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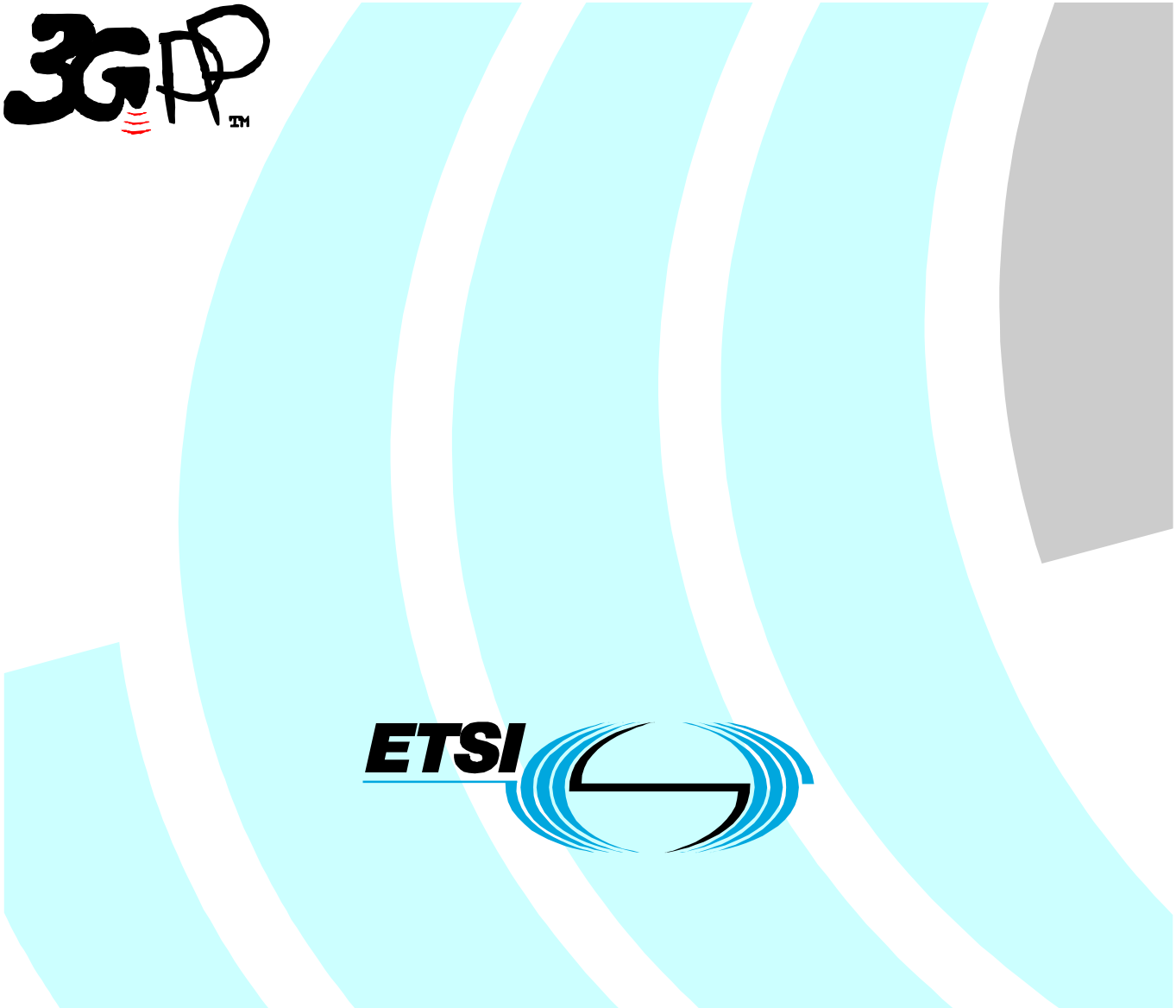
Technical Report

Universal Mobile Telecommunications System (UMTS);
Open Service Access (OSA)
Application Programming Interface (API)
Mapping for Open Service Access;
Part 6: User Location and User Status
Service Mapping to MAP
(3GPP TR 29.998-06 version 6.0.0 Release 6)



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650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

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

Siret N° 348 623 562 00017 - NAF 742 C
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Contents

Foreword

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Introduction

Structure of the OSA API Mapping (3GPP TR 29.998)

The present document is part 6 of a multi-part deliverable covering the 3rd Generation Partnership Project; Technical Specification Group Core Network; Open Service Access (OSA); Application Programming Interface (API) Mapping for OSA.

Table: Overview of the OSA APIs & Protocol Mappings 29.198 & 29.998-family

OSA API specifications 29.198-family					OSA API Mapping - 29.998-family	
29.198-01	Overview				29.998-01	Overview
29.198-02	Common Data Definitions				*29.998-02*	*Not Applicable*
29.198-03	Framework				*29.998-03*	*Not Applicable*
Call Control (CC) SCF	29.198-04-1 Common CC data definitions	29.198-04-2 Generic CC SCF	29.198-04-3 Multi-Party CC SCF	29.198-04-4 Multi-media CC SCF	29.998-04-1	Generic Call Control – CAP mapping
					29.998-04-2	*Generic Call Control – INAP mapping*
					29.998-04-3	*Generic Call Control – Megaco mapping*
					29.998-04-4	Multiparty Call Control – SIP mapping
29.198-05	User Interaction SCF				29.998-05-1	User Interaction – CAP mapping
					29.998-05-2	*User Interaction – INAP mapping*
					29.998-05-3	*User Interaction – Megaco mapping*
					29.998-05-4	User Interaction – SMS mapping
29.198-06	Mobility SCF				**29.998-06**	**User Status and User Location – MAP mapping**
29.198-07	Terminal Capabilities SCF				*29.998-07*	*Not Applicable*
29.198-08	Data Session Control SCF				29.998-08	Data Session Control – CAP mapping
29.198-09	*Generic Messaging SCF*				*29.998-09*	*Not Applicable*
29.198-10	*Connectivity Manager SCF*				*29.998-10*	*Not Applicable*
29.198-11	Account Management SCF				*29.998-11*	*Not Applicable*
29.198-12	Charging SCF				*29.998-12*	*Not Applicable*
29.198-13	Policy Management SCF				*29.998-13*	*Not Applicable*
29.198-14	Presence & Availability Management SCF				*29.998-14*	*Not Applicable*
29.198-15	Multi-media Messaging SCF				*29.998-15*	*Not Applicable*

1 Scope

The present document investigates how the OSA Mobility Interface Class methods defined in 3GPP TS 29.198-6 [5] can be mapped onto CAMEL Application Part (CAP) operations and Mobile Application Part (MAP) operations. The mapping of the OSA API to the CAP and relevant MAP operations is considered informative, and not normative. An overview of the mapping TR is contained in the introduction of the present document as well as in 3GPP TR 29.998-1 [10].

The OSA specifications define an architecture that enables application developers to make use of network functionality through an open standardised interface, i.e. the OSA API's. The API specification is contained in the 3GPP TS 29.198 series of specifications. An overview of these is available in the introduction of the present document as well as in 3GPP TS 29.198-1 [1]. The concepts and the functional architecture for the Open Service Access (OSA) are described by 3GPP TS 23.198 [3]. The requirements for OSA are defined in 3GPP TS 22.127 [2].

2 References

- References are either specific (identified by date of publication and/or edition number or version number) 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 29.198-1: "Open Service Access (OSA); Application Programming Interface (API); Part 1: Overview".

[2] 3GPP TS 22.127: "Service Requirement for the Open Services Access (OSA); Stage 1".

[3] 3GPP TS 23.198: "Open Service Access (OSA); Stage 2".

[4] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[5] 3GPP TS 29.198-6: "Open Service Access (OSA); Application Programming Interface (API); Part 6: Mobility".

[6] 3GPP TS 29.002: "Mobile Application Part (MAP) specification".

[7] 3GPP TS 29.078: "Customised Applications for Mobile network Enhanced Logic (CAMEL); CAMEL Application Part (CAP) specification".

[8] 3GPP TS 22.101: "Service Aspects; Service Principles".

[9] ITU-T Recommendation Q.850: "Usage of cause and location in the Digital Subscriber Signalling System No. 1 and the Signalling System No. 7 ISDN User Part".

[10] 3GPP TR 29.998-1: "Open Service Access (OSA); Application Programming Interface (API) Mapping for OSA; Part 1: General Issues on API Mapping".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in TS 29.198-1 [1] apply.

3.2 Abbreviations

For the purposes of the present document, the abbreviations given in TS 29.198-1 [1] apply.

4 User Status Service CAMEL Flows

The User Status (US) interface class allows applications to obtain the status of mobile telephony users.

4.1 triggeredStatusReportingStartReq

TriggeredStatusReportingStartReq is a method that is used to subscribe to triggered user status notifications so that events can be sent to the application.

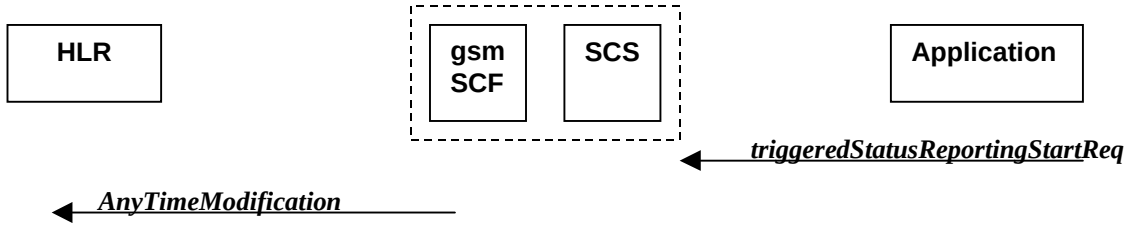

Figure 4-1: Call Flow for triggeredStatusReportingStartReq

Table 4-1: Normal Operation

Pre-conditions	An agreement is established between the network operator and the service provider for the event notification to be enabled
1	The application invokes the ***triggeredStatusReportingStartReq*** method
2	The gsmSCF sends a MAP ***AnyTimeModification*** to the HLR in order to activate the CAMEL Subscription Information (M-CSI) In case the Status Report is requested for multiple users, multiple ATM requests are sent to the HLR

Table 4-2: Parameter Mapping

From: triggeredStatusReportingStartReq	To: MAP AnyTimeModification
appStatus	
users	subscriberIdentity modificationInstruction in modificationRequestFor-CSI has value 'activate', for M-CSI (Mobility CAMEL Subscription Information)
assignmentID	
	gsmSCF-Address

4.2 triggeredStatusReportingStop

triggeredStatusReportingStop is a method that is used by the application to disable triggered user status notifications.

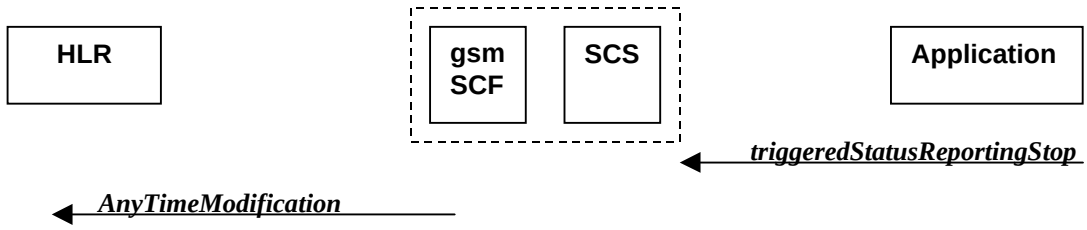

Figure 4-2: Call Flow for triggeredStatusReportingStop

Table 4-3: Normal Operation

Pre-conditions	An agreement is established between the network operator and the service provider for the status notification to be disabled
1	The application invokes the ***triggeredStatusReportingStop*** method
2	The gsmSCF sends a MAP ***AnyTimeModificaitonRequest*** to the HLR in order to de-activate the CAMEL Subscription Information (M-CSI). In case stopping Status Reporting is requested for multiple users, multiple ATM requests are sent to the HLR.

Table 4-4: Parameter Mapping

From: triggeredStatusReportingStop	To: MAP AnyTimeModification
stopRequest assignmentID stopScope users	subscriberIdentity (either extracted from assignmentID, or mapped from 'users') modificationInstruction in modificationRequestFor-CSI has value 'deactivate', for M-CSI (Mobility CAMEL Subscription Information)
	gsmSCF-Address

4.3 statusReportReq

statusReportReq is a method that is used by the application to request a user status report. Note that this can be requested for multiple users at the same time.

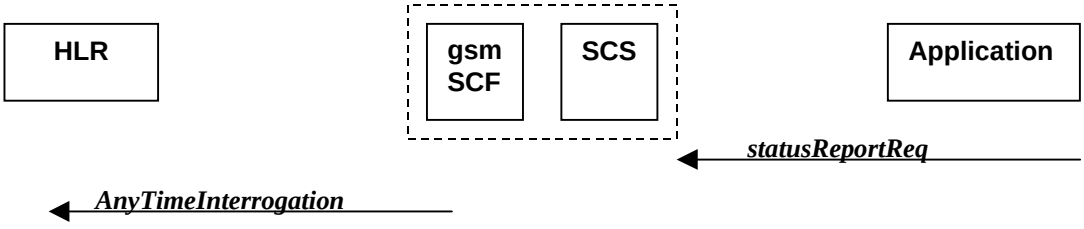

Figure 4-3: Call Flow for statusReportReq

Table 4-5: Normal Operation

Pre-conditions	
1	The application invokes the ***statusReportReq*** method
2	The gsmSCF sends a MAP ***AnyTimeInterrogateRequest*** to the HLR in order to request the subscriber status In case the Status Report is requested for multiple users, multiple ATI requests are sent to the HLR.

Table 4-6: Parameter Mapping

From: statusReportReq	To: MAP AnyTimeInterrogation
	Invoke id
appStatus	
users	subscriberIdentity
	requestedInfo (sequence of optional indicators, of which only subscriberState is present)
	gsmSCF-Address
assignmentID	

4.4 statusReportRes

statusReportRes is a method that is used by the HLR/SCS towards the application, in response to an earlier request for a user status report. Note that this can be requested for multiple users at the same time.

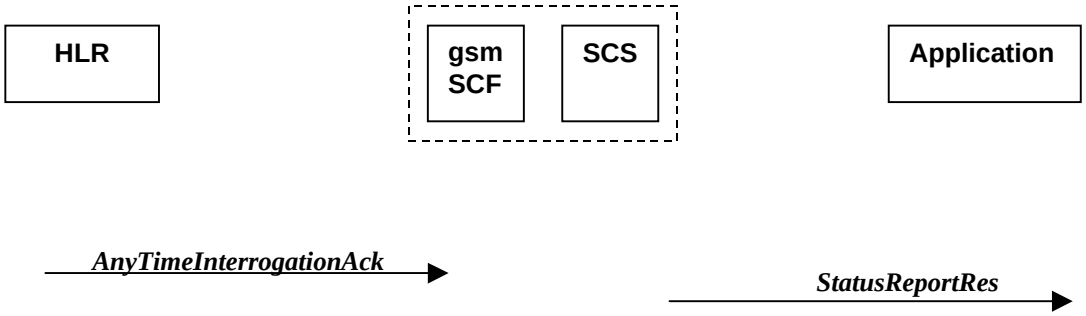

Figure 4-4: Call Flow for statusReportRes

Table 4-7: Normal Operation

Pre-conditions	The application has invoked a *statusReportReq* method and this request has been forwarded to the HLR
1	The HLR sends a MAP ***AnyTimeInterrogationAck*** to the HLR/SCS in response to the earlier request.
2	The gsmSCF/SCS respond to the application via ***StatusReportRes***. In case the Status Report was requested for multiple users, multiple ATI acknowledgements are collected in the gsmSCF/SCS before a response is sent back to the Application.

Table 4-8: Parameter Mapping

To: statusReportRes	From: MAP AnyTimeInterrogationAck
	Invoke id
assignmentID	
status	
userID	
statusCode	
	subscriberInfo (sequence of optional parameters, of which only subscriberState present)
status	subscriberState

4.5 triggeredStatusReport

triggeredStatusReport is a method that is used to notify the application of the arrival of a requested user status report event.

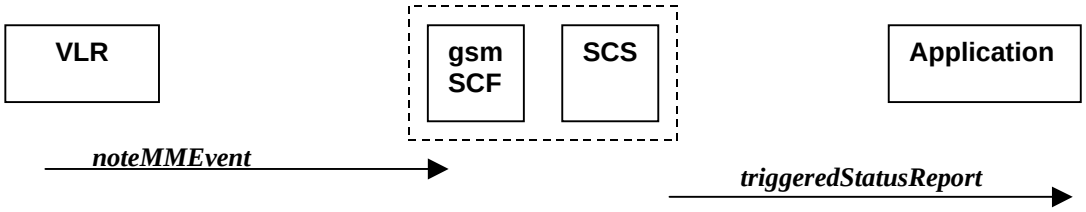

Figure 4-5: Call Flow for triggeredStatusReport

Table 4-9: Normal Operation

Pre-conditions	The Application has requested triggeredStatusReporting
1	The VLR sends a MAP ***noteMM-Event*** message to the CSE/SCS
2	The SCS sends a ***triggeredStatusReport*** to the Application

Table 4-10: Parameter Mapping

To triggeredStatusReport	From: MAP noteMM-Event
status	
userID	msisdn
statusCode	
status	event-Met
	serviceKey
	imsi
assignmentID	

5 User Status Service core-MAP Flows

The User Status (US) interface class allows applications to obtain the status of mobile telephony users.

5.1 statusReportReq

statusReportReq is a method that is used by the application to request a user status report. Note that this can be requested for multiple users at the same time.

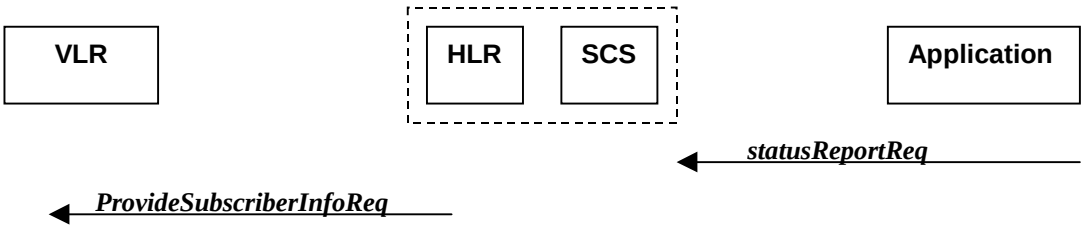

Figure 5-1: Call Flow for statusReportReq

Table 5-1: Normal Operation

Pre-conditions	
1	The application invokes the ***statusReportReq*** method
2	The HLR sends a MAP ***ProvideSubscriberInfoRequest*** to the VLR in order to request the subscriber status In case the Status Report is requested for multiple users, multiple PSI requests are sent to the VLR

Table 5-2: Parameter Mapping

From: statusReportReq	To: MAP ProvideSubscriberInfo
	Invoke id
appStatus	
users	imsi (deduced from information in 'users')
	requestedInfo (sequence of optional indicators, of which only subscriberState is present)
assignmentID	

5.2 statusReportRes

statusReportRes is a method that is used by the HLR/SCS towards the application, in response to an earlier request for a user status report. Note that this can be requested for multiple users at the same time.

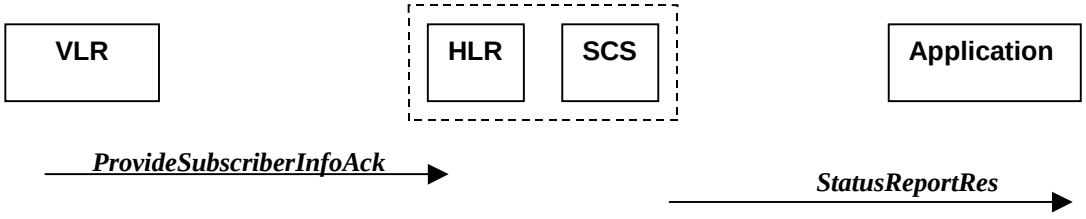

Figure 5-2: Call Flow for statusReportRes

Table 5-3: Normal Operation

Pre-conditions	The application has invoked a *statusReportReq* method and this request has been forwarded to the VLR
1	The VLR sends a MAP ***ProvideSubscriberInfoAck*** to the HLR/SCS in response to the earlier request
2	The HLR/SCS respond to the application via ***StatusReportRes*** In case the Status Report was requested for multiple users, multiple PSI acknowledgements are collected in the HLR/SCS before a response is sent back to the Application

Table 5-4: Parameter Mapping

To: statusReportRes	From: MAP ProvideSubscriberInfoAck
	Invoke id
assignmentID	
status	
userID	
statusCode	
	subscriberInfo (sequence of optional parameters, of which only subscriberState present)
status	subscriberState

6 Network User Location Call Flows

The Network User Location (NUL) provides location information, based on network-related information.

Using the NUL functions, an application programmer can request the VLR number, the Location Area Identifier, geodetic Location Information and the Cell Global Identification and other mobile telephony specific location information, if the network is able to support the corresponding capability.

6.1 locationReportReq

locationReportReq is a method used by the application to request for mobile-related location information on one or several users. A request of location information for several users shall mapped to several MAP-operation-requests.

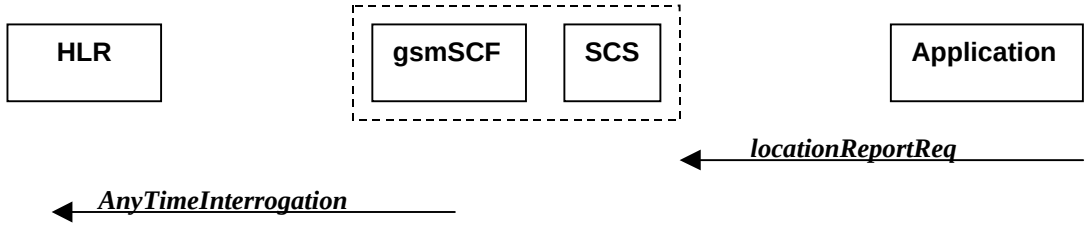

Figure 6-1: Call Flow for locationReportReq

Table 6-1: Normal Operation

Pre-conditions	An agreement is established between the network operator and the service provider for the *locationReportReq* to be enabled
1	The application invoked the ***locationReportReq*** method
2	The gsmSCF sends a MAP ***AnyTimeInterrogationReq*** to the HLR

Table 6-2: Parameter Mapping

From: locationReportReq	To: MAP AnyTimeInterrogationReq
	invokeID
appLocationCamel	
users	subscriberIdentity
	gsmSCF-Address
	requestedInfo (sequence of optional indicators, of which only locationInformation is present)
assignmentID	

6.2 locationReportRes

locationReportRes is a method that delivers a mobile location report towards the application. The report contains mobile-related location information for one or several users. A request of location information for several users shall mapped to several MAP-operation-requests.

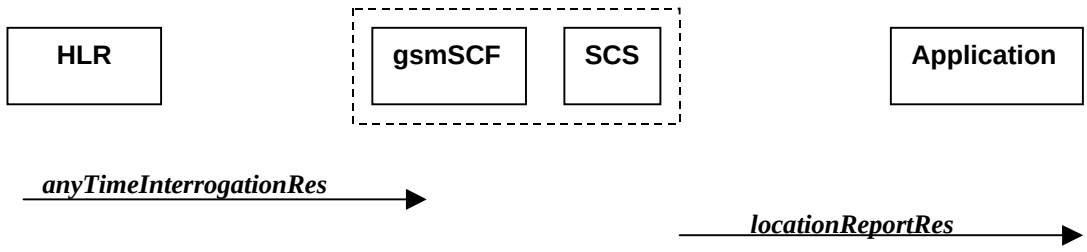

Figure 6-2: Call Flow for locationReportRes

Table 6-3: Normal Operation

Pre-conditions	The Application has previously invoked the *locationReportReq* method causing the gsmSCF to send a MAP a*nyTimeInterrogation* to the HLR
1	The HLR sends MAP ***anyTimeInterrogationRes*** to the gsmSCF/SCS
2	The SCS responds to the application via a ***locationReportRes*** method invocation

Table 6-4: Parameter Mapping

From: MAP AnyTimeInterrogationAck	To: locationReportRes
invokeId	
	assignmentID
subscriberInfo (sequence of optional parameters, of which only locationInformation is present)	
locationInformation	locations
	UserID
	StatusCode
geographicalInformation geodeticInformation	GeographicalPosition (geodeticInformation is mapped if present, otherwise geographicInformation is used)
ageOfLocationInformation	Timestamp (calculated from ageOfLocationInfo)
vlr-number	VlrNumber
locationNumber	LocationNumber
cellGlobalIdorServiceAreaIdOrLai	CellidOrLai
extensionContainer	
selectedLSA-Id	
msc-Number	
currentLocationRetrieved	

6.3 locationReportErr

locationReportErr is a method that indicates that the location report request has failed.

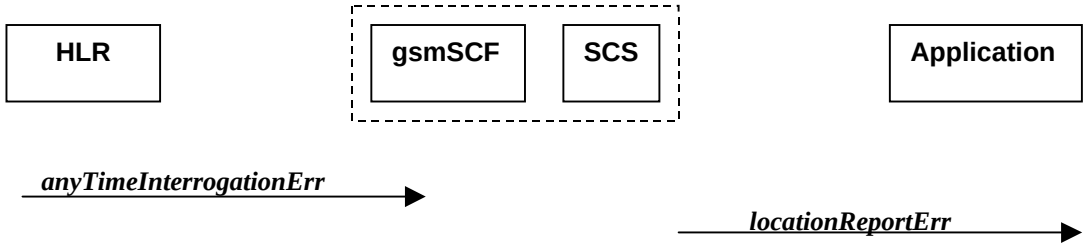

Figure 6-3: Call Flow for locationReportErr

Table 6-5: Normal Operation

Pre-conditions	The Application has previously invoked the *locationReportReq* method causing the gsmSCF to send a MAP a*nyTimeInterrogation* to the HLR
1	The HLR responds with a negative acknowledgement ***anyTimeInterrogationErr*** to the gsmSCF/SCS
2	The SCS responds to the Application via a ***locationReportErr*** method invocation

Table 6-6: Parameter Mapping

From: MAP anyTimeInterrogationErr	To: locationReportErr
	assignmentID
SystemFailure ATI-NotAllowed DataMissing UnexpectedDataValue UnknownSubscriber	cause
	diagnostic

6.4 periodicLocationReportingStartReq

periodicLocationReportingStartReq is a method used by the application to request for periodic mobile location reports on one or several users. A request of location information for several users shall mapped to several MAP-operation-requests.

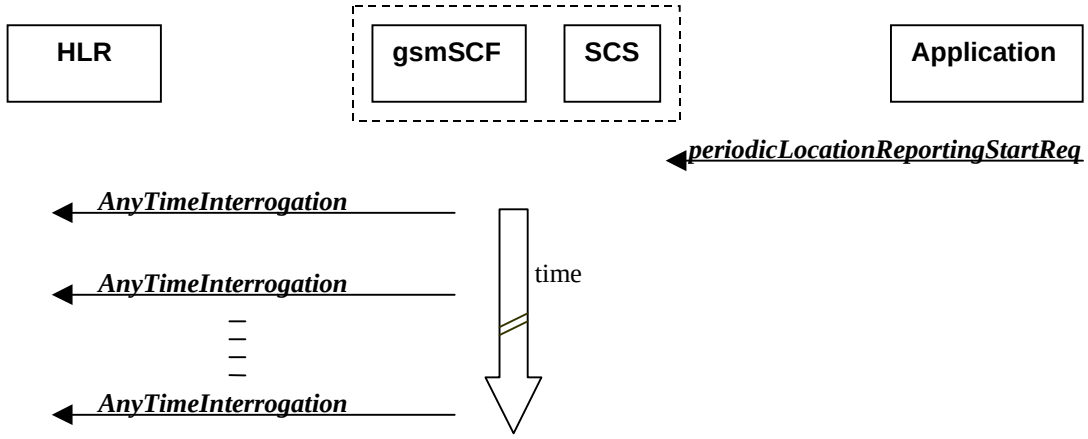

Figure 6-4: Call Flow for periodicLocationReportingStartReq

Table 6-7: Normal Operation

Pre-conditions	An agreement is established between the network operator and the service provider for the ***periodicLocationReportingStartReq*** to be enabled
1	The application invoked the ***periodicLocationReportingStartReq*** method
2	The gsmSCF sends a MAP ***AnyTimeInterrogationReq*** to the HLR, and repeats this according to the requested time interval

Table 6-8: Parameter Mapping

From: periodicLocationReportingStartReq	To: MAP AnyTimeInterrogationReq
	invokeID
appLocation	
users	subscriberIdentity
	gsmSCF-Address
	requestedInfo (sequence of optional indicators, of which only locationInformation is present)
reportingInterval	
assignmentID	

6.5 periodicLocationReportingStop

periodicLocationReportingStop is a method used by the application to stop the sending of periodic mobile location reports for one or several users. A request of location information for several users shall mapped to several MAP-operation-requests.

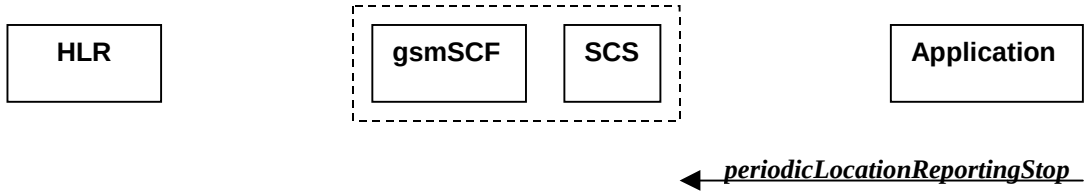

Figure 6-5: Call Flow for periodicLocationReportingStop

Table 6-9: Normal Operation

Pre-conditions	
1	The application invoked the ***periodicLocationReportingStop*** method
2	The gsmSCF stops the periodic sending of MAP ***AnyTimeInterrogationReq*** to the HLR, for the subscribers as indicated in the stop request (for details of StopRequest see e.g. with triggeredLocationReportingStop)

Parameter Mapping

None.

6.6 periodicLocationReport

periodicLocationReport is a method that provides periodic delivery of mobile location reports. The reports are containing mobile-related location information for one or several users. A request of location information for several users shall mapped to several MAP-operation-requests.

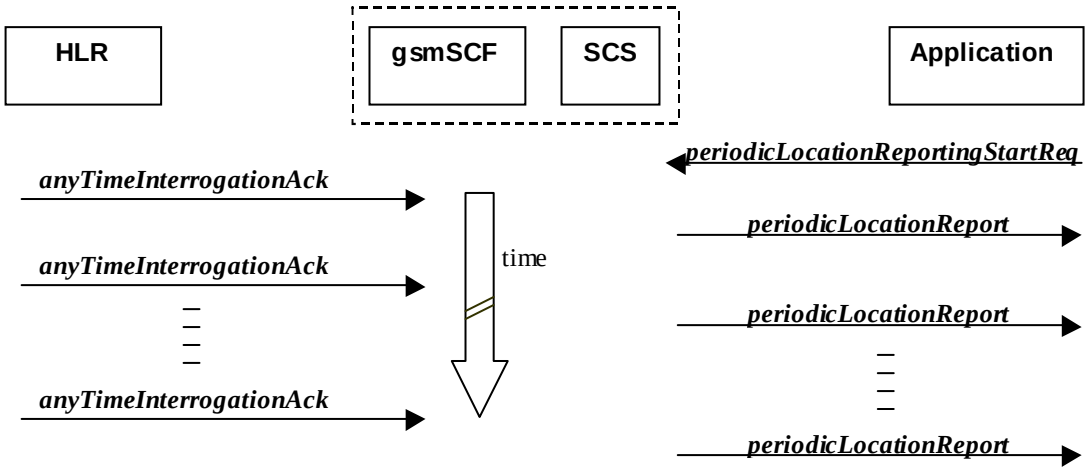

Figure 6-6: Call Flow for periodicLocationReport

Table 6-10: Normal Operation

Pre-conditions	The Application has previously invoked the *periodicLocationReportingStartReq* method causing the gsmSCF to periodically send MAP a*nyTimeInterrogation* to the HLR
1	The HLR sends periodically ***anyTimeInterrogationAck*** to the gsmSCF/SCS
2	The SCS responds to the Application via ***periodicLocationReport*** method invocation

Table 6-11: Parameter Mapping

From: MAP AnyTimeInterrogationAck	To: PeriodicLocationReport
invokeID	assignmentID
subscriberInfo (sequence of optional parameters, of which only is present)	
locationInformation	locations
	UserID
	StatusCode
geographicalInformation geodeticInformation	GeographicalPosition (geodeticInformation is mapped if present, otherwise geographicInformation is used)
ageOfLocationInfromation	Timestamp
vlr-number	VlrNumber
locationNumber	LocationNumber
cellGlobalIdorServiceAreaIdOrLai	CellidOrLai
extensionContainer	
selectedLSA-Id	
msc-Number	
currentLocationRetrieved	

6.7 periodicLocationReportErr

periodicLocationReportErr is a method that indicates that the requested periodic location report has failed. Note that errors only concerning individual users are reported in the ordinary periodicLocationReport() message.

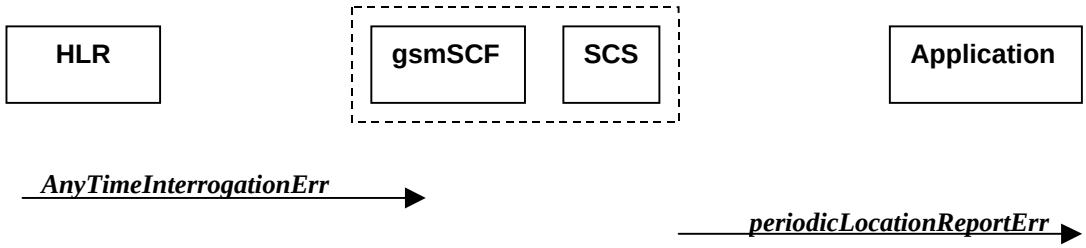

Figure 6-7: Call Flow for periodicLocationReportErr

Table 6-12: Normal Operation

Pre-conditions	The Application has previously invoked the *periodicLocationReportingStartReq* method causing the gsmSCF to periodically send MAP a*nyTimeInterrogation* to the HLR
1	The HLR sends a negative acknowledgement ***anyTimeInterrogationErr*** to the gsmSCF/SCS
2	The SCS responds to the Application via ***periodicLocationReportErr*** method invocation

Table 6-13: Parameter Mapping

From: MAP anyTimeInterrogationErr	To: periodicLocationReportErr
	assignmentID
SystemFailure ATI-NotAllowed DataMissing UnexpectedDataValue UnknownSubscriber	cause
	diagnostic

6.8 triggeredLocationReportingStartReq

triggeredLocationReportingStartReq is a method used by the application to request for user location reports, containing mobile related information, when the location is changed (the report is triggered by the location change, e.g. change of VLR number, change of Global Cell Identification or other location information if available).

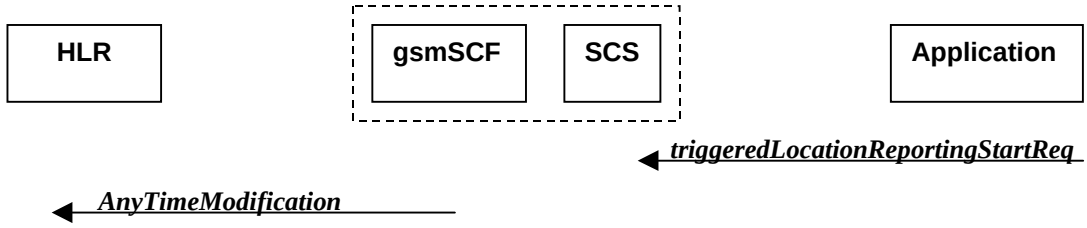

Figure 6-8: Call Flow for triggeredLocationReportingStartReq

Table 6-14: Normal Operation

Pre-conditions	An agreement is established between the network operator and the service provider for the ***triggeredLocationReportingStartReq*** to be disabled
1	The application invoked the ***triggeredLocationReportingStartReq*** method
2	The gsmSCF sends a MAP ***AnyTimeModificationReq*** to the HLR in order to activate the CAMEL subscription Information (M-CSI) In case the Location Report is requested for multiple users, multiple ATM requests are sent to the HLR

Table 6-15: Parameter Mapping

From: triggeredLocationReportingStartReq	To: MAP AnyTimeModificationReq
appLocation	
users	subscriberIdentity modificationInstruction in modificationRequestFor-CSI has value 'activate', for M-CSI (Mobility CAMEL Subscription Information)
	gsmSCF-Address
triggers	

6.9 triggeredLocationReportingStop

triggeredLocationReportingStop is a method used by the application to request that triggered mobile location reporting should stop.

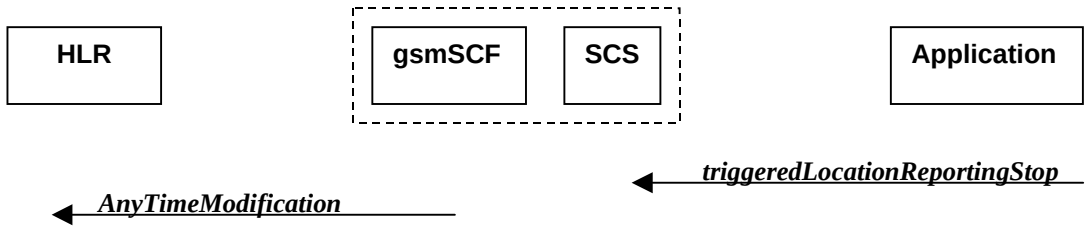

Figure 6-9: Call Flow for triggeredLocationReportingStop

Table 6-16: Normal Operation

Pre-conditions	
1	The application has initiated a ***triggeredLocationReportingStop*** method
2	The gsmSCF sends a MAP ***AnyTimeModificationReq*** to the HLR in order to de-activate the CAMEL subscription Information (M-CSI) In case stopping of triggered location reporting is requested for multiple users, multiple ATM requests are sent to the HLR

Table 6-17: Parameter Mapping

From: triggeredLocationReportingStop	To: MAP AnyTimeModificationReq
stopRequest assignmentID stopScope users	subscriberIdentity (either extracted from assignmentID, or mapped from 'users') modificationInstruction in ModificationRequestFor-CSI has value 'deactivate', for M-CSI (Mobility CAMEL Subscription Information)
	gsmSCF-Address

6.10 triggeredLocationReport

triggeredLocationReport is a method providing the delivery of a report that is indicating that one or several user's mobile location has changed.

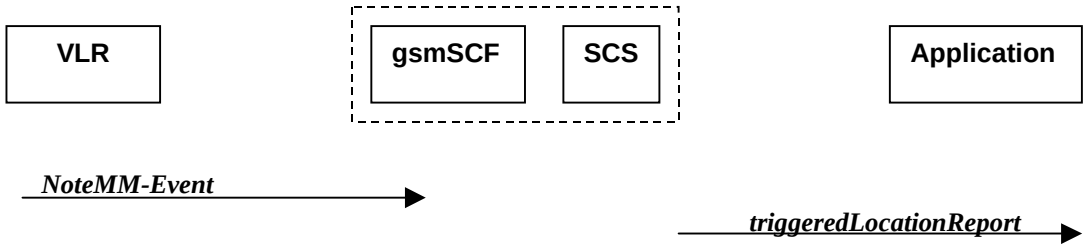

Figure 6-10: Call Flow for triggeredLocationReport

Table 6-18: Normal Operation

Pre-conditions	
1	The application invoked the ***triggeredLocationReportingStartReq*** method

Table 6-19: Parameter Mapping

From: MAP NoteMM-Event	To: triggeredLocationReport
	assignmentID
serviceKey	
imsi	
msisdn	
locationInformation	location
	UserID (from msisdn)
	StatusCode
geographicalInformation geodeticInformation	GeographicalPosition
ageOfLocationInformation	Timestamp (calculated from ageOfLocationInfo)
vlr-number	VlrNumber
locationNumber	LocationNumber
cellGlobalIdorServiceAreaIdOrLai	CellidOrLai
extensionContainer	
selectedLSA-Id	
msc-Number	
currentLocationRetrieved	
eventMet	criterion

6.11 triggeredLocationReportErr

triggeredLocationReportErr is a method indicating that a requested *triggeredLocationReportingStartReq* has failed.

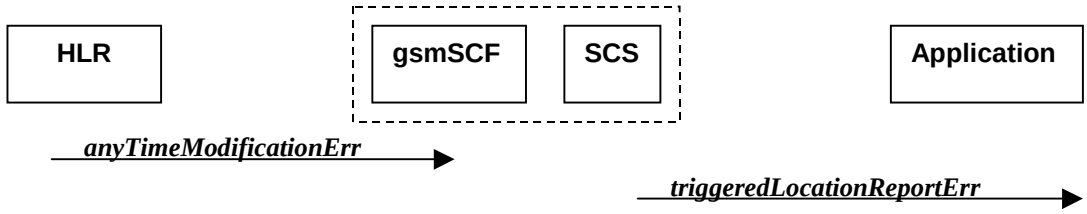

Figure 6-11: Call Flow for triggeredLocationReportErr

Table 6-20: Normal Operation

Pre-conditions	The Application has previously invoked the *triggeredLocationReportingStartReq* **method, causing the gsmSCF to send a MAP** *anyTimeModificationReq* **to the HLR**
1	The HLR sends a negative response ***anyTimeModificationErr*** to the gsmSCF/SCS
2	The SCS sends ***triggeredLocationReportErr*** to the Application

Table 6-21: Parameter Mapping

From: MAP anyTimeModificationErr	To: triggeredLocationReportErr
	assignmentID
Any Time Modification Not Allowed Data Missing Unexpected Data Value Unknown Subscriber Bearer service not provisioned Teleservice not provisioned Call Barred Illegal SS operation SS error status SS incompatibility SS subscription violation Information Not Available	cause
	diagnostic

Annex A:
Change history

Change history							
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**
Mar 2001	CN_11	NP-010131	011	-	CR 29.998: for moving TR 29.998 from R99 to Rel 4 (N5-010159)	3.2.0	4.0.0
Jun 2002	CN_16	--	--	--	Automatically upgraded to Rel-5 (i.e. no change/CR). The overview of the enlarged 29.198/29.998-family was updated in the Introduction.	4.0.0	5.0.0
Dec 2004	CN_26	--	--	--	Automatically upgraded to Rel-6 (i.e. no change/CR). The overview of the enlarged 29.198/29.998-family was updated in the Introduction.	5.0.0	6.0.0

History

Document history		
V6.0.0	December 2004	Publication