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Sophia Antipolis, France

3GPP TSG_SA WG2 #20
Kobe, Japan
29 October – 02 November, 2001

Tdoc S2-013063
(rev Tdoc S2-013015)

Title: LS on Enhanced user privacy for location services
Source: TSG SA WG2
To: TSG SA WG1, TSG SA WG3
Cc: -

Contact Person:

Name: Jan Käll
E-mail Address: jan.kall@nokia.com
Tel. Number: +358 400 400056

2 attachments

1. Developing support for enhanced user privacy in location services

TSG-SA WG2 would like to inform TSG-SA WG1 and TSG-SA WG3 about the ongoing work on enhanced user privacy. There is a new Technical Report being developed with the title "Enhanced user privacy for location services", and the initial draft version 0.1.0 of the TR is attached to this LS. The proposed structure of the TR is to have stage 1 type of service requirements in the first part of the TR and stage 2 type of functional description and requirements in the other part of the TR. With this approach it is proposed that TSG SA WG1 investigates the current chapter 5 of the TR and develop the Technical Report further to reflect the views in SA1 about this issue.

Since user privacy in general is seen to be a TSG SA WG3 relevant issue also TSG SA WG3 is informed about this new activity and is invited to give feedback on the TR and the privacy issues described.

2. Actions:

To TSG SA WG1:

ACTION: TSG SA WG2 asks **TSG SA WG1** to kindly study the attached initial draft TR on enhanced user privacy for location services, especially chapter 5 thereof, and to develop it further with respect to service requirements on enhanced user privacy for location services.

To TSG SA WG3:

ACTION: TSG SA WG2 asks **TSG SA WG3** to kindly study the attached initial draft TR on enhanced user privacy for location services and to give feedback to TSG SA WG2 and TSG SA WG1 on the TR and the privacy issues described therein.

3. Date of next SA2 meeting:

SA2#21 26th - 30th November, 2001 – Cancun (Mexico)

4. Attachments:

4.1 Version 0.1.0 of Technical Report

'Enhanced support for User Privacy in location services' with cover page

- See separate file S2-013065_TR_EUP_v010.zip in file S2-013063.ZIP.

4.2 Proposed revision of WID on LCS in Rel-5

- See separate file S2-013008RevWID_LCSinRel5.doc in file S2-013063.ZIP.

3GPP TSG-SA2 Meeting #20
Kobe, Japan, 20th October – 2nd November 2001

Title: **Proposed updates to the LCS REL5**
Source: **LCS drafting**
For: **Decision**

This contribution proposes to update the WID LCS REL5.

Two new functions are proposed to be added to the WID LCS REL5, namely the Password concept and the Requestor concept.

Work Item Description

Title

Support of Location Services in Release 5, System and Core Network aspects.

1 3GPP Work Area

	Radio Access
X	Core Network
X	Services

2 Linked work items

Location Services for GERAN in A/Gb Mode (UID 2436)

LCS for GERAN in Iu Mode (UID 2442)

The 3GPP Generic User Profile

Specification for the Le Interface(SP-010180)

Support of the Presence Service Architecture (S2-012405)

3 Justification

LoCation Services (LCS) provide the mechanisms to support mobile location services for operators, subscribers and third party service providers.

This Work Item is needed in order to fulfill the requirements on supporting LCS in the GERAN packet switched domain and to enhance LCS with new service features in Release 5.

4 Objective

The service description stage 1 specification 22.071 shall be common for all Access Networks. The new LCS service features to be developed or studied in Release 5 are:

- Location services in GERAN packet switched domain

The task is to include the system and core network aspects of LCS support in GERAN packet switched domain in TS 23.271 Rel'5.

- Event driven deferred LCS request

Event driven LCS is included in Rel'4 to determine the position of a mobile when it becomes active in the network. Other types of events to initiate location reports should be investigated for Rel-5, first in SA1, if needed, to determine the service aspects of event driven LCS request, e.g. different types of events. Some events could be related to localised services, e.g. services limited to UEs in a defined area or location based charging where the tariff is changed according to terminal whereabouts.

- Periodic location reports

Periodic LCS could be seen as Event based LCS, where the event is that a defined period timer is running out and activates a location request/report. In Release 4 it has been decided that GMLC handles periodic LCS request, but in Rel-5 it should be investigated if also other network elements like MSC, SGSN, UE and RNC could handle periodic location reports autonomously. Depending upon how these possibilities are resolved, there may need to be a separate new RAN work item to cover RNC based periodic UE Positioning and a new T work item to cover UE based periodic UE Positioning aspects in Rel-5.

- Standardization of the Le interface

There is a separate Work Item on a standardized Le interface between the LCS Client and GMLC. There are specifications being established that are applicable for this interface and it will be investigated whether such a specification would be applicable for 3GPP LCS, as specified in LCS stage 1 (22.071) and stage 2 (23.271). If found appropriate, the Le work item could be completed by adding references to the established specification for the Le interface in TS 22.071 and TS 23.271. In case there is need for alignment or improvement, this will be communicated with the corresponding forum.

- Enhanced support for user privacy and subscriber data handling

It should be studied how the privacy mechanisms provided for Location Services could be enhanced to support the increasing number of LCS clients and the varying privacy requirements for location services. It should also be possible for the user to set or change the location related privacy parameters in the home network. A Technical Report will be generated on this issue in Rel-5.

- Relationship between Location Services and Presence service

This issue should be studied.

- Compliance with national regulatory guidelines on user privacy

According to the guideline on The Ministry of Public Management, Home Affairs, Posts and Telecommunications in Japan, There is a clear statement regarding to the privacy issue that,

- 1) The UE may be protected against monitoring his location from a third party by having 'Password' function to limit the accesses.
- 2) The UE may be protected against monitoring his location from a third party by screening accesses based on the access terminal.

The LCS REL-5 should be made compliant to this Japanese guideline by adding these optional functions.

The detailed LCS time plan is documented in the 3GPP Work Plan.

Task	Planned Start	Planned Finish
Work Item Revision	5/2001	128/2001
Approval of Revised Work Item Approval		129/2001
Drafting and discussion, updates of specifications	8/2001	3/2002 12/2001
Submission to TSG CN and SA for approval		3/2002 12/2001
Possible remaining corrections and clarifications		6/2002

5 Service Aspects

Yes

6 MMI-Aspects

7 Charging Aspects

8 Security Aspects

It should be studied are there some implications on User Privacy in periodic or deferred location reporting.

9 Impacts

Affects:	USIM	ME	AN	CN	Others
Yes	X	X	X	X	
No					
Don't					

know					
------	--	--	--	--	--

10 Expected Output and Time scale (to be updated at each plenary)

New specifications						
Specification No.	Title	Prime resp. WG	2ndary resp. WG(s)	Presented for information at plenary#	Approved at plenary#	Comments
TRxx.yyz	Technical Report on enhanced privacy support in location services	SA2	SA1	SA#14	SA#14	
Affected existing specifications						
Specification No.	CR	Subject		Approved at plenary#		Comments
22.071		Location Services (LCS); Service description, Stage 1		SA#14		
23.271		Functional stage 2 description of LCS		SA#154		
29.002		Mobile Application Part (MAP)		CN#154		
43.059		Functional Stage 2 Description of Location Services in GERAN		GERAN 12/01		

11 Work item rapporteurs

Jan Kall, Nokia

12 Work item leadership

TSG SA WG 2.

13 Supporting Companies

Nokia, Elisa Communications, Siemens, Ericsson, Vodafone, NTT DoCoMo and NEC

14 Classification of the WI (if known)

	Feature (go to 14a)
X	Building Block (go to 14b)
	Work Task (go to 14c)

14b The WI covers several Building Blocks: List of Work Tasks under these Building Blocks

Building block	Work task	WG
LCS support in GERAN PS domain	Specify the system and core network aspects of LCS in the GERAN PS domain	SA2
	Stage 3 specifications to support LCS in GERAN PS domain	CN
Event driven deferred LCS request	Investigate and standardize other types of events to initiate location reports	SA2 (SA1)
Periodic Location reports	Investigate the implications of generating periodic location reports in MSC/SGSN, RNC or UE	SA2
Standardization of the Le interface	Investigate whether an established Le specification would be applicable for 3GPP LCS, as specified in LCS stage 2 (23.271).	SA2

	Investigate whether an established Le specification would be applicable for 3GPP LCS, as specified in LCS stage 1 (22.071)	SA1
	If seen feasible, the Le work item could be completed by adding references to the established standard for the Le interface in TS 22.071 and TS 23.271.	SA1 & SA2
	Communicate possible needs for alignment or improvement with the corresponding standardization forum.	SA1 & SA2
Enhanced privacy support in location services	Generate Technical Report on Enhanced privacy support in location services	SA2
Relationship between Location Services and the Presence Service	Study the relationship between Location Services and the Presence Service	SA2 & SA1
Password and Requestor handling in location services Compliant to the Japanese guideline	Introduce Password concept and Introduce Requestor Originator concepts according to national regulatory guidelines	SA1 & SA2 & SA3
	Stage 3 of Password concept, MAP and Uu changes	CN
	Stage 3 of Requestor concept, MAP and Uu changes	

Title: Initial draft version 0.1.0 of Technical Report on Enhanced support for User Privacy in location services

Source: SA2

Purpose of the document

The initial draft version 0.1.0 of the Technical Report 'Enhanced support for User Privacy in location services' was agreed by SA2#20 to be sent to TSG SA WG1 for review and elaboration and to TSG SA WG3 for review and feedback.

**3rd Generation Partnership Project;
Technical Specification Group Services and System Aspects
System Aspects;**

**Technical Report
Enhanced support for User Privacy in location services
(Release 5)**



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Keywords

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3GPP

Postal address

3GPP support office address

650 Route des Lucioles - Sophia Antipolis

Valbonne - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Internet

<http://www.3gpp.org>

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Foreword

This Technical Report has been produced by the 3rd Generation Partnership Project (3GPP).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

where:

- x the first digit:
 - 1 presented to TSG for information;
 - 2 presented to TSG for approval;
 - 3 or greater indicates TSG approved document under change control.
- y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- z the third digit is incremented when editorial only changes have been incorporated in the document.

Introduction

There is a need to enhance the privacy mechanisms provided for Location Services to support the increasing number of LCS clients and the varying privacy requirements for location services. It should also be possible for the subscriber to set or change the location related privacy parameters in the home network. There are some limitations in support for user privacy in the current LCS specifications in 3GPP and there is a need to enhance the privacy mechanisms e.g. for roaming subscribers.

In current Specifications only limited screening for privacy is possible. The screening is based on the "LCS client ID" parameter of MAP Provide Subscribe Location message used by GMLC to request the subscriber's location from SGSN or MCS. MSC/VLR maps the received LCS client ID to subscriber's Privacy parameters (e.g. list of allowed LCS clients) to screen out the unwanted location requests. In practise, there is a need to have more detailed service type screening e.g. to differentiate between "where am I" type of services and games or entertainment services.

Additionally, it will be difficult for a subscriber to use local location based services when roaming. The subscriber does not have proper means to add local LCS clients to the allowed LCS client list in the Home environment HLR. Furthermore, the privacy parameters are defined with quite a narrow scope in the HLR, which may make it difficult for the subscriber to set additional and varying privacy parameters per LCS client.

According to the current specifications, the subscriber cannot receive any information regarding who originally asked for the location of the subscriber. Subscribers should be notified about the Requestor identity and it should be possible to allow the location information to be given only to those requestors, who are entitled to have it. All subscriber and location information should anyhow be protected according to privacy requirements in the national regulations.

In order to fulfil national regulatory guidelines, the LCS REL5 shall support the have the password functionality as an optional function. This password functionality enables UE to limit unwelcome LCS access from a third party.

1 Scope

This Technical Report for Rel-5 identifies and describes the service requirements for enhanced user privacy in location services (LCS) and the corresponding functional requirements. **The first part of the TR describes the corresponding stage 1 type of service requirements** and may be moved to the LCS Stage 1 specification TS 22.071, as seen feasible by TSG SA1. Stage one is the set of requirements which shall be supported for the provision of enhanced user privacy in location services, seen primarily from the subscriber's and service providers' points of view. The TR describes some possible enhancements to the privacy mechanisms provided for Location Services to support the increasing number of LCS clients and the varying privacy requirements for location services.

The second part of the TR describes the stage-2 type of functional requirements for enhancing user privacy in location services and may be moved to the LCS Stage 2 specification TS 23.271, as seen feasible by TSG SA2.

This TR defines the service requirements and functional requirements for the enhanced support of user privacy in location services regarding:

- General description of enhanced user privacy in location services
- Definition of enhanced user privacy in location services capabilities
- Service requirements
- Charging aspects
- Security aspects
- Roaming, service availability and continuity
- Relation between privacy issues in Presence and Location services.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document in the same Release as the present document.

[1] 3GPP TS 22.071

[2] 3GPP TS 23.271

3 Definitions, symbols and abbreviations

3.1 Definitions

Requestor: the originating entity which has requested the location of the target UE from the LCS client.

Requestor Identity: This identifier is identifying the Requestor and can be e.g. MSISDN or logical name.

Service Type: [The definition of Service Type is to be included.] The privacy setting may be different depending on which Service Types are offered to the target UE or requested by the target UE.

User: The subscriber and user of the target UE

3.2 Abbreviations

4 General description

5. Service Requirements (this chapter should be handled by SA1)

5.1 Service Type Privacy

The user may wish to differentiate between privacy requirements even with one LCS Client, depending on which service is requested by the user from this LCS client or which service is offered to the user by this LCS Client.

The LCS client requests location information for a target UE from GMLC. Currently the location request contains only the identity of the LCS client and the identity of the target UE. The LCS client request is screened by GMLC using the identity of the LCS client. The screening mechanism is enough for the basic type of location requests, but there is a need to enhance the functionality of the mechanism because one single LCS client may offer or support several or a multitude of different services. It is clear that the target UE user will have different privacy demands for different services even when only one LCS client offers the services.

According to the enhanced mechanism the users should also be able to allow their location information to be given to all LCS clients providing an indicated type of service. The user could e.g. allow all dating type services to get location information. The location request message issued by the LCS client to GMLC should be enhanced to indicate also what type of services are requested or offered in relation to this location request.

5.2 Support for enhanced privacy checking

It is seen that the current way to handle the privacy related settings in the network is probably too limited to support the increasing number of LCS clients and the varying privacy requirements for location services. It should also be possible for the user to set or change the location related privacy parameters in the home environment.

5.3 Requestor

In the 3GPP LCS specifications only the LCS client is identified and authorized when a location based application is requesting the position of a target UE. The GMLC may store an "Authorized UE List", which holds MSISDNs or groups of MSISDN for which the LCS Client may issue a location request [2].

The problem is that there is no mechanism for the target UE user to activate a certain application with a known LCS client, but still be able to restrict who are allowed to get position information regarding the target UE. A simple example of this type of service is a "Friends finder" application. Currently there is only a relation between the LCS client and the MSISDNs it is allowed to issue location request for, but there is no relation between the originating requestor and the target UE. This prevents the target UE user from authorizing the originating requestor.

A new service requirement is hence identified, that the Location Request issued by the LCS client to GMLC should be enhanced to optionally include also the identity of the originator of the location request, i.e. the Requestor, not only the identity of the LCS client.

Note: the security aspects of the Requestor functionality should be further studied.

The identity of the Requestor shall be included in the privacy interrogation request, when this is sent to the target UE and shown to the user.

This functionality should possibly be introduced already in Rel-5.

5.4 User Control

The current LCS stage 1 specification 22.071 contains the following text on user control:

"The user shall be able to change the following settings in the privacy exception list.

- the LCS Client and/or group of LCS Clients list
- the target UE user notification setting (with/without notification)
- the default treatment, which is applicable in the absence of a response from the target UE for each LCS client identifiers"

In addition the user should also be able to change privacy settings for the service types and requestor. The mechanisms for user control are outside the scope of this Technical Report.

5.5 Password

The password is an optional function that shall be handled according to the national regulatory guidelines option for LCS location services to protect UE against monitoring his/her location from the third party access.

The password is set and managed by the UE. The user of the UE is responsible to distribute his/her password to whom the user it is allowed to request his/her location. Once password has been set and properly distributed, UE is protected against the location request from a third party that does not know his password.

Note1: It should be clarified if this password should be limited to value added services only. The password functionality may not be applicable to emergency or lawful intercept services.

Note2: It should be studied what is the relation between this new password functionality and the 5 privacy setting alternatives in the current specifications. (The privacy setting alternatives are listed in chapter 7.)

6. Stage 2 description of service type privacy

This new service type information shall be added to the LCS Service Request on the Le interface from the LCS client to the GMLC. Additionally this information could be included in HLR and in the Provide Subscriber Location MAP message sent by GMLC on the Lg interface to MSC and SGSN, but this is for further study.

The service type can be defined in a similar way as Annex C in TS 22.071, which describes the attributes for specific services.

The service type privacy setting could be the same as the 5 privacy settings listed in Annex A of 23.271, but in addition it may be necessary to define some new privacy settings according to service type.

7. Stage 2 description of enhanced privacy checking

LCS Stage 2 specification TS 23.271 defines only limited set of privacy options in chapter 9.5.3 consisting mainly of five different privacy settings:

- positioning not allowed;

- positioning allowed without notifying the UE user (default case);
- positioning allowed with notification to the UE user;
- positioning requires notification and verification by the UE user; positioning is allowed only if granted by the UE user or if there is no response to the notification;
- positioning requires notification and verification by the UE user; positioning is allowed only if granted by the UE user.

These settings in the network are probably too limited to support the increasing number of LCS clients and the varying privacy requirements for location services especially for roaming subscribers.

It should be possible to have variable privacy settings, e.g. according to time of day, day of week and according to the location of the target UE.

8. Stage 2 description of Requestor indication

TS 23.271 defines a LCS Location Notification Invoke message sent to the target UE in a MT-LR both in the CS and the PS domain. This message indicates the type of location request and the identity of the LCS client and whether privacy verification is required. From target UE user point of view this reflects only part of the location request chain, i.e. a possible requesting entity remains unknown to the target UE user. This is considered as a flaw in terms of target UE user privacy.

[In TS 23.271 GMLC holds an “Authorized UE List” of MSISDNs and/or groups of MSISDN, for which an LCS Client is allowed to issue a MT-LR. Within the current specification there is no relation between the identity of the requesting entity and the target UE user. Therefore, it is proposed that an “Allowed Requestor List” is added. This list contains the identities of the Requestors, whom are authorized to issue a MT-LR for the target UE.]

Editorial note: It is for further study if GMLC should keep the Allowed requestor list for each UE. Roaming problems if GMLC is in another country than target UE. Privacy is a new type of functionality for GMLC.

The identities of the Requestor can be e.g. MSISDNs and/or groups of MSISDNs or logical names.

Editorial note: The requestor identity need perhaps not be globally unique, comp papa and Naomi.

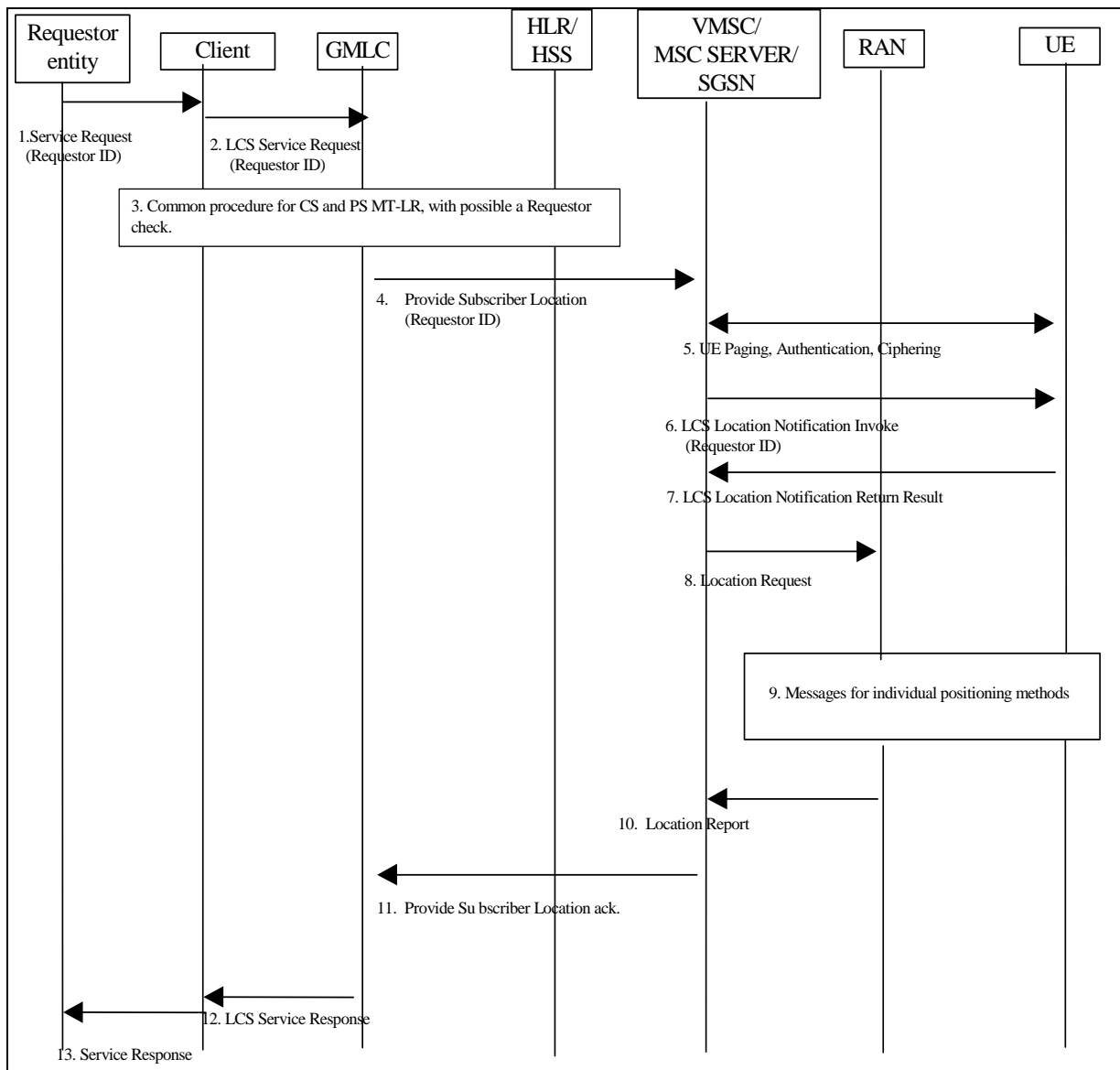
It should be possible for the user of the target UE to access this list by some means and change the corresponding privacy settings, but this is considered to be outside the scope of this TR.

The LCS Location Notification procedure should be enhanced for transferring the Requestor identity to the target UE for a case-by-case authorization by the user.

Functional Requirements:

- The requestor identity should be added as an information element to be carried on the Le, Lg and Lc interfaces.
- The requestor identity should be included in the location request, if available. For Emergency and Lawful intercept services this is optional depending on local legislation.
- A new “Allowed Requestor List” should be added to define per target UE the Requestors, that are authorized to issue a MT-LR for this target UE.
- The requestor identity should be added to the LCS Location Notification Invoke procedure

The figure below illustrates Requestor identity in a MT-LR.



- 1) A requestor entity is accessing an LCS Client requesting a service, which requires the location information of a target UE. [The interface Requestor – LCS client is outside of this TR.] The identity of the Requestor may be added to the service request either by the requestor. Another possibility is that the Requestor identity is obtained from the LCS Client as the requestor is authenticated with the LCS Client. In this case the Requestor identity also needs to be provisioned in the privacy profile.
- 2) The LCS Client issues an location request to the GMLC containing the identity of the Requestor.
- 3) Common PS and CS MT-LR procedure as described in 23.271 section 9.1.1. After the authentication of the LCS Client and checking that the target UE is on the “Authorized UE List” the “Allowed Requestor List” is checked for authorization of the location request for this Requestor.

Note: More detailed information from steps 4 to 12 can be found from the 23.271 section 9.1.2-

- 4) The GMLC sends a PROVIDE_SUBSCRIBER_LOCATION message to the MSC/MSC server/SGSN indicated by the HLR/HSS. This message carries also the new Requestor Identity information. If the target UE subscriber profile so indicates, the UE must be notified for privacy verification. The Requestor identity is included in the LCS Location Notification Invoke message together with the LCS Client Id.
- 5) Described in 23.271 section 9.1.2.
- 6) If the location request comes from a value added LCS client and the UE subscription profile indicates that the UE must either be notified or notified with privacy verification and the UE supports notification of LCS (according to the UE Capability information), an LCS Location Notification Invoke message is sent to the

target UE indicating the type of location request (e.g. current location) and the identity of the LCS client, Requestor identity and whether privacy verification is required.

7) to 12) Described in 23.271 section 9.1.2

13) The LCS Client sends the service response back to the requesting UE with the location information of the target UE. In case there was an error or the request was denied or not authorized this may be indicated in the service response. However, specification of the service response is outside the scope of this TR.

8.1 Backward compatibility

MSC, SGSN and UE according to previous releases do not support the requestor functionality. Backward compatibility should be studied.

9. Stage 2 description of the password concept

There are several ways to standardize the password handling. The following table compares the possible solutions.

	Node where password stored	How to update his password	Node where password is compared	Impacts to the standardization
Alt.1	GMLC	Update without any impact to 3GPP. (Using WAP access as an example)	GMLC	Le interface
Alt.2	HLR	According to the 3GPP standard	GMLC	Le interface and, UE-SGSN/MSC password update, SGSN/MSC-HLR password update, HLR-GMLC password update
Alt.3	UE	In UE internally	UE	Le interface and, Lg interface (GMLC and serving node), 23.030 interface

A solution to be chosen is FFS. It is recommended that a solution be found taking account of the following aspects.

- Roaming
- GMLC located in different PLMN
- Security for password handling

10. Charging Aspects

11. Security aspects

12. Roaming, Service Availability and Continuity

Annex A (informative): Change history

Ver. 0.0.1	October 26, 2001	First Draft
Ver. 0.0.2	October 31, 2001	Comments added in SA2 #20 LCS drafting
Ver. 0.0.3	November 1, 2001	Password functionality added
Ver. 0.1.0	November 2, 2001	Version number raised to 0.1.0

Change history							
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New