Secure User Plane Location Requirements

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1. Scope   (Informative)

This document describes the requirements of the Secure User Plane for Location (SUPL).

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

2.2   Informative References

[3GPP2]   SR0066-0 "IP Based Location Services"

                                 URL: http://www.3gpp2.org/Public_html/specs/S.R0066-0_v1.0_110703.pdf

[22.071]   3GPP TS 22.071: "Location Services (LCS); Service description, Stage 1".

[23.271]   3GPP TS 23.271: "Functional stage 2 description of LCS"

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

AFLT	Advanced Forward Link Trilateration
CAMEL	CAMEL is a network functionality, which provides the mechanisms of Intelligent Network to a mobile user (See [23.271]).
Cell Global Identifier	Refers to the cell used by the Mobile Station at the start of the call. (See [23.271]).
Control Plane	The Control Plane is a functional plane containing the signalling structure for the user bearer management. Typically the control plane designates the circuit switched and packet switched wireless signalling networks which enable voice, data, supplementary service operation, etc.
E-CI	Enhanced Cell-ID
GMLC	The Gateway Mobile Location Center (GMLC) contains functionality required to support LCS. In one PLMN, there may be more than one GMLC (See [23.271]).
LAN	Local area network
LCS	Provides the mechanisms to support mobile location services for operators, subscribers and third party service providers (See [23.271]).
Lg	Interface between Gateway MLC - VMSC, GMLC - MSC Server, GMLC - SGSN (gateway MLC interface) (See [23.271]).
Location Server	Software and/or hardware entity offering location capabilities.
Lr	Interface between Gateway MLCs (See [23.271]).
MLS application	An application which requests and consumes the location information. *Note: this could be further qualified by distinguishing the application provider and actually application consumer of the location information*
SUPL Agent classes	Classifies the deployment architecture of SUPL Agent and MLS application.
MLS application and SUPL Agent classes	MLS Application and SUPL Agent can be classified as follows: - Class1: MLS application and SUPL Agent are in the SET - Class 2: MLS application is in the network and the SUPL Agent is in the SET - Class 3: MLS application is in the SET and SUPL Agent is in the network - Class 4: MLS application and the SUPL Agent are in the network
Network specific parameter	Parameters, extracted from the mobile network, which can be used in a Position Calculation function.
Policy Owner	The privacy policy owner of the SET. Defines/configures the privacy rules to which the MLS apllications will comply to.
Security Function	Security function manages the Authentication and Authorization for SUPL Agents and MLS Applications to access User Plane Location Services *Note: Authentication between the SUPL Agent and MLS applications is beyond the scope of this work*
SUPL Agent	Service access point which accesses the network resources to obtain location information
SUPL Enabled Terminal (SET)	A device that is capable of communicating with a SUPL network using the SUPL interface. Examples of this could be a UE in UMTS, an MS in GSM or CDMAIS-95, or a PC over an IP-based transport
SUPL Provider	Location information is sensitive personal information and requires specific care with privacy and security. The bearer related information (like e.g. "Global Cell Identifier") should not be accessible without the network provider's consent. So it is important that whatever policy the network provider decides, when applicable on the provision of SUPL, functionality cannot be breached. Valid scenarios would be: 1) The network provider is the single SUPL provider 2) The network provider and roaming partners are the only SUPL providers. 3) The network provider out-sources the SUPL functionality and there is a single 3rd party SUPL

provider.

4) The network provider has an open policy on the provision of SUPL functionality and there are multiple 3rd party SUPL providers.

SUPL User	The user of a MLS application
Timing Advance	Parameter in GSM network indicating distance between Base Station and terminal.
User Plane	The user plane designates the functional plane where the information is part of the wireless user data and is transported over user bearers such as the wireless packet data network or SMS.

3.3   Abbreviations

3GPP	3rd Generation Partnership Project (3GPP)
3GPP2	3rd Generation Partnership Project 2 (3GPP2)
A-GPS	Assisted Global Positioning System
ANSI	American National Standards Institute
CAMEL	Customised Applications for Mobile network Enhanced Logic
CGI	Cell Global Identifier
EOTD	Enhanced Observed Time Difference
DTD	Document Type Definition
GMLC	Gateway Mobile Location Center (see [23.271])
GPS	Global Positioning System
GPRS	General Packet Radio Service
GMT	Greenwich Mean Time
HPLMN	Home Public Land Mobile Network (See [23.271])
HTTP	Hypertext Transfer Protocol
HTTPS	HTTP Secure
LCS	LoCation Services
MLC	Mobile Location Center
MLS	Mobile Location Server
MLP	Mobile Location Protocol
MPC	Mobile Positioning Center
MS	Mobile Station
NW	NetWork
P2P	Point to Point
P2M	Point to Multi point
MSID	Mobile Station Identifier
SIM	Subscriber Identity Module

SET	SUPL Enabled Terminal
SUPL	Secure User Plane for Location
OMA	Open Mobile Alliance
OTDOA	Observed Time Difference Of Arrival
QoS	Quality of Service
SUPL	Secure User Plane for Location
SSL	Secure Socket Layer
TLS	Transport Layer Security
UE	User Equipment
USIM	Universal Subscriber Identity Module
URI	Uniform Resource Identifier
URL	Uniform Resource Locator
VPLMN	Visited Public Land Mobile Network (See [23.271])
WAP	Wireless Application Protocol
XML	Extensible Makeup Language

4. Introduction (Informative)

Location services based on the location of mobile devices are becoming increasingly widespread. SUPL (Secure User Plane Location) employs user plane data bearers for transferring location assistance information such as GPS assistance data, and for carrying positioning technology-related protocols between mobile terminal and the network. SUPL is intended as an alternative and complement to the existing standards based on signalling in the mobile network control plane.

SUPL assumes that the mobile network or other access network is capable of establishing a data bearer connection between terminal and location server.

SUPL utilises existing standards where available and possible, and SUPL should be extensible to enabling more positioning technologies as the need arises so that they utilise the same mechanism. In the initial phase, SUPL will provide full functionality of A-GPS with minimum changes of current network elements.

This SUPL RD describes the high-level functional requirements for SUPL including SUPL-specific security, interoperability, and privacy. The traceability of the SUPL requirements to the Location Architecture Overview RD requirements is noted.

SUPL is not an application interface protocol. It does not expose an API to LBS applications. Other OMA specifications such as MLP are designed for that function. Hence, any reference to an MLS application in this document, is assumed to request location information via a specification such as MLP.

5. Use Cases   (Informative)

5.1 Combined SET Initiated and Network Initiated Location Requests

	Affected Areas				
	Device	**Connectivity**	**Enabling Services**	**Applications**	**Content**
Tickmarks (X)	X		X		
Additional Keywords					

Table 1: Affected Areas for use case 1

5.1.1 Short Description

Capability: Mobile Location Services SHALL allow the use of a general and synchronised privacy framework. This use case describes the need for having the same level of privacy management when both Network and SET initiated requests are performed.

A SUPL User has subscribed to a network resident MLS application. To allow optimal performance of the MLS application, a part of this MLS application can reside in the SET.

When the SUPL User accesses the network resident part of the MLS application, the first step is that the application requests the location of the SUPL User from the network (Network Initiated SUPL request). A Service Response is sent back to the SUPL User. Afterwards, the SET resident part of the MLS application will continue with the service and will perform SET initiated SUPL requests if needed.

5.1.2 Actors

SUPL User wants to use the MLS application.

SUPL Enabled Terminal

SUPL Provider

Network resident MLS application. A part of this MLS application resides in the SET.

5.1.2.1 Actor Specific Issues

In this case, the SUPL User uses the one MLS application but from the SUPL aspects, both Network initiated and SET initiated requests are combined.

5.1.2.2 Actor Specific Benefits

In this case, the SUPL User benefits from an optimised MLS application through the use of SET initiated SUPL if needed.

5.1.3 Pre-conditions

Both Network and SET parts of the MLS application are known from the SUPL Provider

5.1.4 Post-conditions

From the SUPL User point of view, a unique MLS application is used. From the SUPL aspects, both Network and SET SUPL requests are performed. The same level of privacy is needed.

5.1.5   Normal Flow

1. A SUPL User subscribes to the Network resident MLS application whereby a part of this MLS application resides in the SET.

2. The Network resident MLS application requests the location of the SUPL User from the network

3. Network resident MLS application sends back requested information to the SUPL User based on this first location retrieval.

4. The Network resident MLS application provides recommendations/conditions to the SET resident part of the MLS application. The SET part will then initiate SUPL location requests (SET Initiated) depending on the recommendations/conditions provided by the network resident part of the MLS application.

5.1.6   Alternative Flow

N/a

5.1.7   Operational and Quality of Experience Requirements

Even though both Network Initiated and SET Initiated SUPL requests are performed for the same MLS application, it is required that the SUPL User experiences a general and synchronised privacy management. The same level of privacy management shall be provided to the SUPL User.

5.2 Roaming into SUPL fully enabled NW from SUPL partially enabled NW

5.2.1 Short Description

Capability: Locating a remote SET (SUPL Enabled Terminal) in the roaming network from the SUPL fully enabled NW to SUPL enabled NW.

When SET roams out from the SUPL partially enabled network (Home network) to the SUPL fully enabled network (Visited Network), the SET can get his location by cooperation with SUPL Provider in the Visited network and the SUPL Provider in the Home network.

SUPL partially enabled network means the SUPL Provider in the network has no capability to proceed the positioning of the SET in the Visited network by itself.
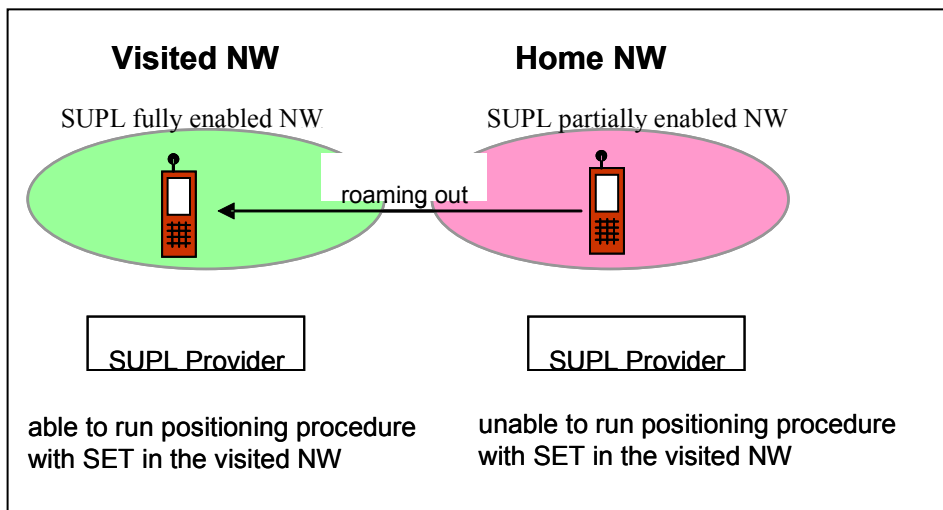
Figure 1: SET is compatible with the protocol and the positioning method within both Home NW and Visited NW
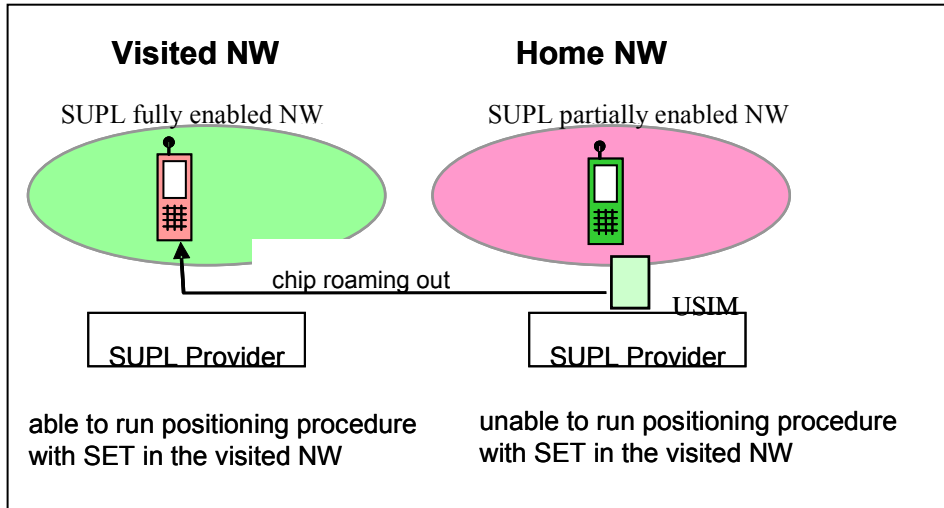
Figure 2: USIM chip roaming out from Home NW to Visited NW

5.2.2   Actors

- SET (SUPL Enabled Terminal) who wants to know his own location, when he is located in the visited network.

- MLS application requesting location of mobile terminal regardless of the SUPL Provider capability of home network currently camped on by the targeted mobile terminal.

- Home Network

- Visited Network

5.2.2.1   Actor Specific Issues

- Home network is SUPL enabled NW. SUPL enabled NW means that the network has SUPL provider. However, the SUPL Provider possesses no capability of the certain function to proceed the positioning of the SET in the visited network.

- Visited network is SUPL fully enabled NW. SUPL Provider of visited network possesses the function to proceed the positioning of the SET that is in the visited network.

- Home network and visited network are independent of user plane data bearer.

5.2.2.2   Actor Specific Benefits

MLS application can get the location of a terminal even in the case when the SUPL Provider of home network possesses no capability of the certain function to proceed the positioning of the SET in the visited network.

5.2.3   Pre-conditions

- SET is in a visited network and outside its home network.

- SUPL provider in the home network can provide the identifier of the SUPL Provider that is feasible to proceed the positioning with the SET in the visited network.

5.2.4   Post-conditions

•   The resulting location information of targeted SET should be processed securely.

5.2.5   Normal Flow

1. SUPL Provider of home network sends an indication to the SET to proceed a positioning. (Network initiated location request)

2. SET requests to the SUPL Provider of the home network (or the SUPL Provider might be the one which has been indicated in 1.) to initiate a positioning procedure.

3. If the requested SUPL Provider in the Home network which has no capability of the certain function to proceed the positioning, the requested SUPL Provider in the Home network and SUPL Provider in visited network, somehow, cooperate to obtain the position of the SET.

4. After processing the position procedure, SET will send the resulting position to the home network.

5.2.6   Alternative Flow

N/A

5.2.7   Operational and Quality of Experience Requirements

N/A

5.3   Use case: Locating a Roaming SET

	Affected Areas				
	Device	**Connectivity**	**Enabling Services**	**Applications**	**Content**
Tickmarks (X)	X		X		
Additional Keywords					

Table 2: Affected Areas for use case 2

5.3.1   Short Description

Capability: Locating a remote SET (SUPL Enabled Terminal) in the roaming network.

When SET roams out from SUPL enabled network (home network) to a visited network and uses the visited network just as a bearer to obtain its location, the SET can get the location with the help of his home network having SUPL support. The use case is represented in Figure 3. SUPL enabled NW means that the network has a SUPL provider.
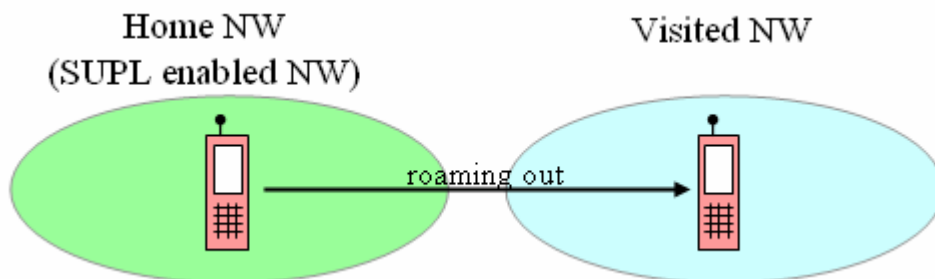
Figure 3: SET roaming out from SUPL enabled home network to visited NW

5.3.2 Actors

- A SET wants to know its own location, when it is located in a visited network, where the visited network cannot deliver the location assistance information to the SET.

- MLS application requesting location of mobile terminal regardless of the SUPL capability of visited network currently camped on by the targeted mobile terminal.

- Home Network

- Visited Network

5.3.2.1 Actor Specific Issues

- Home network is a SUPL enabled NW. SUPL enabled NW means that the network has a SUPL provider.

- Visited network cannot deliver the location assistance information to the SET.

- Home network and visited network are independent of user plane data bearer.

5.3.2.2 Actor Specific Benefits

- A SET can get its own location in both home network and visited network via user plane data bearer even if the SET is in a visited network which cannot deliver the location assistance information to the SET.

5.3.3 Pre-conditions

- SET is in a visited network and outside its home network.

- SUPL provider in the home network can generate and provide location assistance data that covers the visited network.

- Location information of cell or access point of wireless LAN, where SET is camping on can be transferred to home network.

5.3.4 Post-conditions

- The resulting location information of the targeted SET should be processed securely.

5.3.5 Normal Flow

1. A targeted SET is located a the visited network.

2. MLS application requests the position of the targeted SET.

3. If the home network determines that the visited network cannot deliver the location assistance information to the SET, then step 4 follows.

4. The visited network delivers coarse location information (e.g., cell information or access point information) of the targeted SET to home network. Then, the SUPL provider in the home network and the SET, somehow, depending on measurement methods, communicate to obtain the position of the SET.

5. After computing the position of the targeted SET, the resulting position is provided to the MLS application via an location application protocol, such as MLP.

5.3.6   Alternative Flow

- If the visited network has a SUPL provider, the location assistance data may be delivered from the SUPL provider in the visited network to the SET.

5.3.7   Operational and Quality of Experience Requirements

- N/A

5.4   Use case: SET positioning method fallback

Affected Areas				
Device	**Connectivity**	**Enabling Services**	**Applications**	**Content**
X		X		

	Device	Connectivity	Enabling Services	Applications	Content
Tickmarks (X)	X		X		
Additional Keywords					

Table 3: Affected Areas for use case 3

5.4.1   Short Description

Capability: Mobile Location Services SHALL allow a SET which cannot use its requested positioning method to fall back to an alternative method or methods.

A SUPL User has requested the location of a SET. The requested positioning method (e.g., A-GPS) is not available. Either the network or the SET SHALL be able to detect this and invoke an alternative postioning method (e.g., E-OTD, AFLT, OTDOA).

5.4.2   Actors

SUPL User wants to use the MLS application.

SUPL Enabled Terminal

SUPL Provider

Network resident MLS application. A part of this MLS application may reside in the SET.

5.4.2.1   Actor Specific Issues

Failure of the requested positioning method can be detected either by the SET (which could then send an alternative message) or by the network, which can then initiate a location request using an alternative method.

5.4.2.2   Actor Specific Benefits

In this case, the SUPL User benefits from the best available location result, even in circumstances where the requested location method performs poorly.

5.4.3   Pre-conditions

Both Network and SET parts of the MLS application are known to the SUPL Provider.

SET is unable to use its requested location method, and alternative positioning method or methods are available

SET and network must support alternative positioning methods for this use case to be valid.

This use case assumes that the alternative position calculation is performed by the network, and therefore the SET will not know whether it can fulfil the required QoS; only once the calculation has been performed will this be apparent.

5.4.4   Post-conditions

The SUPL User receives a position calculated using the best available positioning method.

5.4.5   Normal Flow

1. SUPL User subscribes to the Network resident MLS application.

2. Network resident MLS application requests SUPL location of the target SET from the network using a defined Quality of Service.

3. SET reports to network that it is unable to use its requested positioning method.

4. Network sends request to use alternative positioning method.

5. SET returns alternative positioning information to network, which calculates a position and returns it to the Network resident MLS.

6. If the calculated position meets the QoS required, it is returned to the SUPL User.

7. If the calculated position does not meet the QoS required, a Location Error is returned to the SUPL User.

5.4.6   Alternative Flow

1. SUPL User subscribes to the Network resident MLS application.

2. Network resident MLS application requests SUPL location of the target SET from the network using a defined Quality of Service.

3. SET cannot use its requested positioning method, and independently decides to use alternative positioning method. This can only happen if the network has allowed the SET a choice of positioning methods.

4. SET returns alternative positioning information to network, which calculates a position and returns it to the Network resident MLS.

5. If the calculated position meets the QoS required, it is returned to the SUPL User.

6. If the calculated position does not meet the QoS required, a Location Error is returned to the SUPL User.

5.4.7   Operational and Quality of Experience Requirements

The SUPL user gets the best available position fix in both circumstances. The normal flow requires two exchanges of messages with the SET, so may result in a slower response, but requires no decision making by the SET. The alternative flow has fewer message exchanges.

Billing of the SUPL User may be affected, since the charge for the alternative positioning method may differ from that of the requested method.

This use case will affect the SUPL message flow which determines the positioning method to be used based on the QoS, the capabilities/availabilities of the SUPL network, and the SET's capabilities and current environment.

6. Requirements (Normative)

The requirements implemented into SUPL enabler releases are according to Table 1.

Requirement ID	Subject matter	Implemented Releases
Section 6.1.1 #1 - #7	General	SUPL V1.0
Section 6.1.1 #8	Deferred location requests	Not implemented
Section 6.1.1 #9	Periodic location requests	Not implemented
Section 6.1.1 #10 - #11	General	SUPL V1.0
Section 6.1.1 #12	Priority	Not implemented
Section 6.1.1 #13 - #17	General	SUPL V1.0
Section 6.1.2 #1 - #3	Security	SUPL V1.0
Section 6.1.3 #1 - #2	Charging	SUPL V1.0
Section 6.1.4 #1 - #2	Administration and Configuration	SUPL V1.0
Section 6.1.5 #1 - #2	Usability	SUPL V1.0
Section 6.1.6 #1 - #5	Interoperability	SUPL V1.0
Section 6.1.7 #1 - #2	Privacy	SUPL V1.0
Section 6.1.8 #1 - #9	Location Technology	SUPL V1.0

Table 4: Implementation of requirements in SUPL enabler releases.

6.1   High-Level Functional Requirements

All high-level functional requirements apply to "Use case1": combined SET initiated and Network Initiated Location Requests.

6.1.1   General

1. SUPL SHALL support positioning procedures performed in collaboration with the target SET and a network resident SUPL function.
    Note: Requirement traced to Arch Overview RD Req # 3.

2. SUPL SHALL support Network-initiated location requests. Network-initiated locating use cases SHALL support P2P (point-to-point) connections and they, if technically feasible, MAY support P2M (point-to-multipoint) connections for emergency. For example, a P2M (point-to-multiple) connection which broadcasts to multiple devices/users is useful for emergency services, especially in a building or hot spot area.

3. SUPL SHALL support SET-initiated location requests.

4. The SUPL reference architecture and specifications SHALL be compatible with all underlying network technologies (Data Bearer Independence). For example, air interface standards (GSM, CDMA, W-CDMA) and transport media (packet data services, SMS, etc) MUST be supported.
    Note: Requirement traced to Arch Overview RD Req # 2.

5. SUPL SHALL NOT impose any requirements on the underlying data bearer service. Hence it MUST NOT be necessary to modify the architecture or functionality in underlying network technology.
    Note: Requirement is SUPL-specific.

6. The SUPL reference architecture will introduce new logical functions. It MUST be possible for these functions to be either hosted in existing LCS elements (for example the GMLC) or in completely new physical entities.
    Note: Requirement is SUPL-specific.

7. Immediate location requests SHALL be supported.
    Note: Requirement traced to Arch Overview RD Req # 1.

8. Deferred location requests SHALL be supported. Deferred location requests are requests, which require event-based location reporting, or location reporting triggered by some other condition.
    Note: Requirement traced to Arch Overview RD Req # 1.

9. Periodic location requests SHALL be supported. Tracking is the use of periodic location requests for a specified time period.
    Note: Requirement traced to Arch Overview RD Req # 9.

10. The architecture SHALL support storage of location information for a SET user in order to provide it at a later time.
    Note: Requirement traced to Arch Overview RD Req # 3.

11. Location information is the result of a successful SUPL location transaction, and SHALL at a minimum, consist of latitude, longitude and timestamp (time at which location estimate is made) but can contain other information, including shape, uncertainty, altitude, speed, direction, QoS, etc.
    Note: Requirement traced to Arch Overview RD Req # 35.

12. It SHALL be possible to differentiate between the priorities of different location requests.
    E.g., it may be necessary to differentiate emergency service requests from commercial services.

13. SUPL SHALL be made adaptable to different legislative environments and variable security requirements so that it is legal to deploy and use SUPL, enabling applications utilizing location information under the laws of different countries.
    Note: Requirement traced to Arch Overview RD Req # 14.

14. A SUPL Agent SHALL be able to specify the desired Quality of Service (QoS), including but not limited to accuracy, response time and age of location, in requesting the location of a SET.
    Note: Requirement traced to Arch Overview RD Req # 15.

15. Where multiple transmission methods are available in a network, and the primary transmission method fails or is not available (e.g., GPRS in a voice call with a class B handset) then it SHALL be possible to use an alternative bearer to successfully perform a full session that has been interrupted by the primary transmission method becoming unavailable.
    Note: Requirement traced to Arch Overview RD Req # 4.

16. SUPL SHALL NOT prevent the Application Service Provider from choosing a SUPL provider.

17. The SUPL architecture and protocol specification SHOULD not be the limiting factor in the location reporting interval from the SUPL system. E.g., for an underlying Location Technology and Bearer Technology combination that provides a 10 second reporting interval, SUPL should not degrade this reporting interval.
    Note: some bearers (e.g., SMS) may restrict the location reporting interval.
    Note: In a tracking scenario, the SUPL protocol SHOULD enable frequent location reporting so that the data usage of mandatory parameters and transmission headers for each location report is minimized. Factor that could contribute to a minimum requirement is technology dependent data packet size. Tracking scenario could be realized by deferred and periodic services. Deferred and periodic services are not in scope for SUPL version 1.0.

    Note: Requirement is SUPL specific.

6.1.2   Security

1. SUPL SHALL ensure that any location information that is stored or exchanged is secure and thus is not accessible to unauthorized access, i.e., unauthorized disclosure, usage, loss or corruption of location data is prevented.

- If SUPL provides the ability for the SET or SUPL network to store location information, the location data SHALL be stored in a secure manner and SHALL be available for retrieval by authorized applications.

- Note that the authorization here is governed by the SET user's privacy requirements (i.e., user privacy preferences/profile) and local regulations. Stored location data SHALL only be accessible to those applications that are authorized by the SET user.

- Emergency services and lawful purposes are exempted from this requirement in that they can override any user privacy preference setting.

Note: Requirement traced to Arch Overview RD Req # 33.

2. SUPL SHALL deliver its content (data which facilitates the SUPL transaction) in a trustworthy and reliable manner, e.g., Location information SHALL be protected against eavesdropping or modification of the data traffic.
    Note: Requirement traced to Arch Overview RD Req # 19.

3. It SHALL be possible to authenticate the SUPL Agent, SUPL network and SET user.
    Note: Requirement traced to Arch Overview RD Req # 28.

6.1.3   Charging

1. SUPL SHALL support the ability for the SUPL provider to apply different charging schemes depending on the service provided.
Note that the cost of SUPL to a SET user may be a QoS parameter, which is negotiated between the SET user application and the SUPL Provider
Note: Requirement traced to Arch Overview RD Req # 12.

2. SUPL SHALL record the appropriate information to enable charging schemes, including but not limited to: SET identity, QoS requested, QoS provided, timestamp.
Note: Requirement is SUPL-specific.

6.1.4   Administration and Configuration

1. The architecture SHALL enable SUPL service management and location information control in both the SET and the network, depending on the SUPL Provider's requirements.
    Note: Requirement is SUPL-specific.

2. Where the SUPL provider supports the use case to supply the SET with assistance data only, the SET SHALL control the location information.
    Note: Requirement is SUPL-specific.

6.1.5   Usability

1. As SUPL is time-sensitive, all SUPL events and transactions SHALL be time-stamped and SHALL use the most recent up-to-date data available (High Data Quality).

    The content of the service SHALL be based on up-to-date data. Consistency and coherency are other important factors.
    Note: Requirement traced to Arch Overview RD Req # 17.

2. SUPL SHALL be available for value-added commercial applications as well as for emergency service applications within the technical limitations of each access network (Service Support). Additionally, the SUPL architecture SHALL be able to differentiate between emergency services and commercial services.

Note 1: SIM-less emergency calls cannot be supported by SUPL

Note 2: In some networks it is not possible to support simultaneous voice and data communication, Hence if simultaneous communication is not supported, SUPL will not be available during voice communication.

Note: Requirement traced to Arch Overview RD Req # 1.

6.1.6   Interoperability

1. The SUPL reference architecture SHALL allow co-existence with existing location related standards specified by 3GPP2 and 3GPP, i.e., the SUPL architecture SHALL NOT negatively impact the operation and performance of existing standards in any way.

2. SUPL SHALL support the positioning of roaming SET users. This will include roaming in the context of the bearer utilised for the secure user plane, the SET user, the MLS application and both the SET user and the MLS application. SUPL SHALL support SET roaming between a network which adopts SUPL and a network which adopts existing LCS standards (e.g., 3GPP2 X.S0002, 3GPP 23.271). The SUPL architecture needs to work within the framework of these roaming standards and provide support where gaps specific to SUPL are identified.

    If the roaming network does not have location capability such as A-GPS, alternative solutions MAY be applied. In order to provide seamless QoS to a SET user, it SHALL be possible for SET user roaming in a network which does not support A-GPS to be served by a SUPL provider via its home network.
    Note: Requirement traced to Arch Overview RD Req # 20.

3. The SUPL architecture SHALL provide backward compatibility mechanisms (e.g., protocol versioning).
    Note: Requirement is SUPL-specific.

4. The architecture SHALL support the ability for a SET to provide its SUPL specific capabilities to the SUPL network.
    Note: Requirement is SUPL-specific.

5. The architecture SHALL support the ability for a SUPL provider to provide its SUPL specific capabilities to the SET.
    Note: Requirement is SUPL-specific.

6.1.7   Privacy

1. SUPL SHALL ensure that the end-user's privacy is protected in all transactions consistent with the user's privacy preferences, except for emergency or lawful purposes depending on local/regional regulations.

    Note that multiple layers of privacy protection MAY be provided.
    Note: Requirement traced to Arch Overview RD Req # 30.

2. SUPL SHALL support a general and synchronised privacy framework.

    Note that MLS application, SUPL Agent, SUPL network and SET can be part of several domains: Mobile Network Operator, IT domain or device domain. Therefore, several service architectures can be derived from these three domains.

    As the MLS application, SUPL Agent, SUPL network and SET can be part of the above-mentioned domains, the same level of privacy management SHALL be performed for all service architectures.

    Note: Requirement traced to Arch Overview RD Req # 34.

6.1.8 Location technology

1. The architecture SHALL support Cell ID positioning.
   Deployment of each technology option is a SUPL provider decision. However, in a Mobile Network, Cell ID SHALL always be the backup positioning method when other positioning methods fail.
   Note: Requirement traced to Arch Overview RD Req # 3.

2. The architecture SHALL support Enhanced Cell ID positioning.
   Enhanced Cell-ID (E-CI) positioning is defined as enhancing Cell ID positioning by using additional measurements from the Mobile Network that are available in the SET.
   Note: Requirement traced to Arch Overview RD Req # 3.

3. The architecture SHALL support AGPS positioning.
   Note: Requirement traced to Arch Overview RD Req # 3.

4. The architecture SHALL support standalone-positioning technologies, e.g., autonomous GPS.
   Note: Requirement traced to Arch Overview RD Req # 3.

5. The architecture SHALL support EOTD positioning if EOTD measurements are available.
   Note: Requirement traced to Arch Overview RD Req # 3.

6. The architecture SHALL support OTDOA positioning if OTDOA measurements are available.
   Note: Requirement traced to Arch Overview RD Req # 3.

7. The architecture SHALL support AFLT positioning if AFLT measurements are available.
   Note: Requirement traced to Arch Overview RD Req # 3.

8. The architecture SHALL support the delivery of assistance data from the SUPL network to the SET.
   Note: Requirement is SUPL-specific.

9. SUPL architecture SHALL support an extensible framework so that new location technologies, supported by the network, can be added efficiently and in-line with the overall architecture.

Appendix A.   Change History   (Informative)

A.1   Approved Version History

Reference	Date	Description
n/a	n/a	No prior version

A.2   Draft/Candidate Version 1.0 History

Document Identifier	Date	Sections	Description
Draft Versions OMA-LOC_SUPL_RD-V1_0	11 Nov 2003	n/a	Initial skeleton draft RD
	17 Jan 2004	6.1	Incorporates requirements approved so far
	02 Feb 2004	3.2; 4; 5.1.1; 5.1.2; 5.1.3; 5.1.4; 5.1.5; 5.1.6; 5.1.7; 6.1.1; 6.1.2; 6.1.3; 6.1.4; 6.1.5; 6.1.6; 6.1.7; 6.1.8; 6.1.9; 6.1.10; 6.1.11; 6.1.12; 6.1.13; 6.1.14; 6.1.15; 6.1.16; 6.1.17; 6.1.18; 6.1.19; 6.1.20; 6.1.21; 6.1.22; 6.1.23; 6.1.24; 6.1 25; 6.1.26; 6.1.27; 6.1 28; 6.1.29; 6.1.30; 6.1.31; 6.1.32; 6.1.33; 6.1.34; 6.1.35; 6.1.36; 6.1.37; 6.1.38; 6.1.39.	Mainly approved SUPL requirement by 0034R01; 0025R02; 0033R01; 0031R04
	11 Feb 2004		❑ 0055r01, adding "This document describes the requirements for the Secure User Plane Location Requirement (SUPL)." into chapter 1; ❑ Adding "3GPP2 SR0066-0 "IP Based Location Services" URL: http://www.3gpp2.org/Public_html/specs/S.R0066-0_v1.0_110703.pdf" into chapter 2.2; ❑ Completed the abbreviations of chapter 3.3; ❑ Removed "<<OR This is an informative document, which is not intended to provide testable requirements to implementations.>> <<If needed, describe or declare using appropriate normative references the additional conventions that are used.>>" of chapter 3.1; ❑ Removed the "Note" of each paragraph from 6.1.1 to 6.1.39; ❑ Removed Chapter 6.2; 6.3 and appendix B; ❑ Update the appendix A.

Document Identifier	Date	Sections	Description
	17 Mar 2004	All	❑ Applied new RD (OMA-Template-ReqDoc-20040205) template ❑ Rearranged High Level requirements
	31 Mar 2004	3.2; 3.3; 4; 5.1.5; 5.2; 5.3; 6.1.1; 6.1.3; 6.1.6	❑ Incorporation of CRs 0078; 0077; 0056r03; 0027r03; 0069r02;
	5 April 2004	6.1.1; 6.1.6	❑ Incorporation of CRs 0021r02; 0031r04
	13 May 2004	All	❑ Incorporation of CRs 90 and 113r01 ❑ Many clerical changes
	12 July 2004	All	❑ Incorporation of comments recevied from OMA-REQ during formal review.
	09 Aug 2004	5.5	❑ Remove user case 5.5
	10 Sep 2004	3.2, 6.1.1	❑ Updated definitions ❑ Removed requirement 18
	21 Sep 2004	All	❑ Header updated
Candidate Version OMA-RD-SUPL-V1_0	30 Sep 2004	n/a	Status changed to Candidate by TP TP ref # OMA-TP-2004-0325-LOC_SUPL_RD_for_approval
	16 Jun 2005	All	Changes due to SUPL Consistency Review ❑ OMA-LOC-2005-0258r02: SUPL V1.0 vs V2.0 ❑ OMA-LOC-2005-0348: editorial changes