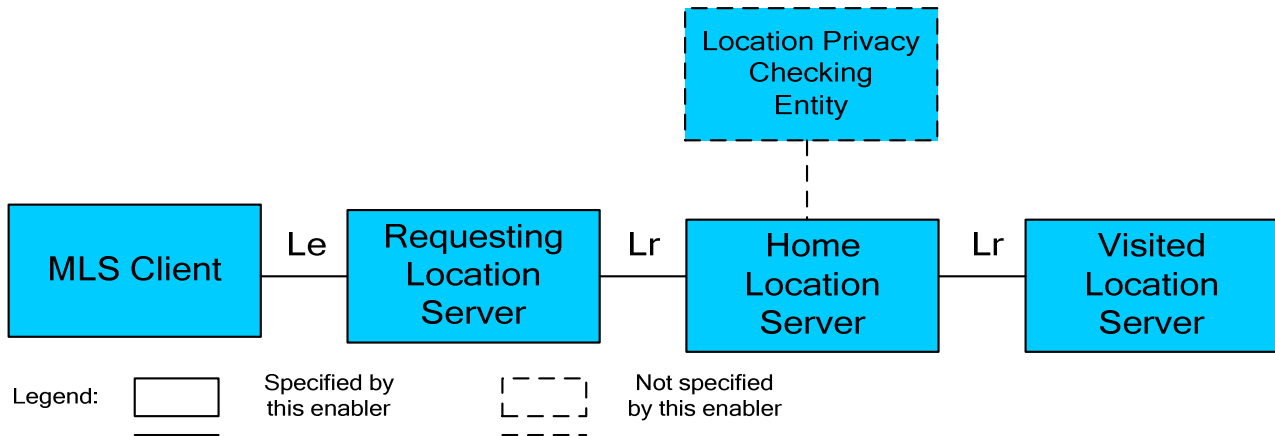


Figure 1: Architectural diagram of MLS

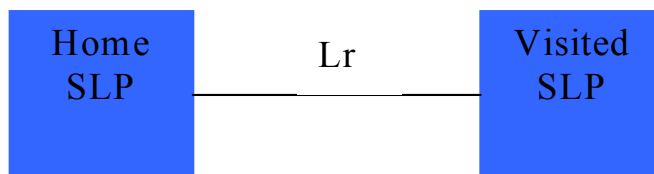


Figure 2: Relevant Reference Points in SUPL



## 4.1 Planned Phases

MLS V1.2 is an evolution of MLS V1.1. The functional additions are:

- support of 3GPP Release 7 LCS Specification
- support of OMA SUPL V2.0
- support of the L3 interface in “TIA/EIA-41-D Location Services Enhancements”
- support of multiple responses with increasing accuracy to a location request
- support of the capability to stop the location reporting for individual targets of a Triggered Location Reporting Request that included more than one target.
- Support of civic address formats.

The above functional additions do not influence the architecture.

Relative to MLS V1.1 the protocol specification for reference points Lid and Lpp is removed. The system entity PCE and reference points Lid and Lpp will thus not be defined in MLS V1.2.

Apart from “PCP specific” requirements, MLS V1.2 is expected to fulfill all the currently defined requirements and thus no further versions of MLS are currently planned. It is however foreseen that evolution on the location specifications supported may create a need for further releases in the future.

## 4.2 Security Considerations

MLS V1.2 does not introduce any new interfaces or mechanisms that require any modification of the security mechanisms defined in MLS V1.1

## 5. Architectural Model

The Architectural model of MLS V1.2 is described in [23.271 Rel-7]. The Architectural model described in [23.271 Rel-7] is summarised in [Figure 1] in section 4.

### 5.1 Dependencies

MLS V1.2 has no dependencies to other architectures in OMA.

### 5.2 Architectural Diagram

The architecture for MLS V1.2 is described in [23.271Rel-7] section 6.

### 5.3 Functional Components and Interfaces

The Architecture of MLS V1.2 as described in [23.271 Rel-7] section 6 defines four reference points Le, Lr, Lpp and Lid. Two of these referencepoints are instantiated by two OMA protocol specifications as listed below.

- Reference point Le is instantiated by MLP [MLP 3.3]. MLP is defined using XML transported over HTTP [RFC 2616].
- Reference point Lr is instantiated by RLP [RLP 1.1]. RLP is defined using XML transported over HTTP [RFC 2616].

Reference points Lpp and Lid are not instantiated in MLS V1.2.

The Architecture of MLS V1.2 as described in [23.271 Rel-7] section 6 also describes the components in the architecture as shown in [Figure 1] in section 4. The components are:

- MLS Client that is described in [23.271 Rel-7] section 6.3.2
- Requesting Location Server, Home Location Server and Visited Location Server that are described in [23.271Rel-7] section 6.3.3

For the transport of MLP and RLP over HTTP the following mechanism applies. All Location Services are invoked by sending a request using HTTP POST. The answer to the invocation of a Location Service is returned using an HTTP response. If the MLS Client requests standard location of asynchronous mode, triggered or periodic reporting of location, the Location Server will, in addition to the answer returned in a HTTP response, return one or more reports by performing HTTP POST operations towards the client. The client must specify the URI that the report should be posted to. This is done in the service request or by having it in the LCS client profile that can be stored in the Location Server.

### 5.4 Flows

The flows for MLS V1.2 are described in [23.271 Rel-7] section 9.

## Appendix A. Change History

(Informative)

### A.1 Approved Version History

Reference	Date	Description
n/a	n/a	

### A.2 Draft/Candidate Version V1.2 History

Document Identifier	Date	Sections	Description
Draft Versions OMA-AD-MLS-V1_2	07 Dec 2006	n/a	First draft based on content of OMA-AD-MLS-V1_1-20060724-C with following changes: - Content moved to latest template - MLS V1.1 changed to MLS V1.2 where appropriate - Scope of MLS 1.2 and differences relative MLS 1.1 are to be defined. - Sections 4.1 and 4.2 left empty
	15 Jun 2007	1, 2, 3.2, 4, 5	- Implemented approved CR: OMA-LOC-2007-0174- CR_MLS_1_2_AD_NewTemplateAndRequirements - Applied new template
	22 Oct 2007	1,2.1,3.3,4, 5.3	- Implemented approved CR: OMA-LOC-2007-0375R01-CR_MLS_1_2_AD_RemovePCP
	31 Mar 2008	2.2, 3.2, 3.3, 4.1, 4.2, 5.3	Editorial correction applied to resolved comments from consistency review.
Candidate Version OMA-AD-MLS-V1_2	27 Jun 2008	n/a	Status changed to Candidate by TP TP ref#: OMA-TP-2008-0221- INP_LOC_MLS_V1.2_for_Candidate_Approval