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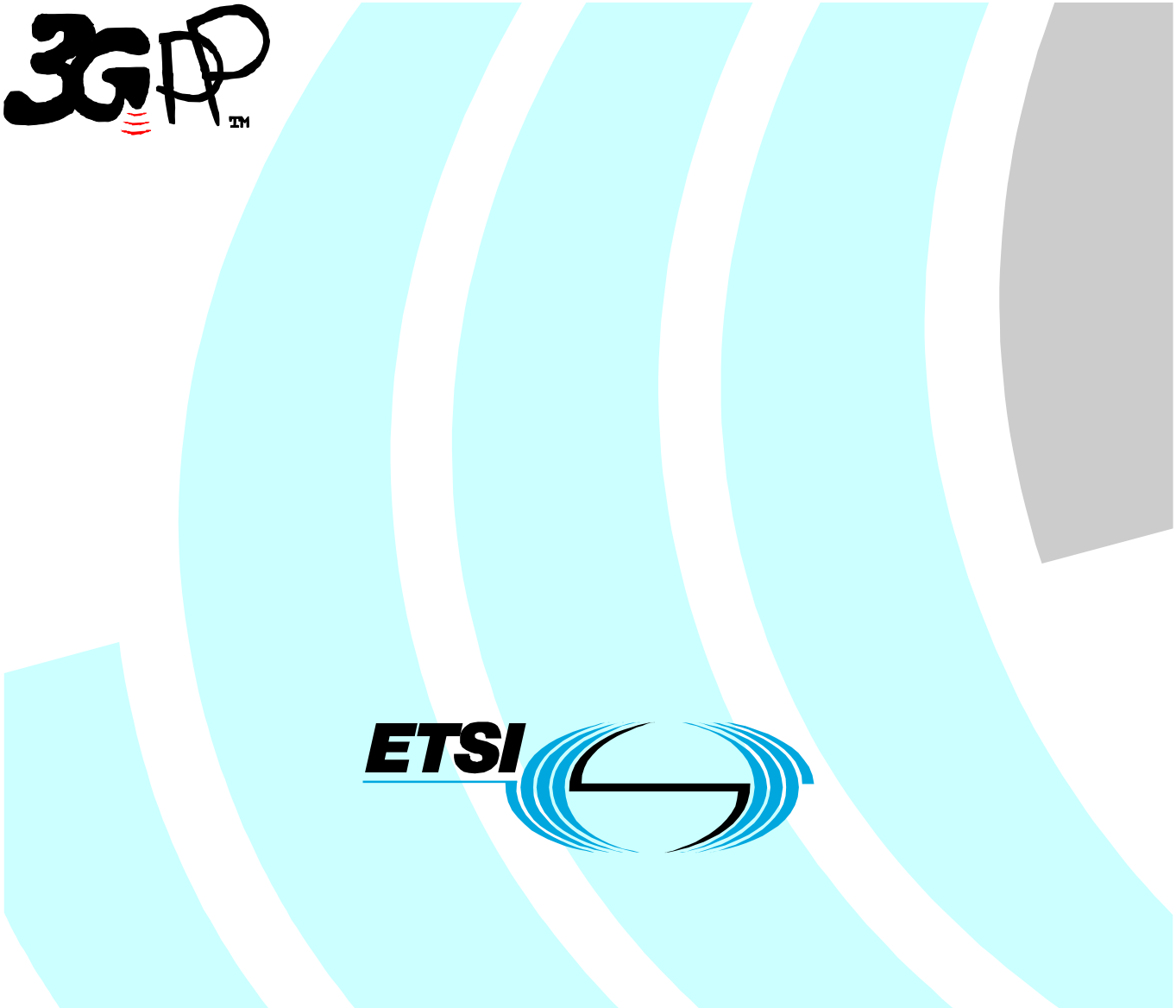
Technical Specification

Universal Mobile Telecommunications System (UMTS);
Open Service Access (OSA)
Application Programming Interface (API);
Part 6: Mobility Service Capability Feature (SCF)
(3GPP TS 29.198-06 version 7.0.0 Release 7)



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Contents

Intellectual Property Rights 2
Foreword 2
Foreword 8
Introduction 8
1 Scope 10
2 References 10
3 Definitions and abbreviations 11
3.1 Definitions 11
3.2 Abbreviations 11
4 Mobility SCF 11
4.1 General requirements on support of methods 11
5 Sequence Diagrams 11
5.1 User Location Sequence Diagrams 11
5.1.1 User Location Interrogation - Triggered Request 11
5.1.2 User Location Interrogation - Periodic Request 12
5.1.3 User Location Interrogation - Interactive Request 13
5.2 User Location Camel Sequence Diagrams 14
5.2.1 User Location Camel Interrogation - Triggered Request 14
5.2.2 User Location Camel Interrogation - Periodic Request 15
5.2.3 User Location Camel Interrogation - Interactive Request 16
5.3 User Status Sequence Diagrams 17
5.3.1 Triggered Reporting 17
5.3.2 Interactive Request 18
6 Class Diagrams 19
6.1 User Location Class Diagrams 19
6.2 User Location Camel Class Diagrams 21
6.3 User Status Class Diagrams 21
7 The Service Interface Specifications 22
7.1 Interface Specification Format 22
7.1.1 Interface Class 22
7.1.2 Method descriptions 23
7.1.3 Parameter descriptions 23
7.1.4 State Model 23
7.2 Base Interface 23
7.2.1 Interface Class IpInterface 23
7.3 Service Interfaces 23
7.3.1 Overview 23
7.4 Generic Service Interface 23
7.4.1 Interface Class IpService 23
7.4.1.1 Method setCallback() 24
7.4.1.2 Method setCallbackWithSessionID() 24
8 Mobility Interface Classes 25
8.1 User Location Interface Classes 25
8.1.1 Interface Class IpUserLocation 25
8.1.1.1 Method locationReportReq() 25
8.1.1.2 Method extendedLocationReportReq() 26
8.1.1.3 Method periodicLocationReportingStartReq() 26
8.1.1.4 Method periodicLocationReportingStop() 27
8.1.1.5 Method getNextPeriodicLocationRequest() 27
8.1.2 Interface Class IpAppUserLocation 28

8.1.2.1 Method locationReportRes() 28
8.1.2.2 Method locationReportErr() 29
8.1.2.3 Method extendedLocationReportRes() 29
8.1.2.4 Method extendedLocationReportErr() 29
8.1.2.5 Method periodicLocationReport() 30
8.1.2.6 Method periodicLocationReportErr() 30
8.1.3 Interface Class IpTriggeredUserLocation 30
8.1.3.1 Method triggeredLocationReportingStartReq() 31
8.1.3.2 Method triggeredLocationReportingStop() 31
8.1.3.3 Method getNextTriggeredLocationRequest() 32
8.1.4 Interface Class IpAppTriggeredUserLocation 32
8.1.4.1 Method triggeredLocationReport() 33
8.1.4.2 Method triggeredLocationReportErr() 33
8.1.4.3 Method triggeredReportingEnded() 33
8.2 User Location Camel Interface Classes 34
8.2.1 Interface Class IpUserLocationCamel 34
8.2.1.1 Method locationReportReq() 34
8.2.1.2 Method periodicLocationReportingStartReq() 35
8.2.1.3 Method periodicLocationReportingStop() 35
8.2.1.4 Method triggeredLocationReportingStartReq() 36
8.2.1.5 Method triggeredLocationReportingStop() 36
8.2.1.6 Method getNextPeriodicLocationRequest() 37
8.2.1.7 Method getNextTriggeredLocationRequest() 37
8.2.2 Interface Class IpAppUserLocationCamel 38
8.2.2.1 Method locationReportRes() 38
8.2.2.2 Method locationReportErr() 39
8.2.2.3 Method periodicLocationReport() 39
8.2.2.4 Method periodicLocationReportErr() 39
8.2.2.5 Method triggeredLocationReport() 39
8.2.2.6 Method triggeredLocationReportErr() 40
8.2.2.7 Method triggeredReportingEnded() 40
8.3 User Status Interface Classes 40
8.3.1 Interface Class IpAppUserStatus 40
8.3.1.1 Method statusReportRes() 41
8.3.1.2 Method statusReportErr() 41
8.3.1.3 Method triggeredStatusReport() 42
8.3.1.4 Method triggeredStatusReportErr() 42
8.3.1.5 Method extendedStatusReportRes() 42
8.3.1.6 Method extendedStatusReportErr() 42
8.3.1.7 Method extTriggeredStatusReport() 43
8.3.1.8 Method extTriggeredStatusReportErr() 43
8.3.1.9 Method triggeredReportingEnded() 43
8.3.2 Interface Class IpUserStatus 43
8.3.2.1 Method statusReportReq() 44
8.3.2.2 Method triggeredStatusReportingStartReq() 44
8.3.2.3 Method triggeredStatusReportingStop() 45
8.3.2.4 Method getNextTriggeredStatusRequest() 45
8.3.2.5 Method extendedStatusReportReq() 46
8.3.2.6 Method extTriggeredStatusReportingStartReq() 46
8.3.2.7 Method extTriggeredStatusReportingStop() 47

9 State Transition Diagrams 47
9.1 User Location 47
9.2 User Location Camel 47
9.2.1 State Transition Diagrams for IpUserLocationCamel 47
9.2.1.1 Active State 48
9.3 User Status 48
9.3.1 State Transition Diagrams for IpUserStatus 48
9.3.1.1 Active State 49

10 Service Properties 49
10.1 Mobility Properties 49

10.1.1 Emergency Application Subtypes 49
10.1.2 Value Added Application Subtypes 50
10.1.3 PLMN Operator Application Subtypes 50
10.1.4 Lawful Intercept Application Subtypes 50
10.1.5 Altitude Obtainable 50
10.1.6 Location Methods 50
10.1.7 Priorities 51
10.1.8 Max Interactive Requests 51
10.1.9 Max Triggered Users 51
10.1.10 Max Periodic Users 51
10.1.11 Min Periodic Interval Duration 51
10.1.12 Initial Report 51
10.1.13 Max Life Time 51
10.2 User Location Service Properties 51
10.3 User Location Camel Service Properties 52
10.4 User Status Service Properties 53

11 Data Definitions 53
11.1 Common Mobility Data Definitions 53
11.1.1 TpGeographicalPosition 53
11.1.2 TpLocationPriority 54
11.1.3 TpLocationRequest 55
11.1.4 TpLocationResponseIndicator 55
11.1.5 TpLocationResponseTime 55
11.1.6 TpLocationType 55
11.1.7 TpLocationUncertaintyShape 56
11.1.8 TpMobilityDiagnostic 56
11.1.9 TpMobilityError 57
11.1.10 TpMobilityStopAssignmentData 57
11.1.11 TpMobilityStopScope 57
11.1.12 TpTerminalType 57
11.2 User Location Data Definitions 58
11.2.1 IpUserLocation 58
11.2.2 IpUserLocationRef 58
11.2.3 IpAppUserLocation 58
11.2.4 IpAppUserLocationRef 58
11.2.5 IpTriggeredUserLocation 58
11.2.6 IpTriggeredUserLocationRef 58
11.2.7 IpAppTriggeredUserLocation 58
11.2.8 IpAppTriggeredUserLocationRef 58
11.2.9 TpUlExtendedData 58
11.2.10 TpUlExtendedDataSet 58
11.2.11 TpUserLocationExtended 59
11.2.12 TpUserLocationExtendedSet 59
11.2.13 TpLocationTrigger 59
11.2.14 TpLocationTriggerSet 59
11.2.15 TpLocationTriggerCriteria 59
11.2.16 TpUserLocation 59
11.2.17 TpUserLocationSet 60
11.2.18 TpTriggeredLocationRequestSetEntry 60
11.2.19 TpTriggeredLocationRequestSet 60
11.2.20 TpTriggeredLocationRequest 60
11.2.21 TpPeriodicLocationRequestSetEntry 60
11.2.22 TpPeriodicLocationRequestSet 60
11.2.23 TpPeriodicLocationRequest 60
11.3 User Location Camel Data Definitions 61
11.3.1 IpUserLocationCamel 61
11.3.2 IpUserLocationCamelRef 61
11.3.3 IpAppUserLocationCamel 61
11.3.4 IpAppUserLocationCamelRef 61
11.3.5 TpLocationCellIDOrLAI 61
11.3.6 TpLocationTriggerCamel 61

11.3.7 TpUserLocationCamel 62
11.3.8 TpUserLocationCamelSet 62
11.4 User Location Emergency Data Definitions 62
11.4.1 IpUserLocationEmergency 62
11.4.2 IpUserLocationEmergencyRef 62
11.4.3 IpAppUserLocationEmergency 62
11.4.4 IpAppUserLocationEmergencyRef 62
11.4.5 TpIMEI 62
11.4.6 TpNaESRD 62
11.4.7 TpNaESRK 63
11.4.8 TpUserLocationEmergencyRequest 63
11.4.9 TpUserLocationEmergency 63
11.4.10 TpUserLocationEmergencyTrigger 64
11.5 User Status Data Definitions 64
11.5.1 IpUserStatus 64
11.5.2 IpUserStatusRef 64
11.5.3 IpAppUserStatus 64
11.5.4 IpAppUserStatusRef 64
11.5.5 TpUserStatus 64
11.5.6 TpUserStatusSet 64
11.5.7 TpUserStatusIndicator 64
11.5.8 TpTriggeredStatusRequestSetEntry 65
11.5.9 TpTriggeredStatusRequestSet 65
11.5.10 TpTriggeredStatusRequest 65
11.5.11 TpUserStatusExtended 65
11.5.12 TpUserStatusExtendedSet 65
11.5.13 TpUserStatusIndicatorExtended 66
11.5.14 TpAuthStatusIndicator 66
11.5.15 TpUserInfo 66
11.5.16 TpNetworkStatusIndicator 66
11.5.17 TpAccessTechnology 66
11.5.18 TpRoamingStatus 66
11.6 User Binding Data Definitions 67
11.6.1 TpBindingSet 67
11.6.2 TpBindingEntrySet 67
11.6.3 TpBindingEntry 67
11.6.4 TpBindingEntryType 67
11.6.5 TpBindingNotificationCriteriaSet 67
11.6.6 TpBindingNotificationCriteria 68
11.6.7 TpBindingNotificationCriteriaType 68
11.7 Units and Validations of Parameters 69

12 Exception Classes 69

Annex A (normative): OMG IDL Description of Mobility SCF 71

Annex B (informative): W3C WSDL Description of Mobility SCF 72

Annex C (informative): Java API Description of the Mobility SCFs 73

Annex D (informative): Description of Mobility SCF for 3GPP2 cdma2000 networks 74

D.1 General Exceptions 74

D.2 Specific Exceptions 74
D.2.1 Clause 1: Scope 74
D.2.2 Clause 2: References 74
D.2.3 Clause 3: Definitions and abbreviations 74
D.2.4 Clause 4: Mobility SCF 74
D.2.5 Clause 5: Sequence Diagrams 74
D.2.6 Clause 6 Class Diagrams 75
D.2.7 Clause 7: The Service Interface Specifications 75
D.2.8 Clause 8: Mobility Interface Classes 75

D.2.9 Clause 9: State Transition Diagrams 75
D.2.10 Clause 10: Service Properties 75
D.2.11 Clause 11: Data Definitions 75
D.2.12 Clause 12: Exception Classes 75
D.2.13 Annex A (normative): OMG IDL Description of Mobility SCF 75
D.2.14 Annex B (informative): W3C WSDL Description of Mobility SCF 75
D.2.15 Annex C (informative): Java™ API Description of Mobility SCF 75

Annex E (informative): Change history 76

History 77

Foreword

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

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Introduction

The present document is part 6 of a multi-part TS covering the 3rd Generation Partnership Project: Technical Specification Group Core Network; Open Service Access (OSA); Application Programming Interface (API), as identified below. The **API specification** (3GPP TS 29.198) is structured in the following Parts:

Part 1:	"Overview";	
Part 2:	"Common Data Definitions";	
Part 3:	"Framework";	
Part 4:	"Call Control";	
	Sub-part 1: "Call Control Common Definitions";	
	Sub-part 2: "Generic Call Control SCF";	
	Sub-part 3: "Multi-Party Call Control SCF";	
	Sub-part 4: "Multi-Media Call Control SCF";	
	Sub-part 5: "Conference Call Control SCF";	(new in 3GPP Release 7)
Part 5:	"User Interaction SCF";	
Part 6:	**"Mobility SCF";**	
Part 7:	"Terminal Capabilities SCF";	
Part 8:	"Data Session Control SCF";	
Part 9:	"Generic Messaging SCF";	(not part of 3GPP Release 7)
Part 10:	"Connectivity Manager SCF";	(not part of 3GPP Release 7)
Part 11:	"Account Management SCF";	
Part 12:	"Charging SCF".	
Part 13:	"Policy Management SCF";	
Part 14:	"Presence and Availability Management SCF";	
Part 15:	"Multi Media Messaging SCF";	
Part 16:	"Service Broker SCF".	(new in Release 7)

The **Mapping specification of the OSA APIs and network protocols** (3GPP TR 29.998) is also structured as above. A mapping to network protocols is however not applicable for all Parts, but the numbering of Parts is kept. Also in case a Part is not supported in a Release, the numbering of the parts is maintained.

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	29.198-04-5 Conf 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 – ISC 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**					29.998-06-1	User Status and User Location – MAP mapping
						29.998-06-2	User Status and User Location – SIP 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*
29.198-16	Service Broker SCF					*29.998-16*	*Not Applicable*

1 Scope

The present document is Part 6 of the Stage 3 specification for an Application Programming Interface (API) for Open Service Access (OSA).

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 APIs. The concepts and the functional architecture for the OSA are contained in 3GPP TS 23.198 [3]. The requirements for OSA are contained in 3GPP TS 22.127 [2].

The present document specifies the Mobility Service Capability Feature (SCF) aspects of the interface. All aspects of the Mobility SCF are defined here, these being:

- Sequence Diagrams
- Class Diagrams
- Interface specification plus detailed method descriptions
- State Transition diagrams
- Data definitions
- IDL Description of the interfaces
- WSDL Description of the interfaces
- Reference to the Java™ API description of the interfaces

The process by which this task is accomplished is through the use of object modelling techniques described by the Unified Modelling Language (UML).

This specification has been defined jointly between 3GPP TSG CT WG5, ETSI TISPAN and the Parlay Group, in co-operation with a number of JAIN™ Community member companies.

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 29.198-01: "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 TS 29.002: "Mobile Application Part (MAP) specification".

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 Mobility SCF

The following clauses describe each aspect of the Mobility Service Capability Feature (SCF).

The order is as follows:

- The Sequence diagrams give the reader a practical idea of how each of the SCFs is implemented.
- The Class relationships clause shows how each of the interfaces applicable to the SCF, relate to one another.
- The Interface specification clause describes in detail each of the interfaces shown within the Class diagram part.
- The State Transition Diagrams (STD) show the transition between states in the SCF. The states and transitions are well-defined; either methods specified in the Interface specification or events occurring in the underlying networks cause state transitions.
- The Data Definitions clause shows a detailed expansion of each of the data types associated with the methods within the classes. Note that some data types are used in other methods and classes and are therefore defined within the Common Data types part of this specification.

4.1 General requirements on support of methods

An implementation of this API which supports or implements a method described in the present document, shall support or implement the functionality described for that method, for at least one valid set of values for the parameters of that method.

Where a method is not supported by an implementation of a Service interface, the exception P_METHOD_NOT_SUPPORTED shall be returned to any call of that method.

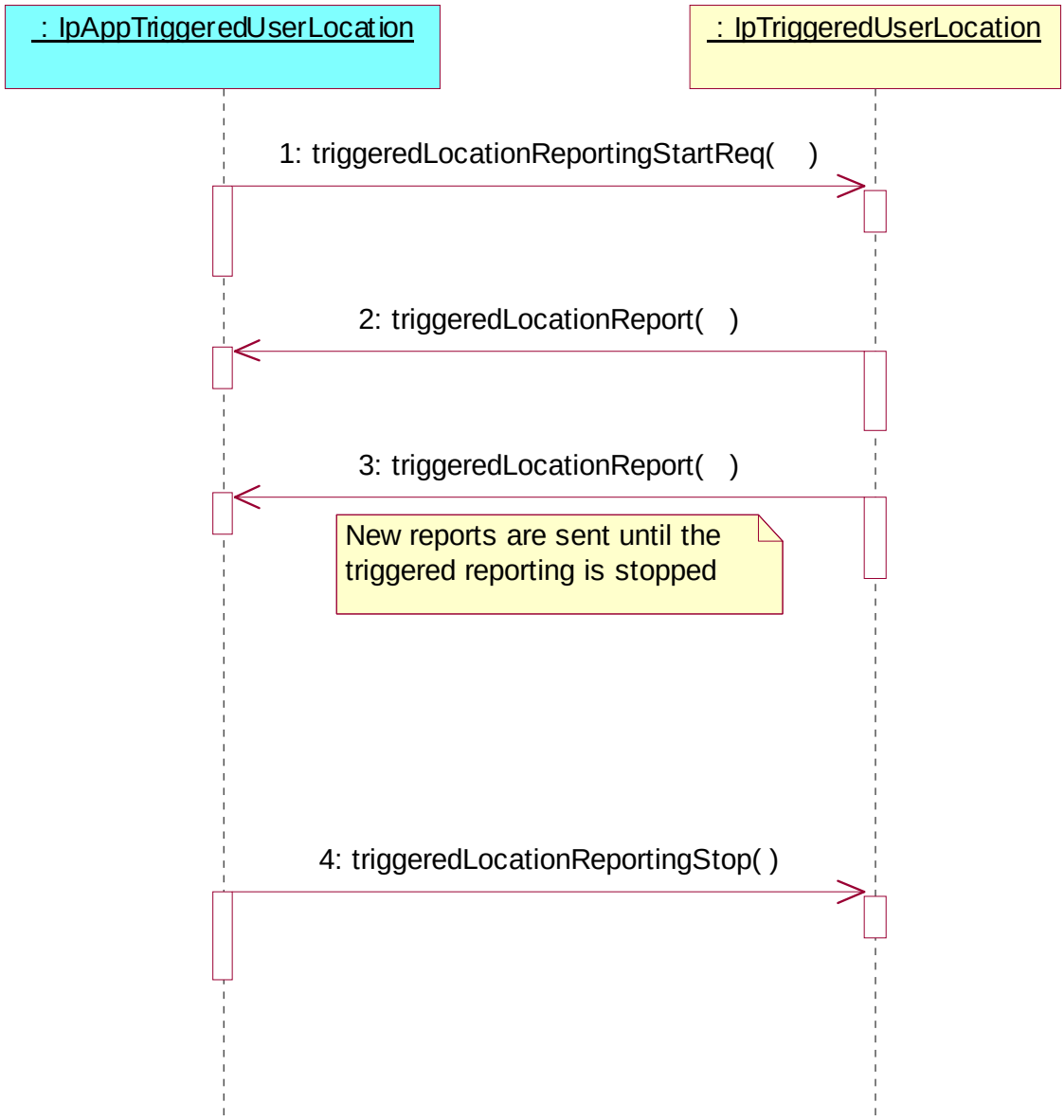
Where a method is not supported by an implementation of an Application interface, a call to that method shall be possible, and no exception shall be returned.

5 Sequence Diagrams

5.1 User Location Sequence Diagrams

5.1.1 User Location Interrogation - Triggered Request

The following sequence diagram shows how an application requests triggered location reports from the User Location service. When users location changes, the service reports this to the application.



1: This message is used to start triggered location reporting for one or several users.

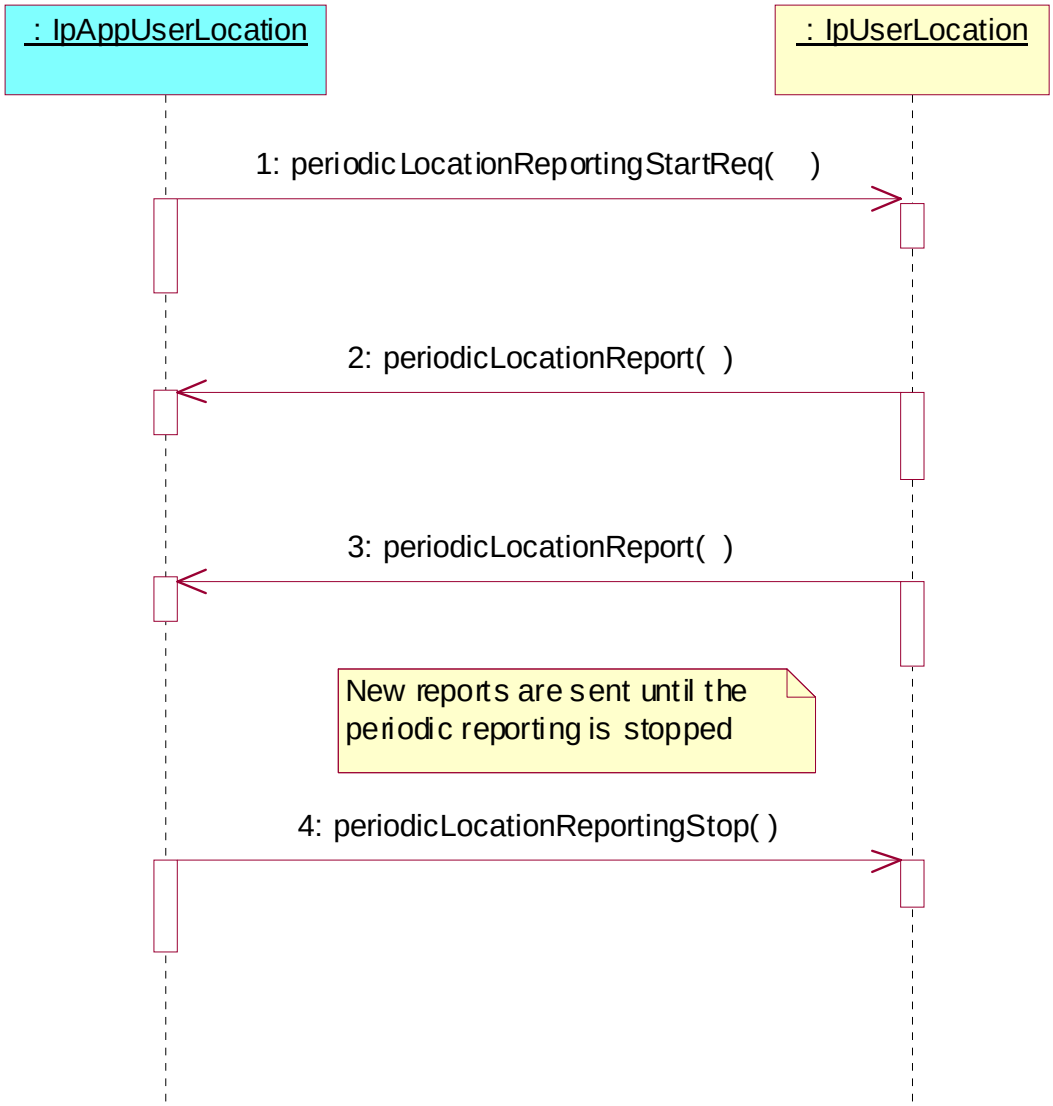
2: When the trigger condition is fulfilled then this message passes the location of the affected user to its callback object.

3: This is repeated until the application stops triggered location reporting (see next message).

4: This message is used to stop triggered location reporting.

5.1.2 User Location Interrogation - Periodic Request

The following sequence diagram shows how an application requests periodic location reports from the User Location service.



1: This message is used to start periodic location reporting for one or several users.

2: This message passes the location of one or several users to its callback object.

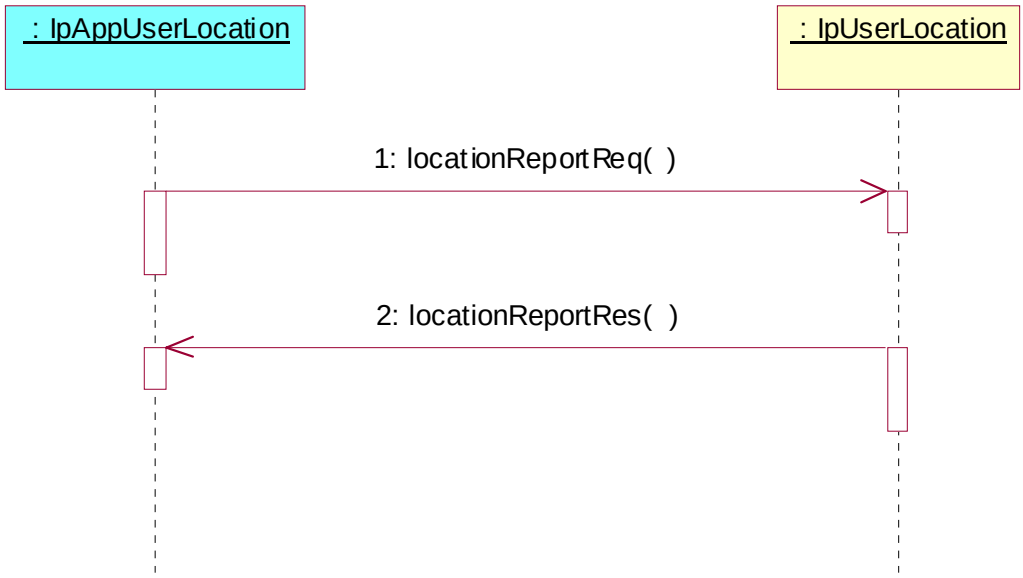
3: This message passes the location of one or several users to its callback object.

This is repeated at regular intervals until the application stops periodic location reporting (see next message).

4: This message is used to stop periodic location reporting.

5.1.3 User Location Interrogation - Interactive Request

The following sequence diagram shows how an application requests a location report from the User Location service.



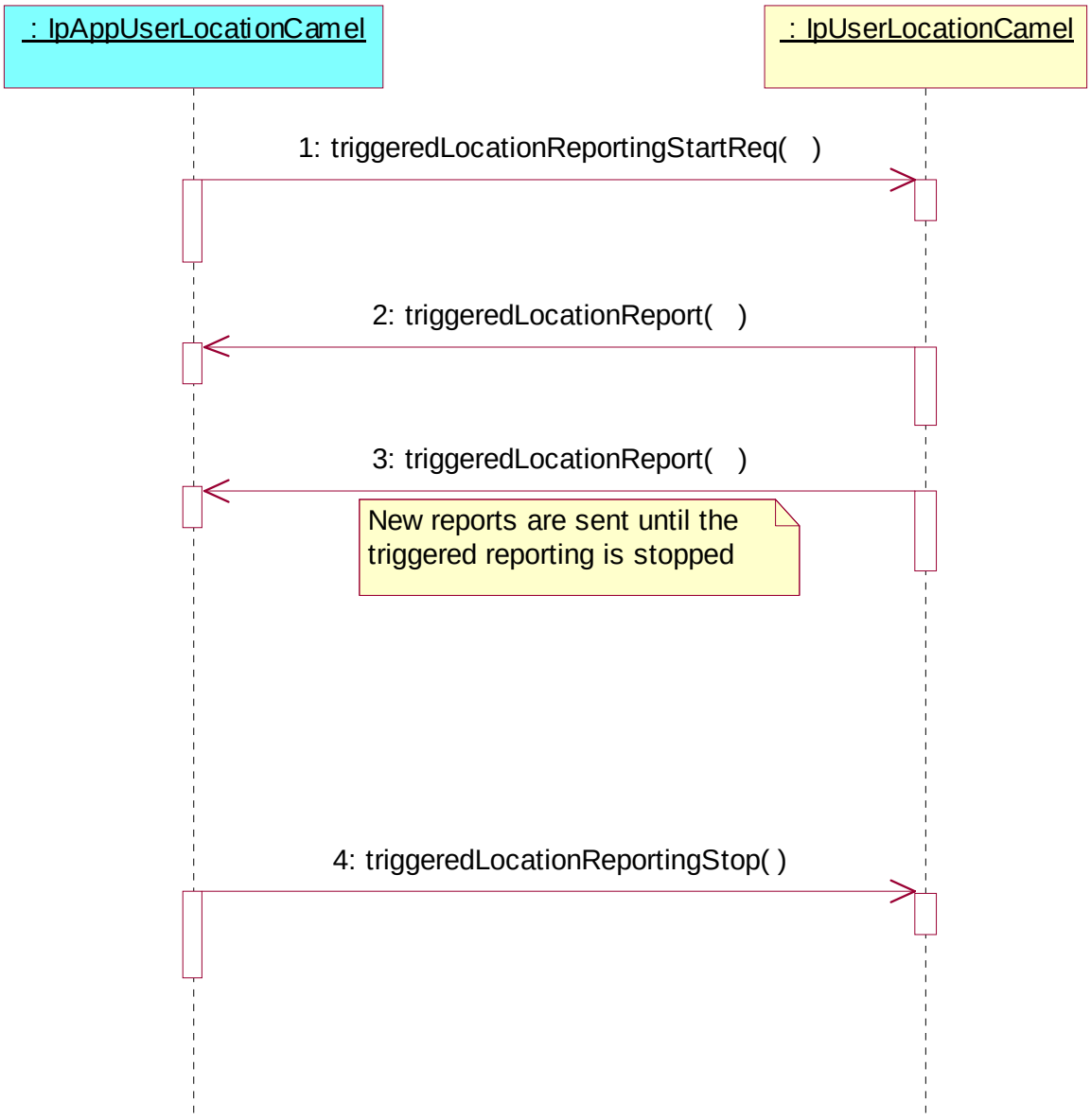
1: This message is used to request the location of one or several users.

2: This message passes the result of the location request for one or several users to its callback object.

5.2 User Location Camel Sequence Diagrams

5.2.1 User Location Camel Interrogation - Triggered Request

The following sequence diagram shows how an application requests triggered location reports from the User Location Camel service. When users location changes, the service reports this to the application.



1: This message is used to start triggered location reporting for one or several users.

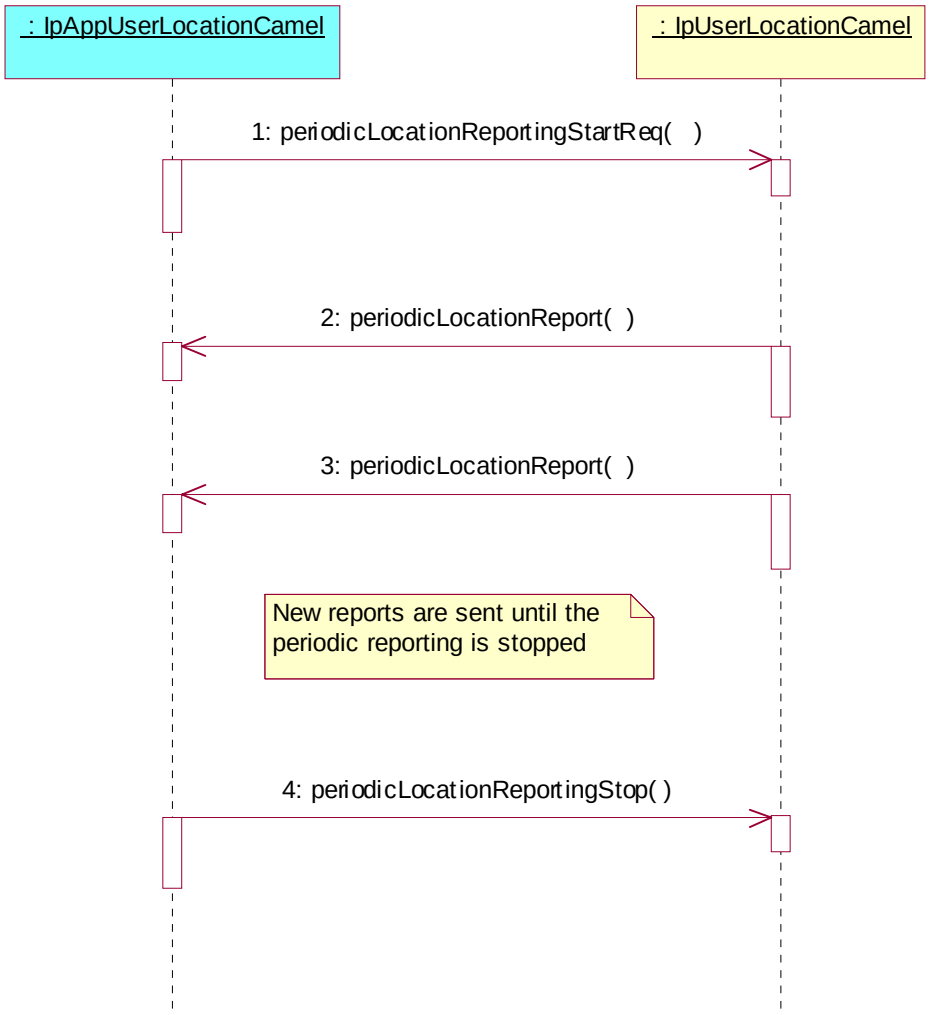
2: When the trigger condition is fulfilled then this message passes the location of the affected user to its callback object.

3: This is repeated until the application stops triggered location reporting (see next message).

4: This message is used to stop triggered location reporting.

5.2.2 User Location Camel Interrogation - Periodic Request

The following sequence diagram shows how an application requests periodic location reports from the User Location Camel service.



1: This message is used to start periodic location reporting for one or several users.

2: This message passes the location of one or several users to its callback object.

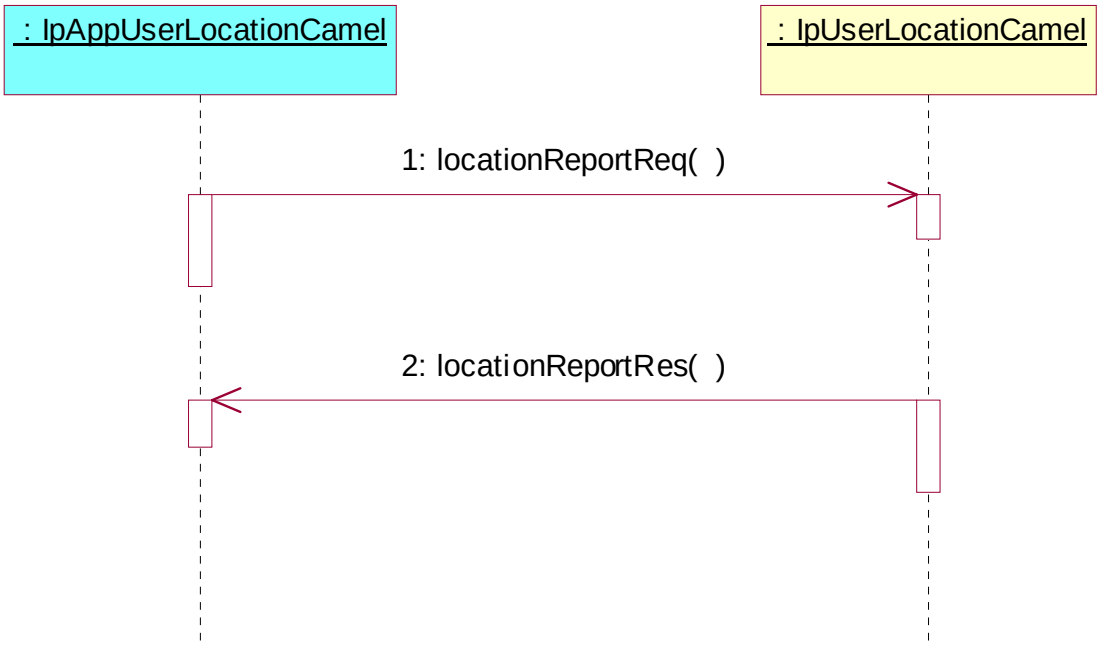
3: This message passes the location of one or several users to its callback object.

This is repeated at regular intervals until the application stops periodic location reporting (see next message).

4: This message is used to stop periodic location reporting.

5.2.3 User Location Camel Interrogation - Interactive Request

The following sequence diagram shows how an application requests a location report from the User Location Camel service.



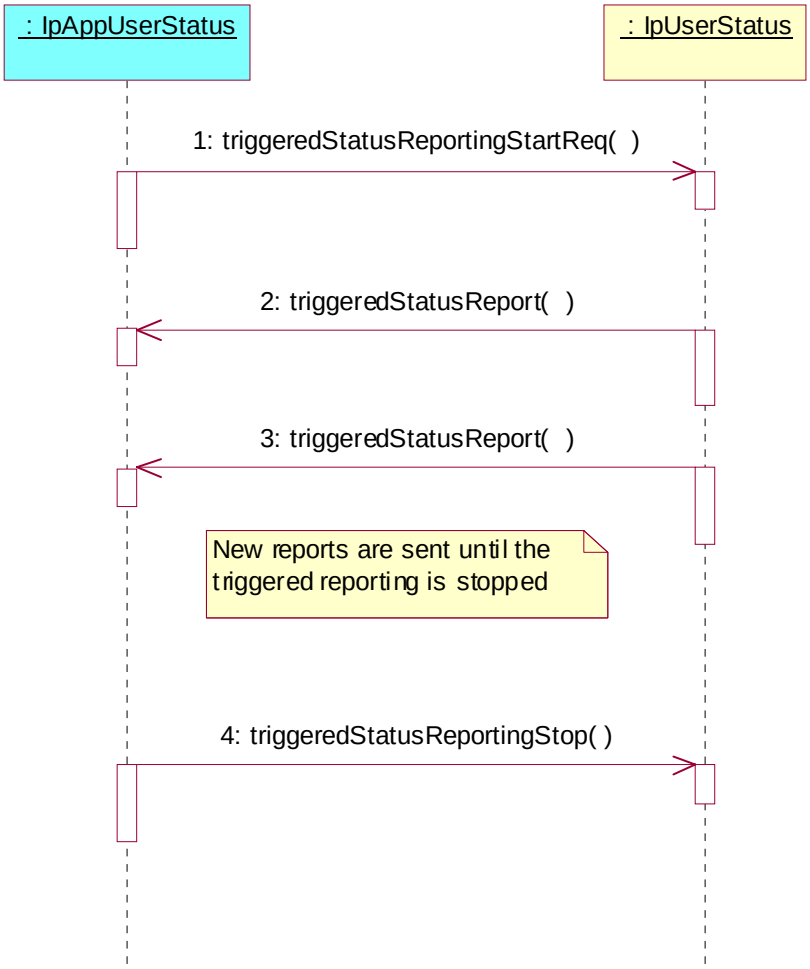
1: This message is used to request the location of one or several users.

2: This message passes the result of the location request for one or several users to its callback object.

5.3 User Status Sequence Diagrams

5.3.1 Triggered Reporting

The following sequence diagram shows how an application requests triggered status reports from the Status Location service. When user's status changes, the service reports this to the application.



1: This message is used to start triggered status reporting for one or several users.

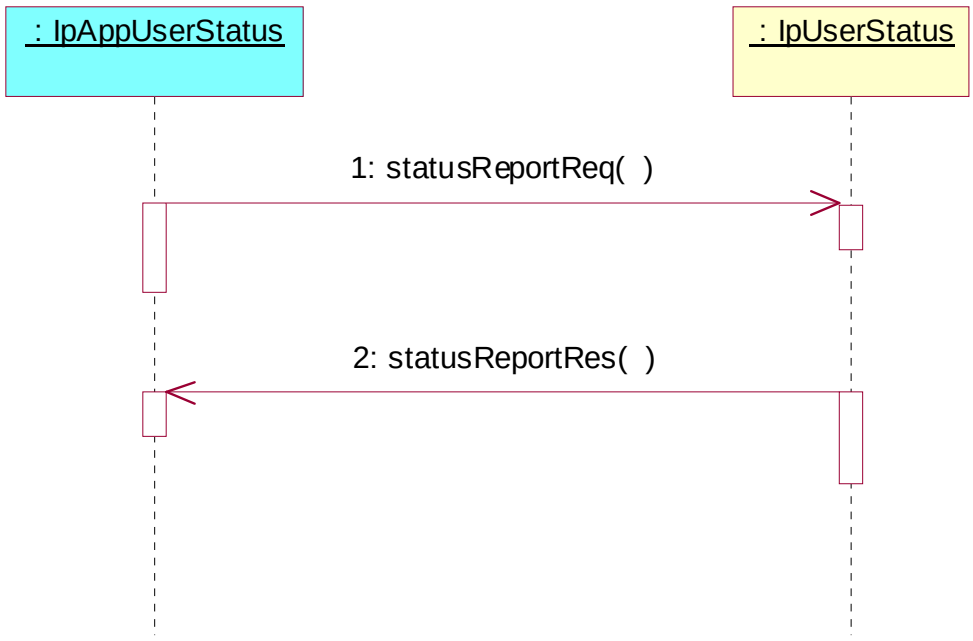
2: When a user's status changes, this message passes the status to its callback object.

3: This is repeated until the application stops triggered status reporting (see next message).

4: This message is used to stop triggered status reporting.

5.3.2 Interactive Request

The following sequence diagram shows how an application requests a status report from the User Status service.



1: This message is used to request the status of one or several users.

2: This message passes the result of the status request to its callback object.

6 Class Diagrams

6.1 User Location Class Diagrams

This class diagram shows the relationship between the interfaces in the User Location service. IpTriggeredUserLocation inherits from IpUserLocation, and IpAppTriggeredUserLocation inherits from IpAppUserLocation.

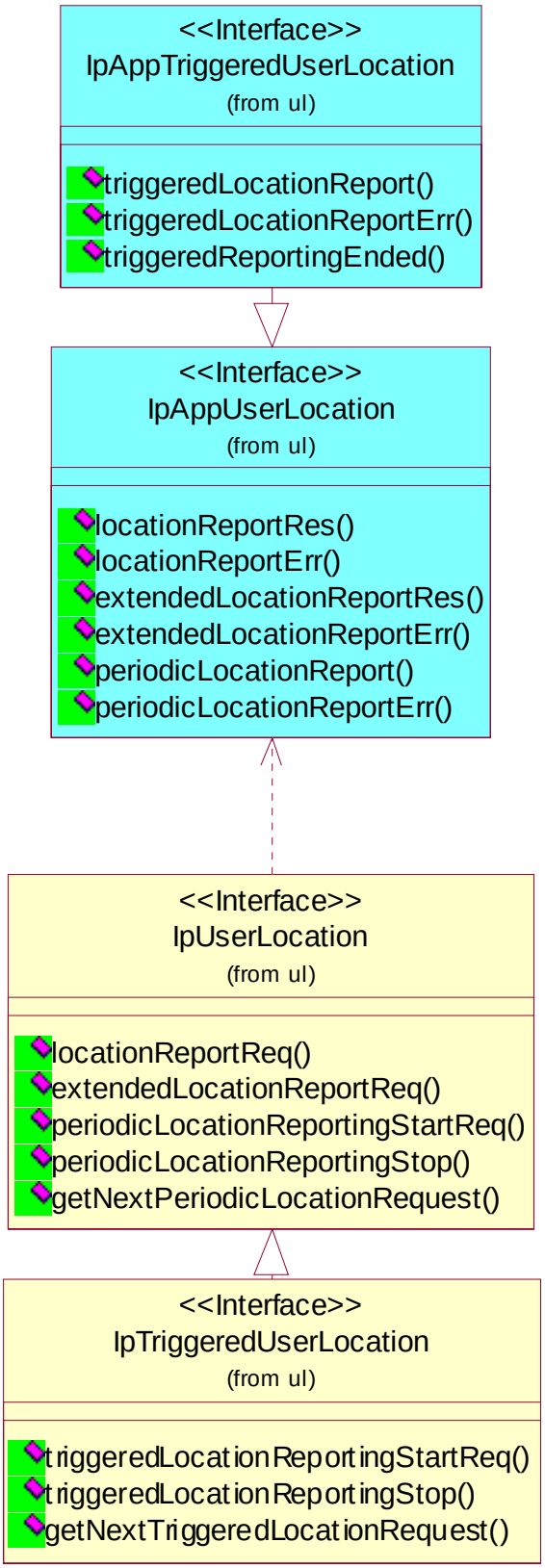


Figure: User Location Class Diagram

6.2 User Location Camel Class Diagrams

This class diagram shows the interfaces for the User Location Camel service.

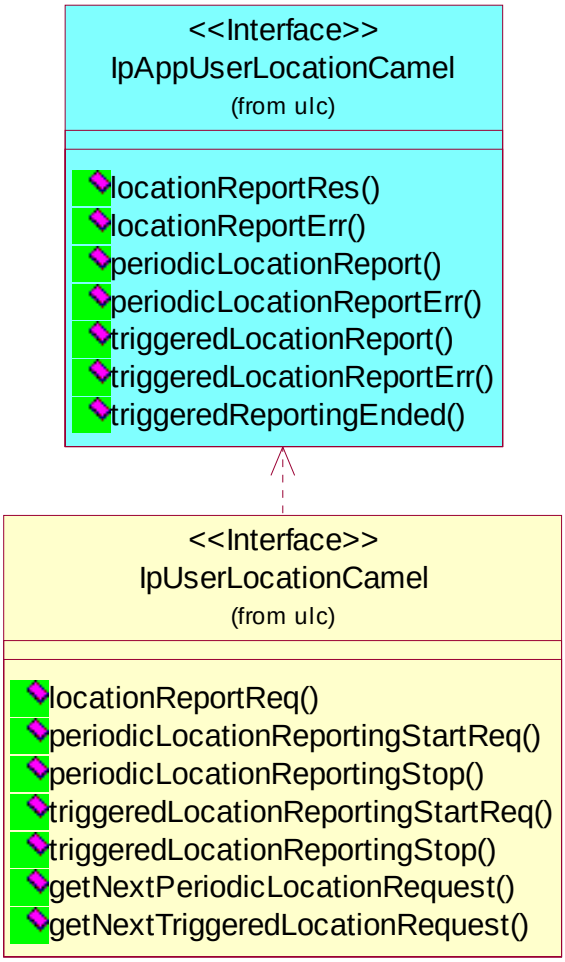


Figure: User Location Camel Class Diagram

6.3 User Status Class Diagrams

This class diagram shows the interfaces for the User Status service.

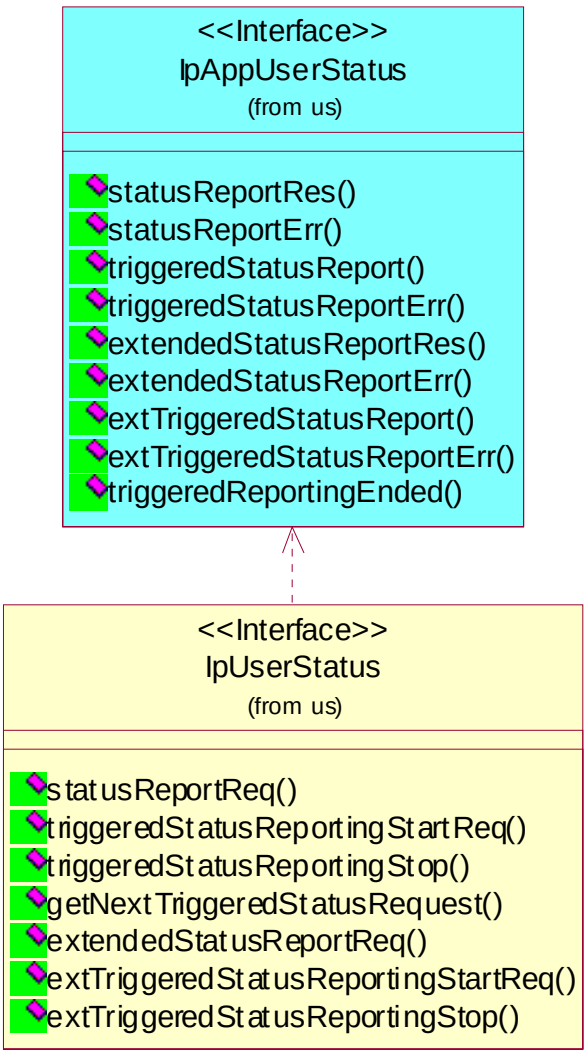


Figure: User Status Class Diagram

7 The Service Interface Specifications

7.1 Interface Specification Format

This clause defines the interfaces, methods and parameters that form a part of the API specification. The Unified Modelling Language (UML) is used to specify the interface classes. The general format of an interface specification is described below.

7.1.1 Interface Class

This shows a UML interface class description of the methods supported by that interface, and the relevant parameters and types. The Service and Framework interfaces for enterprise-based client applications are denoted by classes with name `Ip<name>`. The callback interfaces to the applications are denoted by classes with name `IpApp<name>`. For the interfaces between a Service and the Framework, the Service interfaces are typically denoted by classes with name IpSvc<name>, while the Framework interfaces are denoted by classes with name IpFw<name>.

7.1.2 Method descriptions

Each method (API method 'call') is described. Both synchronous and asynchronous methods are used in the API. Asynchronous methods are identified by a '`Req`' suffix for a method request, and, if applicable, are served by asynchronous methods identified by either a '`Res`' or '`Err`' suffix for method results and errors, respectively. To handle responses and reports, the application or service developer must implement the relevant `IpApp<name>` or `IpSvc<name>` interfaces to provide the callback mechanism.

7.1.3 Parameter descriptions

Each method parameter and its possible values are described. Parameters described as 'in' represent those that must have a value when the method is called. Those described as 'out' are those that contain the return result of the method when the method returns.

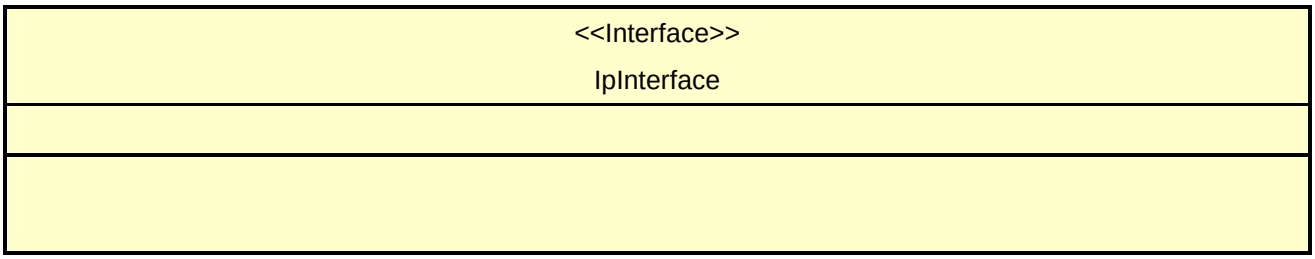
7.1.4 State Model

If relevant, a state model is shown to illustrate the states of the objects that implement the described interface.

7.2 Base Interface

7.2.1 Interface Class IpInterface

All application, framework and service interfaces inherit from the following interface. This API Base Interface does not provide any additional methods.



7.3 Service Interfaces

7.3.1 Overview

The Service Interfaces provide the interfaces into the capabilities of the underlying network - such as call control, user interaction, messaging, mobility and connectivity management.

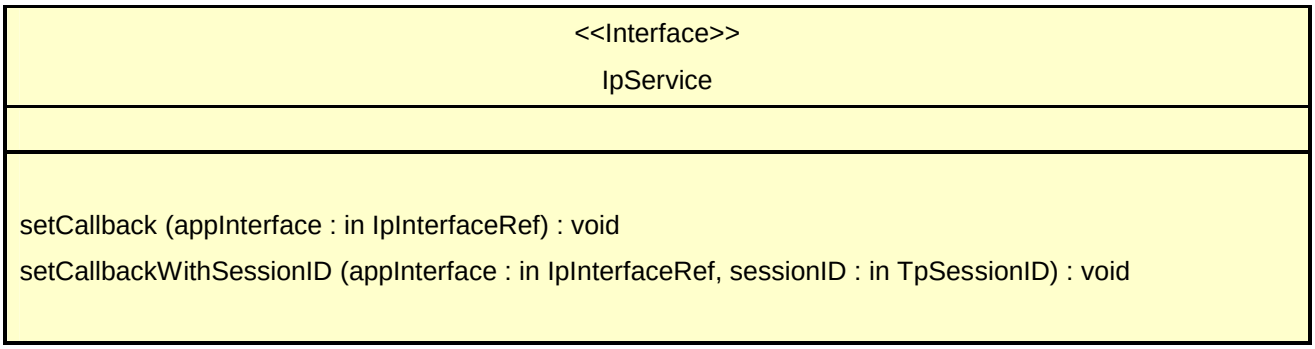
The interfaces that are implemented by the services are denoted as 'Service Interface'. The corresponding interfaces that must be implemented by the application (e.g. for API callbacks) are denoted as 'Application Interface'.

7.4 Generic Service Interface

7.4.1 Interface Class IpService

Inherits from: IpInterface

All service interfaces inherit from the following interface.



7.4.1.1 Method setCallback()

This method specifies the reference address of the callback interface that a service uses to invoke methods on the application. It is not allowed to invoke this method on an interface that uses SessionIDs. Multiple invocations of this method on an interface shall result in multiple callback references being specified. The SCS shall use the most recent callback interface provided by the application using this method. In the event that a callback reference fails or is no longer available, the next most recent callback reference available shall be used.

Parameters

appInterface : in IpInterfaceRef

Specifies a reference to the application interface, which is used for callbacks.

Raises

TpCommonExceptions, P_INVALID_INTERFACE_TYPE

7.4.1.2 Method setCallbackWithSessionID()

This method specifies the reference address of the application's callback interface that a service uses for interactions associated with a specific session ID: e.g. a specific call, or call leg. It is not allowed to invoke this method on an interface that does not use SessionIDs. Multiple invocations of this method on an interface shall result in multiple callback references being specified. The SCS shall use the most recent callback interface provided by the application using this method. In the event that a callback reference fails or is no longer available, the next most recent callback reference available shall be used.

Parameters

appInterface : in IpInterfaceRef

Specifies a reference to the application interface, which is used for callbacks.

sessionID : in TpSessionID

Specifies the session for which the service can invoke the application's callback interface.

Raises

TpCommonExceptions, P_INVALID_SESSION_ID, P_INVALID_INTERFACE_TYPE

8 Mobility Interface Classes

8.1 User Location Interface Classes

The User Location service (UL) provides a general geographic location service. UL has functionality to allow applications to obtain the geographical location and the status of fixed, mobile and IP based telephony users.

UL is supplemented by User Location Camel service (ULC) to provide information about network related information. There is also some specialised functionality to handle emergency calls in the User Location Emergency service (ULE).

The UL service provides the IpUserLocation and IpTriggeredUserLocation interfaces. Most methods are asynchronous, in that they do not lock a thread into waiting whilst a transaction performs. In this way, the client machine can handle many more calls, than one that uses synchronous message calls. To handle responses and reports, the developer must implement IpAppUserLocation and IpAppTriggeredUserLocation interfaces to provide the callback mechanism.

When periodic or triggered location reporting is used, errors may be reported either when the recurrent reporting is requested, as an error per user in reports or in the corresponding err-method when the error concerns all subscribers in an assignment.

8.1.1 Interface Class IpUserLocation

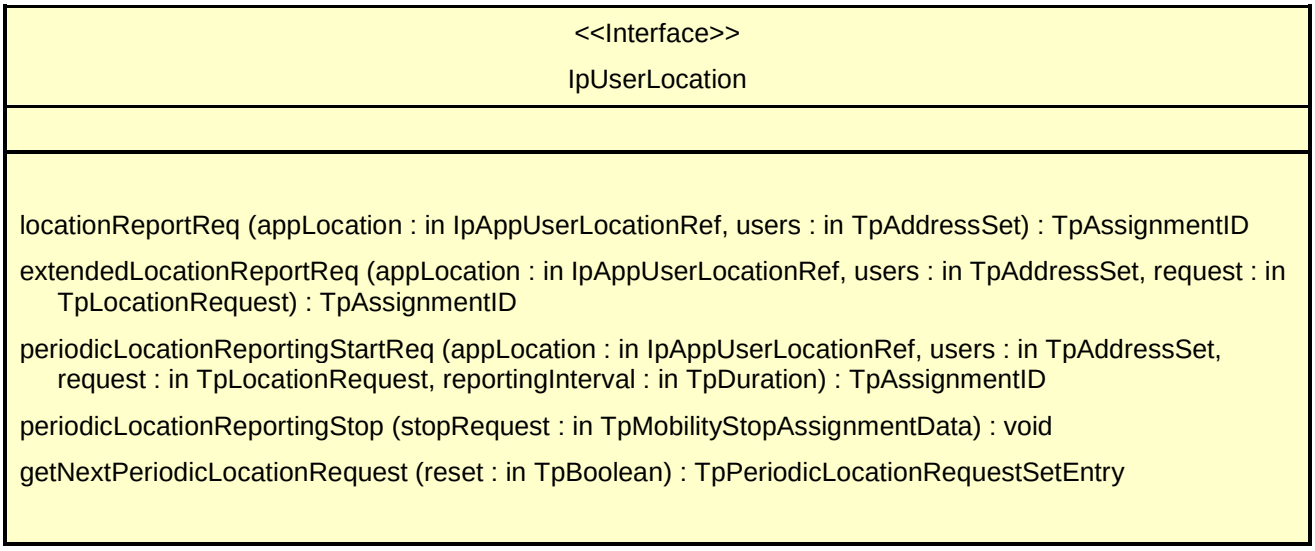
Inherits from: IpService.

This interface is the 'service manager' interface for the User Location Service.

The user location interface provides the management functions to the user location service. The application programmer can use this interface to obtain the geographical location of users.

This interface, or IpTriggeredUserLocation, shall be implemented by a User Location SCF as a minimum requirement.

The locationReportReq() method, or the extendedLocationReportReq() method, or both the periodicLocationReportingStartReq() and periodicLocationReportingStop() methods shall be implemented as a minimum requirement, if this interface is implemented.



8.1.1.1 Method locationReportReq()

Request of a report on the location for one or several users.

Returns: assignmentId.

Specifies the assignment ID of the location-report request.

Parameters

appLocation : in IpAppUserLocationRef

Specifies the application interface for callbacks from the User Location service.

users : in TpAddressSet

Specifies the user(s) for which the location shall be reported.

Returns

TpAssignmentID

Raises

TpCommonExceptions, P_APPLICATION_NOT_ACTIVATED, P_INFORMATION_NOT_AVAILABLE, P_INVALID_INTERFACE_TYPE

8.1.1.2 Method extendedLocationReportReq()

Advanced request of report on the location for one or several users.

Returns: assignmentId.

Specifies the assignment ID of the extended location-report request.

Parameters

appLocation : in IpAppUserLocationRef

Specifies the application interface for callbacks from the User Location service.

users : in TpAddressSet

Specifies the user(s) for which the location shall be reported

request : in TpLocationRequest

Specifies among others the requested location type, accuracy, response time and priority.

Returns

TpAssignmentID

Raises

TpCommonExceptions, P_APPLICATION_NOT_ACTIVATED, P_REQUESTED_ACCURACY_CANNOT_BE_DELIVERED, P_REQUESTED_RESPONSE_TIME_CANNOT_BE_DELIVERED, P_INFORMATION_NOT_AVAILABLE, P_INVALID_INTERFACE_TYPE

8.1.1.3 Method periodicLocationReportingStartReq()

Request of periodic reports on the location for one or several users.

Returns: assignmentId.

Specifies the assignment ID of the periodic location-reporting request.

Parameters

appLocation : in IpAppUserLocationRef

Specifies the application interface for callbacks from the User Location service.

users : in TpAddressSet

Specifies the user(s) for which the location shall be reported.

request : in TpLocationRequest

Specifies among others the requested location type, accuracy, response time and priority.

reportingInterval : in TpDuration

Specifies the requested interval in milliseconds between the reports.

Returns

TpAssignmentID

Raises

TpCommonExceptions, P_INVALID_REPORTING_INTERVAL, P_REQUESTED_ACCURACY_CANNOT_BE_DELIVERED, P_REQUESTED_RESPONSE_TIME_CANNOT_BE_DELIVERED, P_APPLICATION_NOT_ACTIVATED, P_INFORMATION_NOT_AVAILABLE, P_INVALID_INTERFACE_TYPE

8.1.1.4 Method periodicLocationReportingStop()

Termination of periodic reports on the location for one or several users.

Parameters

stopRequest : in TpMobilityStopAssignmentData

Specifies how the assignment shall be stopped, i.e. if whole or just parts of the assignment should be stopped.

Raises

TpCommonExceptions, P_INVALID_ASSIGNMENT_ID

8.1.1.5 Method getNextPeriodicLocationRequest()

This method is used by the application to query the request set created with periodicLocationReportingStartReq. Since a lot of data can potentially be returned (which might cause problem in the middleware), this method must be used in an iterative way. Each method invocation may return part of the total set of requests if the set is too large to return it at once. The reset parameter permits the application to indicate whether an invocation to getNextPeriodicLocationRequest is requesting more requests from the total set of requests or is requesting that the total set of requests shall be returned from the beginning.

Returns the set of requests and an indication whether all off the requests have been obtained or if more requests are available that have not yet been obtained by the application.

Note that the (maximum) number of items provided to the application is determined by the gateway.

Parameters

reset : in TpBoolean

TRUE: indicates that the application is intended to obtain the set of requests starting at the beginning.

FALSE: indicates that the application requests the next set of requests that have not (yet) been obtained since the last call to this method with this parameter set to TRUE.

The first time this method is invoked, reset shall be set to TRUE. Following the receipt of a final indication, for the next call to this method reset shall be set to TRUE. P_TASK_REFUSED may be thrown if these conditions are not met.

Returns

TpPeriodicLocationRequestSetEntry

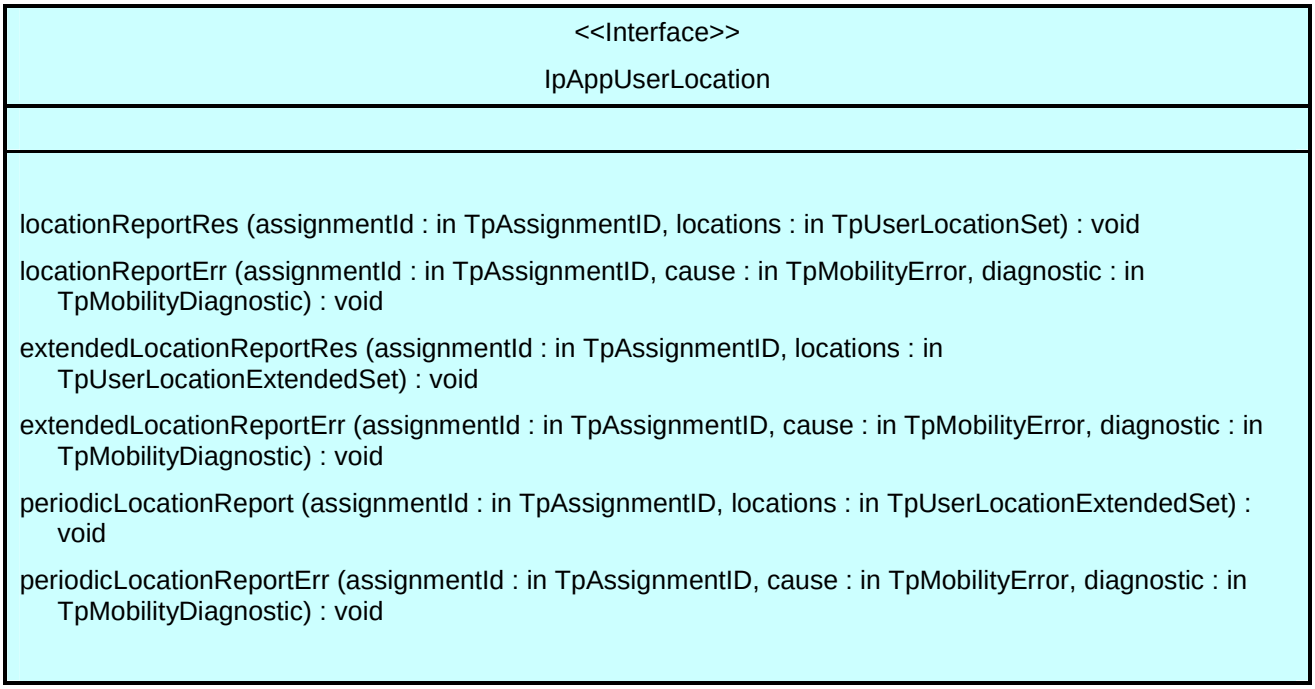
Raises

TpCommonExceptions

8.1.2 Interface Class IpAppUserLocation

Inherits from: IpInterface.

The user-location application interface is implemented by the client application developer and is used to handle user location request responses.



8.1.2.1 Method locationReportRes()

A report containing locations for one or several users is delivered.

Parameters

assignmentId : in TpAssignmentID

Specifies the assignment ID of the location-report request.

locations : in TpUserLocationSet

Specifies the location(s) of one or several users.

8.1.2.2 Method locationReportErr()

This method indicates that the location report request has failed.

Parameters

assignmentId : in TpAssignmentID

Specifies the assignment ID of the failed location report request.

cause : in TpMobilityError

Specifies the error that led to the failure.

diagnostic : in TpMobilityDiagnostic

Specifies additional information about the error that led to the failure.

8.1.2.3 Method extendedLocationReportRes()

A report containing extended location information for one or several users is delivered.

Parameters

assignmentId : in TpAssignmentID

Specifies the assignment ID of the extended location-report request.

locations : in TpUserLocationExtendedSet

Specifies the location(s) of one or several users.

8.1.2.4 Method extendedLocationReportErr()

This method indicates that the extended location report request has failed.

Parameters

assignmentId : in TpAssignmentID

Specifies the assignment ID of the failed extended location report request.

cause : in TpMobilityError

Specifies the error that led to the failure.

diagnostic : in TpMobilityDiagnostic

Specifies additional information about the error that led to the failure.

8.1.2.5 Method periodicLocationReport()

A report containing periodic location information for one or several users is delivered.

Parameters

`assignmentId : in TpAssignmentID`

Specifies the assignment ID of the periodic location-reporting request.

`locations : in TpUserLocationExtendedSet`

Specifies the location(s) of one or several users.

8.1.2.6 Method periodicLocationReportErr()

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

Parameters

`assignmentId : in TpAssignmentID`

Specifies the assignment ID of the failed periodic location reporting start request.

`cause : in TpMobilityError`

Specifies the error that led to the failure.

`diagnostic : in TpMobilityDiagnostic`

Specifies additional information about the error that led to the failure.

8.1.3 Interface Class IpTriggeredUserLocation

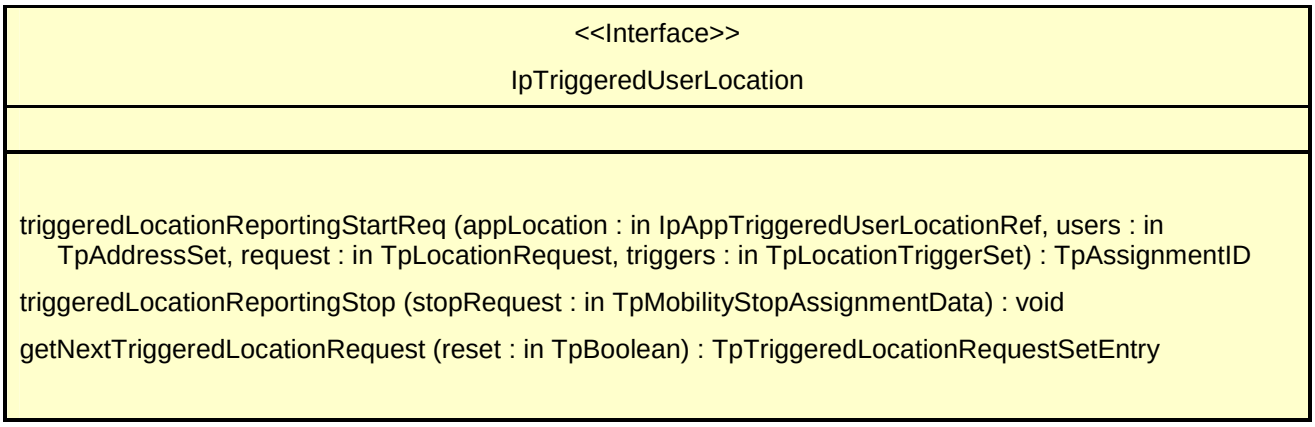
Inherits from: IpUserLocation.

This interface can be used as an extended version of the User Location: Service Interface.

The triggered user location interface represents the interface to the triggered user location functions. The application programmer can use this interface to request user location reports that are triggered by location change.

This interface, or IpUserLocation, shall be implemented by a User Location SCF as a minimum requirement.

The triggeredLocationReportingStartReq() and triggeredLocationReportingStop() methods shall be implemented as a minimum requirement. An implementation of IpTriggeredUserLocation is not required to implement the minimum mandatory methods of IpUserLocation.



8.1.3.1 Method triggeredLocationReportingStartReq()

Request for user location reports when the location is changed (reports are triggered by location change).

Returns: assignmentId.

Specifies the assignment ID of the triggered location-reporting request.

Parameters

appLocation : in IpAppTriggeredUserLocationRef

Specifies the application interface for callbacks from the User Location service.

users : in TpAddressSet

Specifies the user(s) for which the location shall be reported.

request : in TpLocationRequest

Specifies among others the requested location type, accuracy, response time and priority.

triggers : in TpLocationTriggerSet

Specifies the trigger conditions.

Returns

TpAssignmentID

Raises

TpCommonExceptions, P_REQUESTED_ACCURACY_CANNOT_BE_DELIVERED, P_REQUESTED_RESPONSE_TIME_CANNOT_BE_DELIVERED, P_TRIGGER_CONDITIONS_NOT_SUBSCRIBED, P_UNKNOWN_SUBSCRIBER, P_APPLICATION_NOT_ACTIVATED, P_INFORMATION_NOT_AVAILABLE, P_INVALID_INTERFACE_TYPE

8.1.3.2 Method triggeredLocationReportingStop()

Stop triggered user location reporting.

Parameters

stopRequest : in TpMobilityStopAssignmentData

Specifies how the assignment shall be stopped, i.e. if whole or just parts of the assignment should be stopped.

Raises

TpCommonExceptions, P_INVALID_ASSIGNMENT_ID

8.1.3.3 Method getNextTriggeredLocationRequest()

This method is used by the application to query the request set created with triggeredLocationReportingStartReq. Since a lot of data can potentially be returned (which might cause problem in the middleware), this method must be used in an iterative way. Each method invocation may return part of the total set of requests if the set is too large to return it at once. The reset parameter permits the application to indicate whether an invocation to getNextTriggeredLocationRequest is requesting more requests from the total set of requests or is requesting that the total set of requests shall be returned from the beginning.

Returns the set of requests and an indication whether all off the requests have been obtained or if more requests are available that have not yet been obtained by the application.

Note that the (maximum) number of items provided to the application is determined by the gateway.

Parameters

reset : in TpBoolean

TRUE: indicates that the application is intended to obtain the set of requests starting at the beginning.

FALSE: indicates that the application requests the next set of requests that have not (yet) been obtained since the last call to this method with this parameter set to TRUE.

The first time this method is invoked, reset shall be set to TRUE. Following the receipt of a final indication, for the next call to this method reset shall be set to TRUE. P_TASK_REFUSED may be thrown if these conditions are not met.

Returns

TpTriggeredLocationRequestSetEntry

Raises

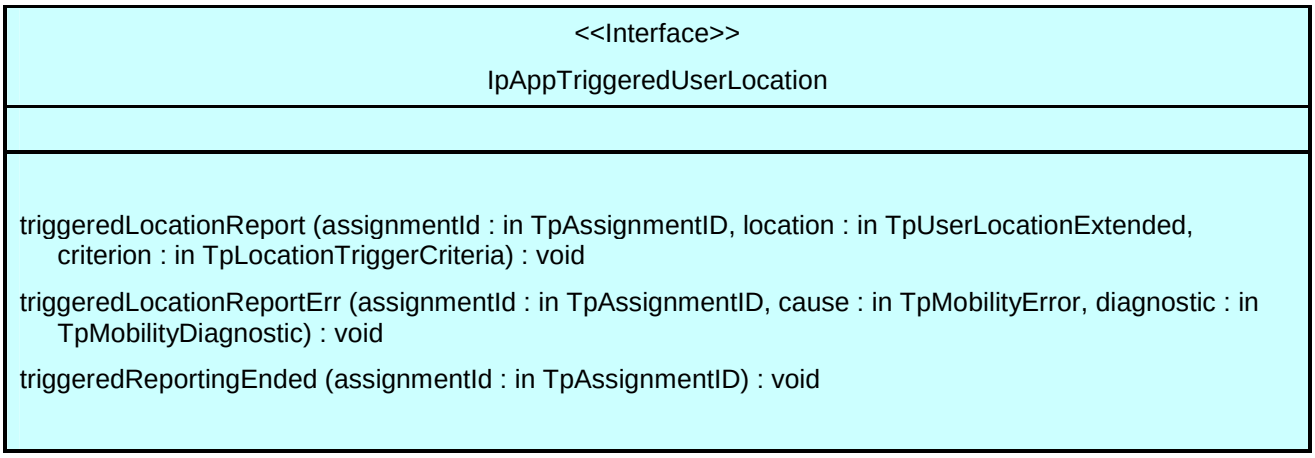
TpCommonExceptions

8.1.4 Interface Class IpAppTriggeredUserLocation

Inherits from: IpAppUserLocation.

This interface must be used as a specialised version of the User Location: Application Interface if the Triggered User Location: Service Interface is used.

The triggered user location application interface is implemented by the client application developer and is used to handle triggered location reports.



8.1.4.1 Method triggeredLocationReport()

A triggered report containing location for a user is delivered.

Parameters

`assignmentId : in TpAssignmentID`

Specifies the assignment ID of the triggered location-reporting request.

`location : in TpUserLocationExtended`

Specifies the location of the user.

`criterion : in TpLocationTriggerCriteria`

Specifies the criterion that triggered the report.

8.1.4.2 Method triggeredLocationReportErr()

This method indicates that a requested triggered location report has failed. Note that errors only concerning individual users are reported in the ordinary triggeredLocationReport() message.

Parameters

`assignmentId : in TpAssignmentID`

Specifies the assignment ID of the failed triggered location reporting start request.

`cause : in TpMobilityError`

Specifies the error that led to the failure.

`diagnostic : in TpMobilityDiagnostic`

Specifies additional information about the error that led to the failure.

8.1.4.3 Method triggeredReportingEnded()

The user status or user location triggering has stopped because the max life time allowed for this triggering has exceeded.

Parameters

`assignmentId : in TpAssignmentID`

Specifies the assignment ID of the triggered request.

8.2 User Location Camel Interface Classes

The ULC provides location information, based on network-related information, rather than the geographical co-ordinates that can be retrieved via the general User Location Service.

Using the ULC functions, an application programmer can request the VLR Number, the location Area Identification and the Cell Global Identification and other mobile-telephony-specific location information.

The ULC provides the IpUserLocationCamel interface. Most methods are asynchronous, in that they do not lock a thread into waiting whilst a transaction performs. In this way, the client machine can handle many more calls, than one that uses synchronous message calls. To handle responses and reports, the developer must implement IpAppUserLocationCamel interface to provide the callback mechanism.

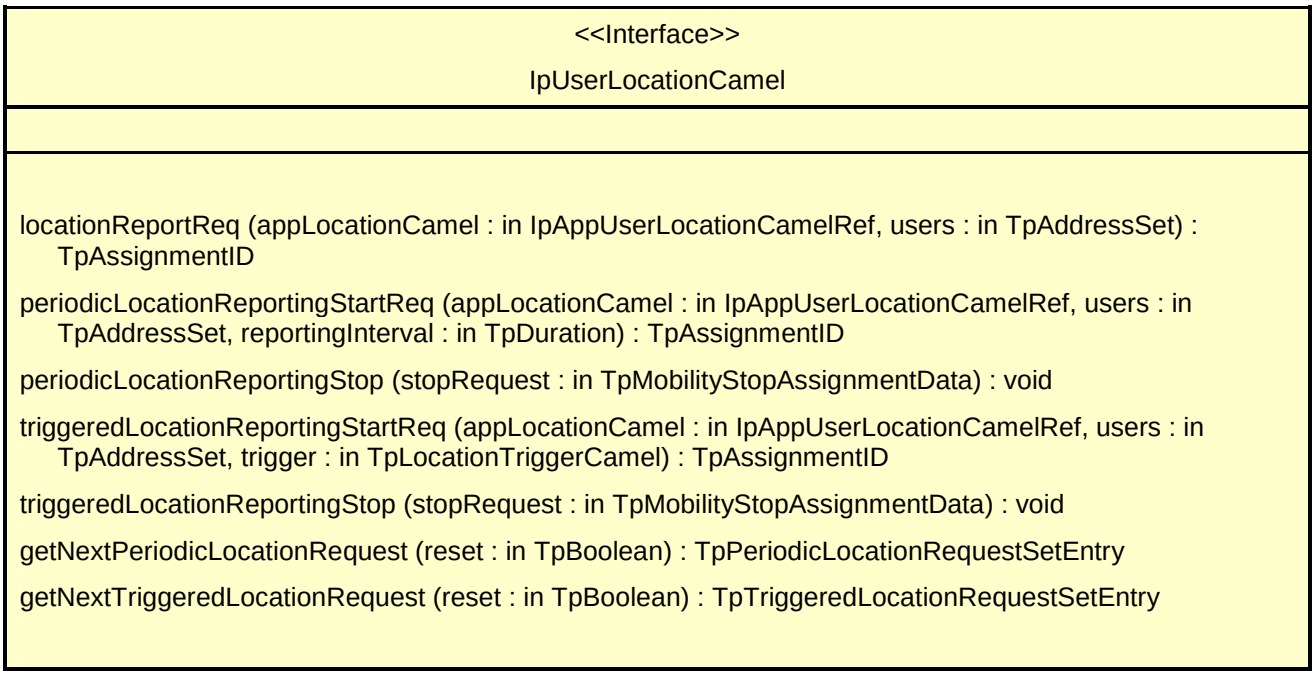
8.2.1 Interface Class IpUserLocationCamel

Inherits from: IpService.

This interface is the 'service manager' interface for ULC.

This interface shall be implemented by a User Location Camel SCF.

The locationReportReq() method, or both the periodicLocationReportingStartReq() and periodicLocationReportingStop() methods, or both the triggeredLocationReportingStartReq() and triggeredLocationReportingStop() methods shall be implemented as a minimum requirement.



8.2.1.1 Method locationReportReq()

Request for mobile-related location information on one or several camel users.

Returns: assignmentId.

Specifies the assignment ID of the location-report request.

Parameters

appLocationCamel : in IpAppUserLocationCamelRef

Specifies the application interface for callbacks from the User Location Camel service.

users : in TpAddressSet

Specifies the user(s) for which the location shall be reported.

Returns

TpAssignmentID

Raises

TpCommonExceptions, P_UNKNOWN_SUBSCRIBER, P_APPLICATION_NOT_ACTIVATED, P_INFORMATION_NOT_AVAILABLE, P_INVALID_INTERFACE_TYPE

8.2.1.2 Method periodicLocationReportingStartReq()

Request for periodic mobile location reports on one or several users.

Returns: assignmentId.

Specifies the assignment ID of the periodic location-reporting request.

Parameters

appLocationCamel : in IpAppUserLocationCamelRef

Specifies the application interface for callbacks from the User Location Camel service.

users : in TpAddressSet

Specifies the user(s) for which the location shall be reported.

reportingInterval : in TpDuration

Specifies the requested interval in milliseconds between the reports.

Returns

TpAssignmentID

Raises

TpCommonExceptions, P_INVALID_REPORTING_INTERVAL, P_UNKNOWN_SUBSCRIBER, P_APPLICATION_NOT_ACTIVATED, P_INFORMATION_NOT_AVAILABLE, P_INVALID_INTERFACE_TYPE

8.2.1.3 Method periodicLocationReportingStop()

This method stops the sending of periodic mobile location reports for one or several users.

Parameters

stopRequest : in TpMobilityStopAssignmentData

Specifies how the assignment shall be stopped, i.e. if whole or just parts of the assignment should be stopped.

Raises

TpCommonExceptions, P_INVALID_ASSIGNMENT_ID

8.2.1.4 Method triggeredLocationReportingStartReq()

Request for user location reports, containing mobile related information, when the location is changed (the report is triggered by the location change).

Returns: assignmentId.

Specifies the assignment ID of the triggered location-reporting request.

Parameters

appLocationCamel : in IpAppUserLocationCamelRef

Specifies the application interface for callbacks from the User Location Camel service.

users : in TpAddressSet

Specifies the user(s) for which the location shall be reported.

trigger : in TpLocationTriggerCamel

Specifies the trigger conditions.

Returns

TpAssignmentID

Raises

TpCommonExceptions, P_UNKNOWN_SUBSCRIBER, P_APPLICATION_NOT_ACTIVATED, P_INFORMATION_NOT_AVAILABLE, P_INVALID_INTERFACE_TYPE

8.2.1.5 Method triggeredLocationReportingStop()

Request that triggered mobile location reporting should stop.

Parameters

stopRequest : in TpMobilityStopAssignmentData

Specifies how the assignment shall be stopped, i.e. if whole or just parts of the assignment should be stopped.

Raises

TpCommonExceptions, P_INVALID_ASSIGNMENT_ID

8.2.1.6 Method getNextPeriodicLocationRequest()

This method is used by the application to query the request set created with periodicLocationReportingStartReq. Since a lot of data can potentially be returned (which might cause problem in the middleware), this method must be used in an iterative way. Each method invocation may return part of the total set of requests if the set is too large to return it at once. The reset parameter permits the application to indicate whether an invocation to getNextPeriodicLocationRequest is requesting more requests from the total set of requests or is requesting that the total set of requests shall be returned from the beginning.

Returns the set of requests and an indication whether all off the requests have been obtained or if more requests are available that have not yet been obtained by the application.

Note that the (maximum) number of items provided to the application is determined by the gateway.

Parameters

reset : in TpBoolean

TRUE: indicates that the application is intended to obtain the set of requests starting at the beginning.

FALSE: indicates that the application requests the next set of requests that have not (yet) been obtained since the last call to this method with this parameter set to TRUE.

The first time this method is invoked, reset shall be set to TRUE. Following the receipt of a final indication, for the next call to this method reset shall be set to TRUE. P_TASK_REFUSED may be thrown if these conditions are not met.

Returns

TpPeriodicLocationRequestSetEntry

Raises

TpCommonExceptions

8.2.1.7 Method getNextTriggeredLocationRequest()

This method is used by the application to query the request set created with triggeredLocationReportingStartReq. Since a lot of data can potentially be returned (which might cause problem in the middleware), this method must be used in an iterative way. Each method invocation may return part of the total set of requests if the set is too large to return it at once. The reset parameter permits the application to indicate whether an invocation to getNextTriggeredLocationRequest is requesting more requests from the total set of requests or is requesting that the total set of requests shall be returned from the beginning.

Returns the set of requests and an indication whether all off the requests have been obtained or if more requests are available that have not yet been obtained by the application.

Note that the (maximum) number of items provided to the application is determined by the gateway.

Parameters

reset : in TpBoolean

TRUE: indicates that the application is intended to obtain the set of requests starting at the beginning.

FALSE: indicates that the application requests the next set of requests that have not (yet) been obtained since the last call to this method with this parameter set to TRUE.

The first time this method is invoked, reset shall be set to TRUE. Following the receipt of a final indication, for the next call to this method reset shall be set to TRUE. P_TASK_REFUSED may be thrown if these conditions are not met.

Returns

`TpTriggeredLocationRequestSetEntry`

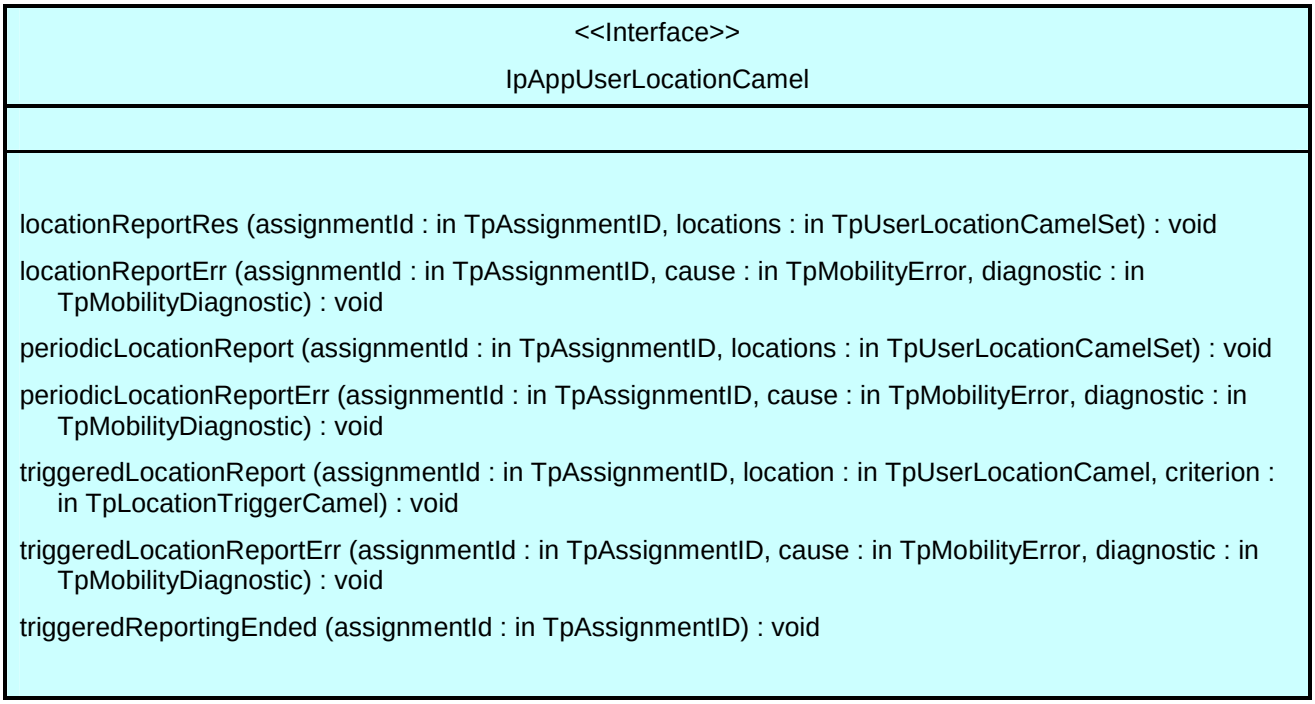
Raises

`TpCommonExceptions`

8.2.2 Interface Class IpAppUserLocationCamel

Inherits from: IpInterface.

The user location Camel application interface is implemented by the client application developer and is used to handle location reports that are specific for mobile telephony users.



8.2.2.1 Method locationReportRes()

Delivery of a mobile location report. The report is containing mobile-related location information for one or several users.

Parameters

`assignmentId : in TpAssignmentID`

Specifies the assignment ID of the location-report request.

`locations : in TpUserLocationCamelSet`

Specifies the location(s) of one or several users.

8.2.2.2 Method locationReportErr()

This method indicates that the location report request has failed.

Parameters

`assignmentId : in TpAssignmentID`

Specifies the assignment ID of the failed location report request.

`cause : in TpMobilityError`

Specifies the error that led to the failure.

`diagnostic : in TpMobilityDiagnostic`

Specifies additional information about the error that led to the failure.

8.2.2.3 Method periodicLocationReport()

Periodic delivery of mobile location reports. The reports are containing mobile-related location information for one or several users.

Parameters

`assignmentId : in TpAssignmentID`

Specifies the assignment ID of the periodic location-reporting request.

`locations : in TpUserLocationCamelSet`

Specifies the location(s) of one or several users.

8.2.2.4 Method periodicLocationReportErr()

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

Parameters

`assignmentId : in TpAssignmentID`

Specifies the assignment ID of the failed periodic location reporting start request.

`cause : in TpMobilityError`

Specifies the error that led to the failure.

`diagnostic : in TpMobilityDiagnostic`

Specifies additional information about the error that led to the failure.

8.2.2.5 Method triggeredLocationReport()

Delivery of a report that is indicating that the user's mobile location has changed.

Parameters

assignmentId : in TpAssignmentID

Specifies the assignment ID of the triggered location-reporting request.

location : in TpUserLocationCamel

Specifies the location of the user.

criterion : in TpLocationTriggerCamel

Specifies the criterion that triggered the report.

8.2.2.6 Method triggeredLocationReportErr()

This method indicates that a requested triggered location report has failed. Note that errors only concerning individual users are reported in the ordinary triggeredLocationReport() message.

Parameters

assignmentId : in TpAssignmentID

Specifies the assignment ID of the failed triggered location reporting start request.

cause : in TpMobilityError

Specifies the error that led to the failure.

diagnostic : in TpMobilityDiagnostic

Specifies additional information about the error that led to the failure.

8.2.2.7 Method triggeredReportingEnded()

The user status or user location triggering has stopped because the max life time allowed for this triggering has exceeded.

Parameters

assignmentId : in TpAssignmentID

Specifies the assignment ID of the triggered request.

8.3 User Status Interface Classes

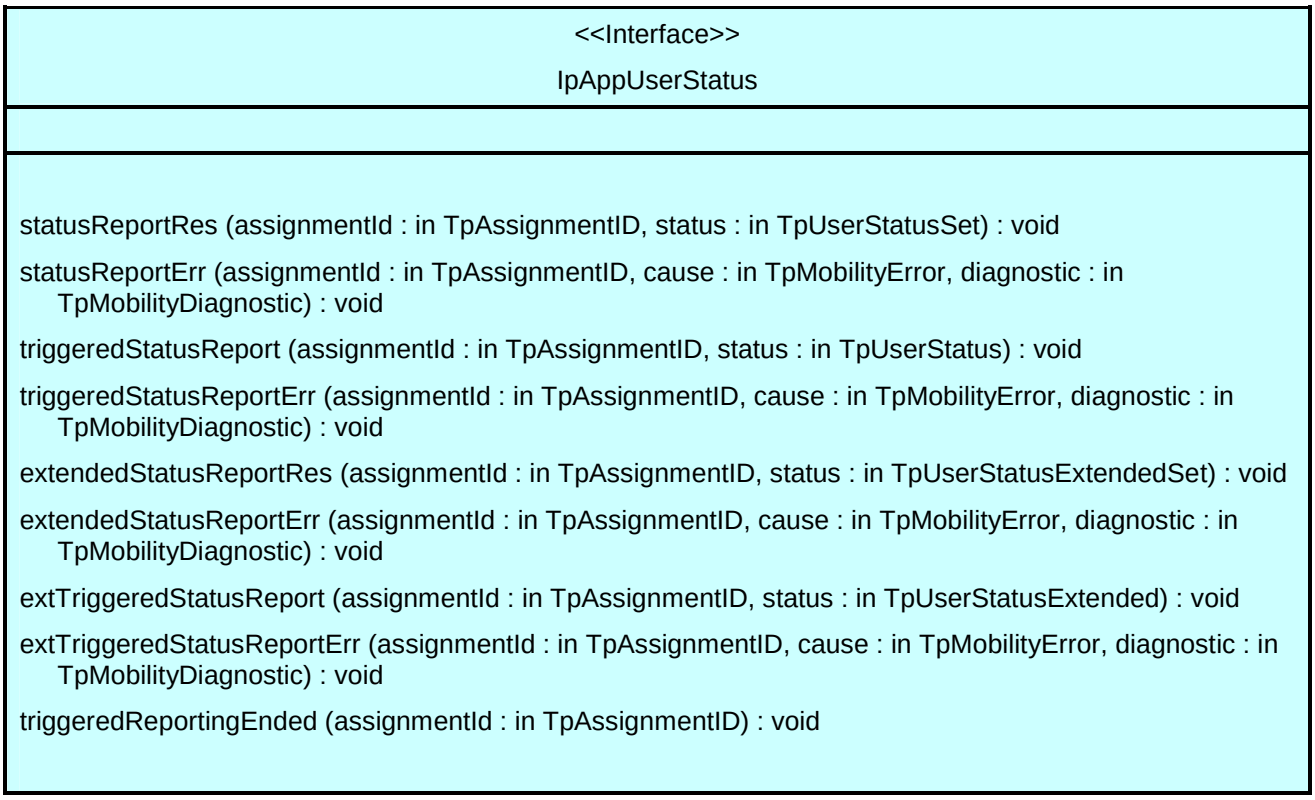
The User Status Service (US) provides a general user status service. US allow applications to obtain the status of fixed, mobile and IP-based telephony users.

The US provides the IpUserStatus interface. Most methods are asynchronous, in that they do not lock a thread into waiting whilst a transaction performs. In this way, the client machine can handle many more calls, than one that uses synchronous message calls. To handle responses and reports, the developer must implement IpAppUserStatus interface to provide the callback mechanism.

8.3.1 Interface Class IpAppUserStatus

Inherits from: IpInterface.

The user-status application interface is implemented by the client application developer and is used to handle user status reports.



8.3.1.1 Method statusReportRes()

Delivery of a report, that is containing one or several user's status.

Parameters

`assignmentId : in TpAssignmentID`

Specifies the assignment ID of the status-report request.

`status : in TpUserStatusSet`

Specifies the status of one or several users.

8.3.1.2 Method statusReportErr()

This method indicates that the status report request has failed.

Parameters

`assignmentId : in TpAssignmentID`

Specifies the assignment ID of the failed status report request.

`cause : in TpMobilityError`

Specifies the error that led to the failure.

`diagnostic : in TpMobilityDiagnostic`

Specifies additional information about the error that led to the failure.

8.3.1.3 Method triggeredStatusReport()

Delivery of a report that is indicating that a user's status has changed.

Parameters

`assignmentId : in TpAssignmentID`

Specifies the assignment ID of the triggered status-reporting request.

`status : in TpUserStatus`

Specifies the status of the user.

8.3.1.4 Method triggeredStatusReportErr()

This method indicates that a requested triggered status reporting has failed. Note that errors only concerning individual users are reported in the ordinary triggeredStatusReport() message.

Parameters

`assignmentId : in TpAssignmentID`

Specifies the assignment ID of the failed triggered status reporting start request.

`cause : in TpMobilityError`

Specifies the error that led to the failure.

`diagnostic : in TpMobilityDiagnostic`

Specifies additional information about the error that led to the failure.

8.3.1.5 Method extendedStatusReportRes()

Delivery of a report, that is containing one or several user's status.

Parameters

`assignmentId : in TpAssignmentID`

Specifies the assignment ID of the status-report request.

`status : in TpUserStatusExtendedSet`

Specifies the status of one or several users.

8.3.1.6 Method extendedStatusReportErr()

This method indicates that the status report request has failed.

Parameters

`assignmentId : in TpAssignmentID`

Specifies the assignment ID of the failed status report request.

`cause : in TpMobilityError`

Specifies the error that led to the failure.

diagnostic : in TpMobilityDiagnostic

Specifies additional information about the error that led to the failure.

8.3.1.7 Method extTriggeredStatusReport()

Delivery of a report that is indicating that a user's status has changed.

Parameters

assignmentId : in TpAssignmentID

Specifies the assignment ID of the triggered status-reporting request.

status : in TpUserStatusExtended

Specifies the status of the user.

8.3.1.8 Method extTriggeredStatusReportErr()

This method indicates that a requested triggered status reporting has failed. Note that errors only concerning individual users are reported in the ordinary extTriggeredStatusReport() message.

Parameters

assignmentId : in TpAssignmentID

Specifies the assignment ID of the failed triggered status reporting start request.

cause : in TpMobilityError

Specifies the error that led to the failure.

diagnostic : in TpMobilityDiagnostic

Specifies additional information about the error that led to the failure.

8.3.1.9 Method triggeredReportingEnded()

The user status or user location triggering has stopped because the max life time allowed for this triggering has exceeded.

Parameters

assignmentId : in TpAssignmentID

Specifies the assignment ID of the triggered request.

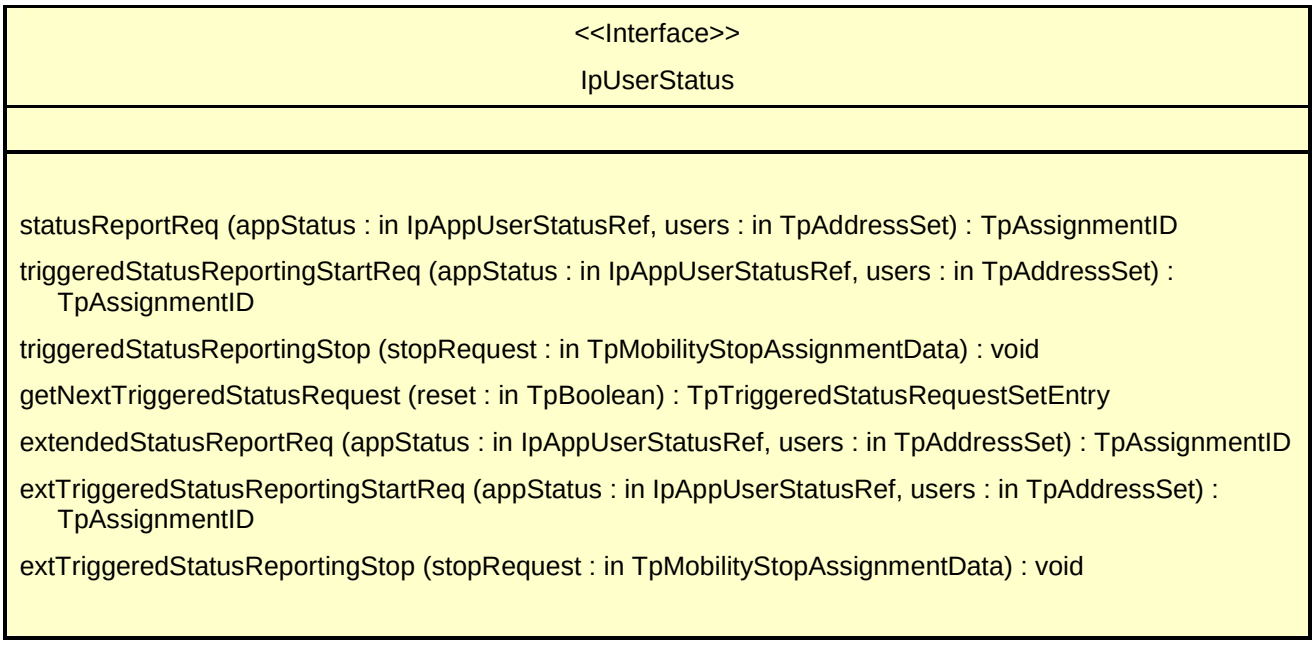
8.3.2 Interface Class IpUserStatus

Inherits from: IpService.

The application programmer can use this interface to obtain the status of fixed, mobile and IP-based telephony users.

This interface shall be implemented by a User Status SCF.

The statusReportReq() method, or both the triggeredStatusReportingStartReq() and trigggeredStatusReportingStop() methods shall be implemented as a minimum requirement.



8.3.2.1 Method statusReportReq()

Request for a report on the status of one or several users.

Returns: assignmentId.

Specifies the assignment ID of the status-report request.

Parameters

appStatus : in IpAppUserStatusRef

Specifies the application interface for callbacks from the User Status service.

users : in TpAddressSet

Specifies the user(s) for which the status shall be reported.

Returns

TpAssignmentID

Raises

TpCommonExceptions, P_UNKNOWN_SUBSCRIBER, P_INFORMATION_NOT_AVAILABLE, P_APPLICATION_NOT_ACTIVATED, P_INVALID_INTERFACE_TYPE

8.3.2.2 Method triggeredStatusReportingStartReq()

Request for triggered status reports when one or several user's status is changed. The user status service will send a report when the status changes.

Returns: assignmentId.

Specifies the assignment ID of the triggered status-reporting request.

Parameters

appStatus : in IpAppUserStatusRef

Specifies the application interface for callbacks from the User Status service.

users : in TpAddressSet

Specifies the user(s) for which the status changes shall be reported.

Returns

TpAssignmentID

Raises

TpCommonExceptions, P_UNKNOWN_SUBSCRIBER, P_INFORMATION_NOT_AVAILABLE, P_APPLICATION_NOT_ACTIVATED, P_INVALID_INTERFACE_TYPE

8.3.2.3 Method triggeredStatusReportingStop()

This method stops the sending of status reports for one or several users.

Parameters

stopRequest : in TpMobilityStopAssignmentData

Specifies how the assignment shall be stopped, i.e. if whole or just parts of the assignment should be stopped.

Raises

TpCommonExceptions, P_INVALID_ASSIGNMENT_ID

8.3.2.4 Method getNextTriggeredStatusRequest()

This method is used by the application to query the request set created with triggeredStatusReportingStartReq. Since a lot of data can potentially be returned (which might cause problem in the middleware), this method must be used in an iterative way. Each method invocation may return part of the total set of requests if the set is too large to return it at once. The reset parameter permits the application to indicate whether an invocation to getNextTriggeredStatusRequest is requesting more requests from the total set of requests or is requesting that the total set of requests shall be returned from the beginning.

Returns the set of requests and an indication whether all off the requests have been obtained or if more requests are available that have not yet been obtained by the application.

Note that the (maximum) number of items provided to the application is determined by the gateway.

Parameters

reset : in TpBoolean

TRUE: indicates that the application is intended to obtain the set of requests starting at the beginning.

FALSE: indicates that the application requests the next set of requests that have not (yet) been obtained since the last call to this method with this parameter set to TRUE.

The first time this method is invoked, reset shall be set to TRUE. Following the receipt of a final indication, for the next call to this method reset shall be set to TRUE. P_TASK_REFUSED may be thrown if these conditions are not met.

Returns

TpTriggeredStatusRequestSetEntry

Raises

TpCommonExceptions

8.3.2.5 Method extendedStatusReportReq()

Request for a report on the status of one or several users.

A user can be identified by the following address types:

- MSISDN indicated with address plan P_ADDRESS_PLAN_E164.

- IP Address indicated with address plan P_ADDRESS_PLAN_IP.

- User Name indicated with address plan P_ADDRESS_PLAN_UNDEFINED.

Returns: assignmentID.

Parameters

appStatus : in IpAppUserStatusRef

Specifies the application interface for callbacks from the User Status service.

users : in TpAddressSet

Specifies the user(s) for which the status shall be reported.

Returns

TpAssignmentID

Raises

TpCommonExceptions, P_UNKNOWN_SUBSCRIBER, P_INFORMATION_NOT_AVAILABLE, P_APPLICATION_NOT_ACTIVATED, P_INVALID_INTERFACE_TYPE

8.3.2.6 Method extTriggeredStatusReportingStartReq()

Request for triggered status reports when one or several user's status is changed. The user status service will send a report when the status changes.

Returns: assignmentId.

Specifies the assignment ID of the triggered status-reporting request.

Parameters

appStatus : in IpAppUserStatusRef

Specifies the application interface for callbacks from the User Status service.

users : in TpAddressSet

Specifies the user(s) for which the status changes shall be reported.

Returns

TpAssignmentID

Raises

TpCommonExceptions, P_UNKNOWN_SUBSCRIBER, P_INFORMATION_NOT_AVAILABLE, P_APPLICATION_NOT_ACTIVATED, P_INVALID_INTERFACE_TYPE

8.3.2.7 Method extTriggeredStatusReportingStop()

This method stops the sending of status reports for one or several users.

Parameters

stopRequest : in TpMobilityStopAssignmentData

Specifies how the assignment shall be stopped, i.e. if whole or just parts of the assignment should be stopped.

Raises

TpCommonExceptions, P_INVALID_ASSIGNMENT_ID

9 State Transition Diagrams

9.1 User Location

There are no State Transition Diagrams for User Location.

9.2 User Location Camel

9.2.1 State Transition Diagrams for IpUserLocationCamel

During the signServiceAgreement a new user location interface reference is created, which is user as the initial point of contact for the application.

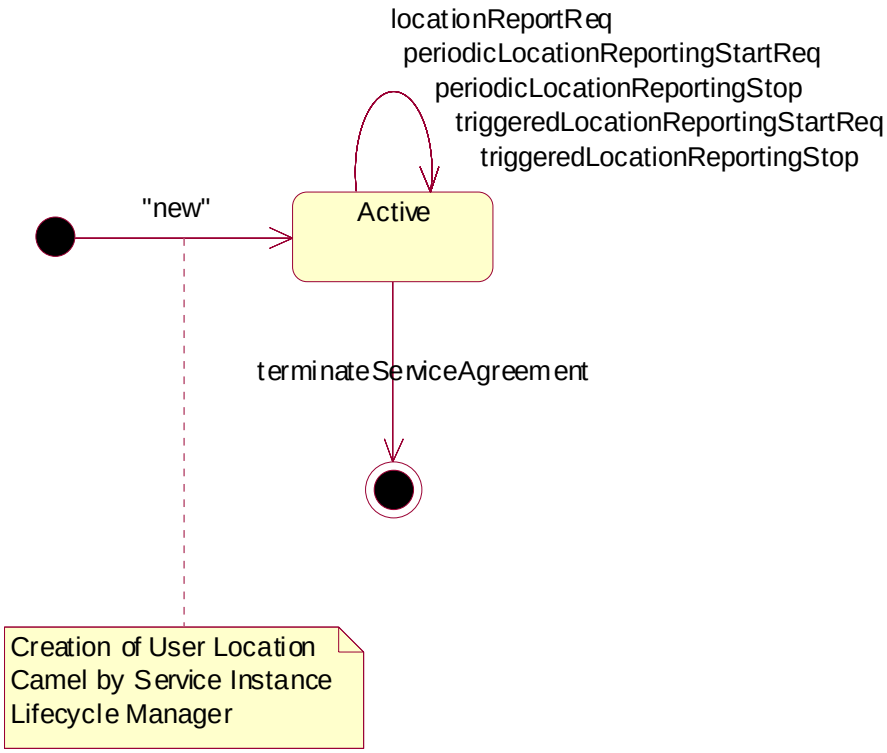


Figure : State Transition Diagram for User Location Camel

9.2.1.1 Active State

In this state, a relation between the Application and the Network User Location Service Capability Feature has been established. It allows the application to request a specific user location reports, subscribe to periodic user location reports or subscribe to triggers that generate location report when a location update occurs inside the current VLR area or when the user moves to another VLR area or both.

9.3 User Status

9.3.1 State Transition Diagrams for IpUserStatus

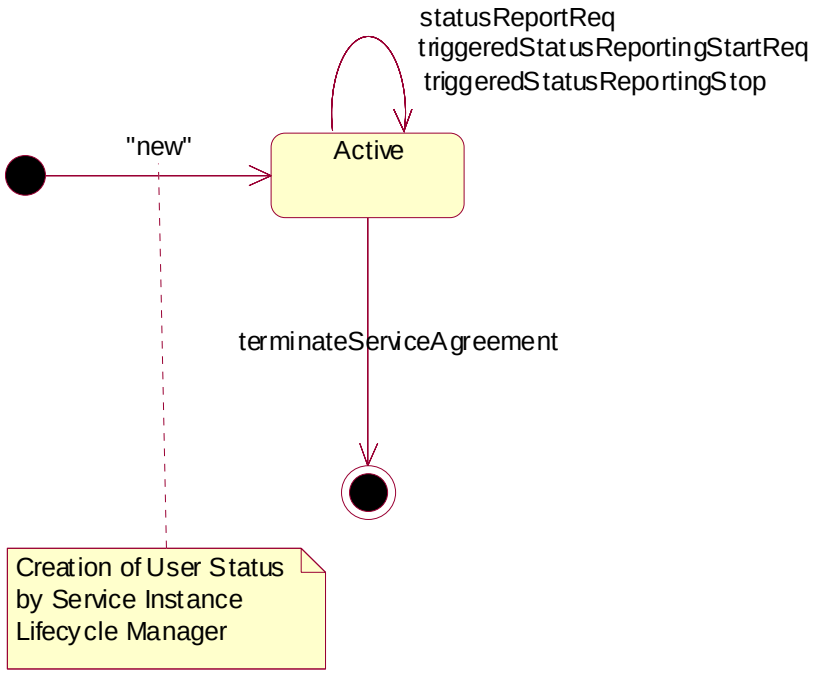


Figure : State Transition Diagram for User Status

9.3.1.1 Active State

In this state, a relation between the Application and the User Status Service Capability Feature has been established. It allows the application to request a specific user status report or subscribe to triggers that generate status reports when the status of one of the monitored user changes.

10 Service Properties

10.1 Mobility Properties

10.1.1 Emergency Application Subtypes

Emergency (see definition of "LCS Client Type" in 3GPP TS 23.271) Application Subtypes;

This property contains a list of application subtypes that are permitted to use the service. The possible subtypes are (see definition of "LCS Client Internal ID" in 3GPP TS 23.271):

- 'Broadcast service'
- 'O&M HPLMN service'
- 'O&M VPLMN service'
- 'Anonymous location'
- 'Target MS subscribed service'

10.1.2 Value Added Application Subtypes

Value Added (see definition of "LCS Client Type" in 3GPP TS 23.271) Application Subtypes.

This property contains a list of application subtypes that are permitted to use the service. The possible subtypes are (see definition of "LCS Client Internal ID" in 3GPP TS 23.271):

- 'Broadcast service'
- 'O&M HPLMN service'
- 'O&M VPLMN service'
- 'Anonymous location'
- 'Target MS subscribed service'

10.1.3 PLMN Operator Application Subtypes

PLMN Operator (see definition of "LCS Client Type" in 3GPP TS 23.271.) Application Subtypes.

This property contains a list of application subtypes that are permitted to use the service. The possible subtypes are (see definition of "LCS Client Internal ID" in 3GPP TS 23.271):

- 'Broadcast service'
- 'O&M HPLMN service'
- 'O&M VPLMN service'
- 'Anonymous location'
- 'Target MS subscribed service'

10.1.4 Lawful Intercept Application Subtypes

Lawful Intercept (See definition of "LCS Client Type" in 3GPP TS 23.271.) Application Subtypes.

This property contains a list of application subtypes that are permitted to use the service. The possible subtypes are (see definition of "LCS Client Internal ID" in 3GPP TS 23.271):

- 'Broadcast service'
- 'O&M HPLMN service'
- 'O&M VPLMN service'
- 'Anonymous location'
- 'Target MS subscribed service'

10.1.5 Altitude Obtainable

Indicates whether it is possible to obtain a user"s altitude.

10.1.6 Location Methods

List of supported location methods. Possible values (other values are permitted):

- 'Time of Arrival'
- 'Timing Advance'
- 'GPS'
- 'User Data Lookup'
- 'Any Time Interrogation'

10.1.7 Priorities

List of supported priorities for location requests. Possible values (no other values are permitted):

- 'Normal'
- 'High'

10.1.8 Max Interactive Requests

The maximum number of parallel outstanding location or status requests allowed per application. It shall be possible to convert the value to a 32-bit integer.

10.1.9 Max Triggered Users

The maximum number of users allowed per application for which triggered location reporting can be requested. It shall be possible to convert the value to a 32-bit integer.

10.1.10 Max Periodic Users

The maximum number of users allowed per application for which periodic location reporting can be requested. It shall be possible to convert the value to a 32-bit integer.

10.1.11 Min Periodic Interval Duration

The minimal time in seconds allowed between two periodic reports. It shall be possible to convert the value to a 32-bit integer. Note however that the *reportingInterval* parameter, which is used in methods pertaining to periodic location reporting, is of common data type *TpDuration*, i.e. a signed 32-bit integer representing a time interval in milliseconds.

10.1.12 Initial Report

Indicates whether a triggered service should generate an initial triggered report immediately after a triggered start request.

- Triggered Status – If this property is set to 'True', the initial status of the end user is reported immediately after the triggeredStatusReportingStartReq.
- Triggered Location – If this property is set to 'True', the initial location of the end user is reported immediately after the triggeredLocationReportingStartReq, if the trigger criteria is met i.e. if the end user is within the location area and the `Criterion` is `P_UL_ENTERING_AREA` or the end user is outside the location area and the `Criterion` is `P_UL_LEAVING_AREA`.

10.1.13 Max Life Time

Specifies the maximum life time in milliseconds of a triggered or periodic reporting. It is of common data type *TpDuration*, i.e. a signed 32-bit integer representing a time interval in milliseconds. A value of zero means infinite life time.

- The periodic or triggered reporting will stop when a stop method associated with the triggering is received by the SCS or when the life time has expired.

10.2 User Location Service Properties

A specific User Location service shall set the following properties:

- General Properties applicable to all SCFs (in Framework)
- Permitted application types

- Permitted application subtypes
- Priorities (see definition of "LCSClientType" in 3GPP TS 23.271.)
- Altitude obtainable
- Location methods
- Max interactive requests
- Max triggered users
- Max periodic users
- Min periodic interval duration
- Initial Report
- Max Life Time

EXAMPLE: The example below describes the capabilities of two fictive User Location services:

Property Name	Property Value Service 1	Property Value Service 2
Service instance ID	0x80923AD0	0xF0ED85CB
Service name	UserLocation	UserLocation
Service version	2.1	2.1
Service description	Basic User Location service	Advanced high-performance User Location service
Product name	Find It	Locate.com
Product version	1.3	3.1
Supported interfaces	'IpUserLocation'	'IpUserLocation'
Permitted application types	'Emergency service', 'Value added service'	'Emergency service', 'Value added service', 'Lawful intercept service'
Permitted application subtypes	?	?
Priorities	'Normal'	'Normal', 'High'
Altitude obtainable	False	True
Location methods	'Timing Advance'	'GPS', 'Time Of Arrival'
Max interactive requests	2000	10000
Max triggered users	0	2000
Max periodic users	300	2000
Min periodic interval duration	600	30
Initial Report	True	True

10.3 User Location Camel Service Properties

A specific User Location Camel service shall set the following properties:

- General Properties applicable to all SCFs (in Framework)
- Max interactive requests
- Max triggered users
- Max periodic users
- Min periodic interval duration
- Initial Report
- Max Life Time

10.4 User Status Service Properties

A specific User Location service shall set the following properties:

- General Properties applicable to all SCFs (in Framework)
- Max interactive requests
- Max triggered users
- Initial Report
- Max Life Time

11 Data Definitions

All data types referenced but not defined in this clause are common data definitions which may be found in 3GPP TS 29.198-2.

11.1 Common Mobility Data Definitions

The following data definitions are used for several of the mobility services.

11.1.1 TpGeographicalPosition

Defines the `Sequence of Data Elements` that specify a geographical position.

The horizontal location is defined by an 'ellipsoid point with uncertainty shape'. The reference system chosen for the coding of locations is the World Geodetic System 1984 (WGS 84).

TypeOfUncertaintyShape describes the type of the uncertainty shape and *Longitude*/*Latitude* defines the position of the uncertainty shape. The following table defines the meaning of the data elements that describe the uncertainty shape for each uncertainty shape type.

Type of uncertainty shape	***Uncertainty Outer Semi Major***	***Uncertainty Outer Semi Minor***	***Uncertainty Inner Semi Major***	***Uncertainty Inner Semi Minor***	***Angle Of Semi Major***	***Segment Start Angle***	***Segment End Angle***
None	-	-	-	-	-	-	-
Circle	radius of circle	-	-	-	-	-	-
Circle Sector	radius of circle	-	-	-	-	start angle of circle segment	end angle of circle segment
Circle Arc Stripe	radius of outer circle	-	radius of inner circle	-	-	start angle of circle arc stripe	end angle of circle arc stripe
Ellipse	length of semi-major axis	length of semi-minor axis	-	-	rotation of ellipse measured clockwise from north	-	-
Ellipse Sector	length of semi-major axis	length of semi-minor axis	-	-	rotation of ellipse measured clockwise from north	start angle of ellipse segment	end angle of ellipse segment
Ellipse Arc Stripe	length of semi-major axis, outer ellipse	length of semi-minor axis, outer ellipse	length of semi-major axis, inner ellipse	length of semi-minor axis, inner ellipse	rotation of ellipse measured clockwise from north	start angle of ellipse arc stripe	end angle of ellipse arc stripe

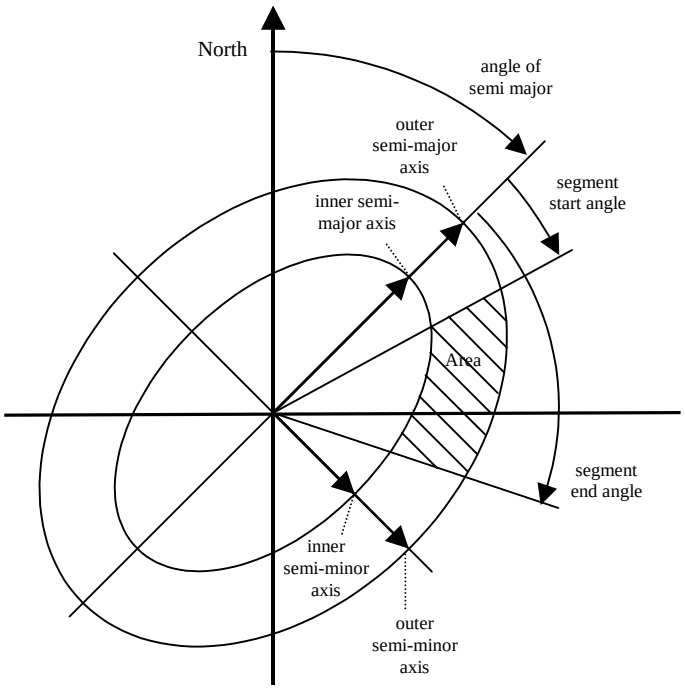


Figure 1 Description of an Ellipse Arc

TpGeographicalPosition:

Sequence Element Name	Sequence Element Type
Longitude	TpFloat
Latitude	TpFloat
TypeOfUncertaintyShape	TpLocationUncertaintyShape
UncertaintyInnerSemiMajor	TpFloat
UncertaintyOuterSemiMajor	TpFloat
UncertaintyInnerSemiMinor	TpFloat
UncertaintyOuterSemiMinor	TpFloat
AngleOfSemiMajor	TpInt32
SegmentStartAngle	TpInt32
SegmentEndAngle	TpInt32

11.1.2 TpLocationPriority

Defines the priority of a location request.

Name	Value	Description
P_M_NORMAL	0	Normal
P_M_HIGH	1	High

11.1.3 TpLocationRequest

Defines the `Sequence of Data Elements` that specify a location request.

Sequence Element Name	Sequence Element Type	Description
`RequestedAccuracy`	`TpFloat`	Requested accuracy in meters.
`RequestedResponseTime`	TpLocationResponseTime	Requested response time as a classified requirement or as an absolute timer.
`AltitudeRequested`	`TpBoolean`	Altitude request flag.
`Type`	TpLocationType	The kind of location that is requested.
`Priority`	TpLocationPriority	Priority of location request.
`RequestedLocationMethod`	`TpString`	The kind of location method that is requested.

11.1.4 TpLocationResponseIndicator

Defines a response time requirement.

Name	Value	Description
`P_M_NO_DELAY`	0	No delay: return either initial or last known location of the user.
`P_M_LOW_DELAY`	1	Low delay: return the current location with minimum delay. The mobility service shall attempt to fulfil any accuracy requirement, but in doing so shall not add any additional delay.
`P_M_DELAY_TOLERANT`	2	Delay tolerant: obtain the current location with regard to fulfilling the accuracy requirement.
`P_M_USE_TIMER_VALUE`	3	Use timer value: obtain the current location with regard to fulfilling the response time requirement.

11.1.5 TpLocationResponseTime

Defines the `Sequence of Data Elements` that specify the application"s requirements on the mobility service"s response time.

Sequence Element Name	Sequence Element Type	Description
`ResponseTime`	TpLocationResponseIndicator	Indicator for which kind of response time that is required, see TpLocationResponseIndicator.
`TimerValue`	`TpInt32`	Optional timer used in combination when ResponseTime equals P_M_USE_TIMER_VALUE. Units are seconds.

11.1.6 TpLocationType

Defines the type of location requested.

Name	Value	Description
`P_M_CURRENT`	0	Current location
`P_M_CURRENT_OR_LAST_KNOWN`	1	Current or last known location
`P_M_INITIAL`	2	Initial location for an emergency services call

11.1.7 TpLocationUncertaintyShape

Defines the type of uncertainty shape.

Name	Value	Description
P_M_SHAPE_NONE	0	No uncertainty shape present.
P_M_SHAPE_CIRCLE	1	Uncertainty shape is a circle.
P_M_SHAPE_CIRCLE_SECTOR	2	Uncertainty shape is a circle sector.
P_M_SHAPE_CIRCLE_ARC_STRIPE	3	Uncertainty shape is a circle arc stripe.
P_M_SHAPE_ELLIPSE	4	Uncertainty shape is an ellipse.
P_M_SHAPE_ELLIPSE_SECTOR	5	Uncertainty shape is an ellipse sector.
P_M_SHAPE_ELLIPSE_ARC_STRIPE	6	Uncertainty shape is an ellipse arc stripe.

11.1.8 TpMobilityDiagnostic

Defines a diagnostic value that is reported in addition to an error by one of the mobility services.

Name	Value	Description
P_M_NO_INFORMATION	0	No diagnostic information present. Valid for all type of errors.
P_M_APPL_NOT_IN_PRIV_EXCEPT_LST	1	Application not in privacy exception list. Valid for "Unauthorised Application" error.
P_M_CALL_TO_USER_NOT_SETUP	2	Call to user not set-up. Valid for "Unauthorised Application" error.
P_M_PRIVACY_OVERRIDE_NOT_APPLIC	3	Privacy override not applicable. Valid for "Unauthorised Application" error.
P_M_DISALL_BY_LOCAL_REGULAT_REQ	4	Disallowed by local regulatory requirements. Valid for "Unauthorised Application" error.
P_M_CONGESTION	5	Congestion. Valid for "Position Method Failure" error.
P_M_INSUFFICIENT_RESOURCES	6	Insufficient resources. Valid for "Position Method Failure" error.
P_M_INSUFFICIENT_MEAS_DATA	7	Insufficient measurement data. Valid for "Position Method Failure" error.
P_M_INCONSISTENT_MEAS_DATA	8	Inconsistent measurement data. Valid for "Position Method Failure" error.
P_M_LOC_PROC_NOT_COMPLETED	9	Location procedure not completed. Valid for "Position Method Failure" error.
P_M_LOC_PROC_NOT_SUPP_BY_USER	10	Location procedure not supported by user. Valid for "Position Method Failure" error.
P_M_QOS_NOT_ATTAINABLE	11	Quality of service not attainable. Valid for "Position Method Failure" error.

11.1.9 TpMobilityError

Defines an error that is reported by one of the mobility services.

Name	Value	Description	Fatal
P_M_OK	0	No error occurred while processing the request.	N/A
P_M_SYSTEM_FAILURE	1	System failure. The request cannot be handled because of a general problem in the mobility service or the underlying network.	Yes
P_M_UNAUTHORIZED_NETWORK	2	Unauthorised network. The requesting network is not authorised to obtain the user"s binding details, location or status.	No
P_M_UNAUTHORIZED_APPLICATION	3	Unauthorised application. The application is not authorised to obtain the user"s binding details, location or status.	Yes
P_M_UNKNOWN_SUBSCRIBER	4	Unknown subscriber. The user is unknown, i.e. no such subscription exists.	Yes
P_M_ABSENT_SUBSCRIBER	5	Absent subscriber. The user is currently not reachable.	No
P_M_POSITION_METHOD_FAILURE	6	Position method failure. The mobility service failed to obtain the user"s position.	No

11.1.10 TpMobilityStopAssignmentData

Defines the Sequence of Data Elements that specify a request to stop whole or parts of an assignment. Assignments are used for periodic or triggered reporting of a user's location or status.

Note that the parameter "Users" is optional. If the parameter "StopScope" is set to P_M_ALL_IN_ASSIGNMENT the parameter "Users" is undefined. If the parameter 'StopScope' is set to P_M_SPECIFIED_USERS, then the assignment shall be stopped only for those users specified in the "Users" list.

Sequence Element Name	Sequence Element Type	Description
AssignmentId	TpAssignmentID	Identity of the assignment that shall be stopped.
StopScope	TpMobilityStopScope	Specify if only a part of the assignment or if all the assignment shall be stopped.
Users	TpAddressSet	Optional parameter describing which users a stop request is addressing, when only a part of an assignment is to be stopped.

11.1.11 TpMobilityStopScope

This enumeration is used in requests to stop mobility reports that are sent from a mobility service to an application.

Name	Value	Description
P_M_ALL_IN_ASSIGNMENT	0	The request concerns all users in an assignment.
P_M_SPECIFIED_USERS	1	The request concerns only the users that are explicitly specified in a list.

11.1.12 TpTerminalType

Defines which kind of terminal is used.

Name	Value	Description
P_M_FIXED	0	Fixed terminal.
P_M_MOBILE	1	Mobile terminal.
P_M_IP	2	IP terminal.

11.2 User Location Data Definitions

11.2.1 IpUserLocation

Defines the address of an `IpUserLocation` Interface.

11.2.2 IpUserLocationRef

Defines a `Reference` to type `IpUserLocation.`

11.2.3 IpAppUserLocation

Defines the address of an `IpAppUserLocation` Interface.

11.2.4 IpAppUserLocationRef

Defines a `Reference` to type `IpAppUserLocation.`

11.2.5 IpTriggeredUserLocation

Defines the address of an `IpTriggeredUserLocation` Interface.

11.2.6 IpTriggeredUserLocationRef

Defines a `Reference` to type `IpTriggeredUserLocation.`

11.2.7 IpAppTriggeredUserLocation

Defines the address of an `IpAppTriggeredUserLocation` Interface.

11.2.8 IpAppTriggeredUserLocationRef

Defines a `Reference` to type `IpAppTriggeredUserLocation.`

11.2.9 TpUlExtendedData

Defines the `Sequence of Data Elements` that specify a location (extended format).

The optional vertical location is defined by the data element *Altitude*, which contains the altitude in meters above sea level, and the data element *AltitudeAccuracy*, which contains the accuracy of the altitude.

Sequence Element Name	Sequence Element Type	Description
`GeographicalPosition`	`TpGeographicalPosition`	Specification of a position and an area of uncertainty.
`TerminalType`	`TpTerminalType`	Kind of terminal.
`AltitudePresent`	`TpBoolean`	Flag indicating if the altitude is present.
`Altitude`	`TpFloat`	Decimal altitude in meters.
`UncertaintyAltitude`	`TpFloat`	Uncertainty of the altitude.
`TimestampPresent`	`TpBoolean`	Flag indicating if the timestamp is present.
`Timestamp`	`TpDateAndTime`	Timestamp indicating when the position was measured.
`UsedLocationMethod`	`TpString`	Specifying which location method was used.

11.2.10 TpUlExtendedDataSet

Defines a `Numbered Set of Data Elements` of TpUlExtendedData.

11.2.11 TpUserLocationExtended

Defines the `Sequence of Data Elements` that specify the identity and location(s) of a user (extended format). In general the data element *Locations* will contain only one location, but in case of IP-telephony users this data element might continue several locations (the locations of all communication end-points, where the user is currently registered).

Sequence Element Name	Sequence Element Type	Description
UserID	TpAddress	The address of the user.
StatusCode	TpMobilityError	Indicator of error.
Locations	TpUlExtendedDataSet	Optional list of locations. If StatusCode is indicating an error, this value is undefined.

11.2.12 TpUserLocationExtendedSet

Defines a `Numbered Set of Data Elements` of TpUserLocationExtended.

11.2.13 TpLocationTrigger

Defines the `Sequence of Data Elements` that specify the criteria for a triggered location report to be generated. The area is defined by an ellipse.

Sequence Element Name	Sequence Element Type	Description
Longitude	TpFloat	Longitude of the position used in the trigger.
Latitude	TpFloat	Latitude of the position used in the trigger.
AreaSemiMajor	TpFloat	Semi major of ellipse area used in the trigger.
AreaSemiMinor	TpFloat	Semi minor of ellipse area used in the trigger.
AngleOfSemiMajor	TpInt32	Angle of the semi major of the ellipse area used in the trigger.
Criterion	TpLocationTriggerCriteria	Trigger criteria with regard to the ellipse area.
ReportingInterval	TpDuration	Duration between generated location reports. Notes: • Units are **milliseconds**. • Denotes the minimum time between invocations of the IpAppTriggeredUserLocation. triggeredLocationReport method, for this specific location ellipse area and trigger criterion.

11.2.14 TpLocationTriggerSet

Defines a `Numbered Set of Data Elements` of TpLocationTrigger.

11.2.15 TpLocationTriggerCriteria

Defines the criteria that trigger a location report.

Name	Value	Description
P_UL_ENTERING_AREA	0	User enters the area
P_UL_LEAVING_AREA	1	User leaves the area

11.2.16 TpUserLocation

Defines the `Sequence of Data Elements` that specify the identity and location of a user (basic format).

Sequence Element Name	Sequence Element Type	Description
UserID	TpAddress	The address of the user.
StatusCode	TpMobilityError	Indicator of error.
GeographicalPosition	TpGeographicalPosition	Specification of a position and an area of uncertainty. If StatusCode is indicating an error, this value is undefined.

11.2.17 TpUserLocationSet

Defines a `Numbered Set of Data Elements` of TpUserLocation.

11.2.18 TpTriggeredLocationRequestSetEntry

Defines the Sequence of Data Elements that specify a set of triggered requests and an indication whether more triggered location requests can be requested.

Sequence Element Name	Sequence Element Type	Description
`Requests`	`TpTriggeredLocationRequestSet`	Numbered set of requests.
`Final`	`TpBoolean`	Indication whether the set of triggered requests is the final set (TRUE) or if there are more triggered requests (FALSE).

11.2.19 TpTriggeredLocationRequestSet

Defines a numbered Set of Data Elements of TpTriggeredLocationRequest.

11.2.20 TpTriggeredLocationRequest

Defines the Sequence of Data Elements that specify the criteria relating to triggered location requests.

Sequence Element Name	Sequence Element Type
`Users`	`TpAddressSet`
`Request`	`TpLocationRequest`
`AssignmentID`	`TpAssignmentID`

11.2.21 TpPeriodicLocationRequestSetEntry

Defines the Sequence of Data Elements that specify a set of triggered requests and an indication whether more periodic location requests can be requested.

Sequence Element Name	Sequence Element Type	Description
`Requests`	`TpPeriodicLocationRequestSet`	Numbered set of requests.
`Final`	`TpBoolean`	Indication whether the set of triggered requests is the final set (TRUE) or if there are more triggered requests (FALSE).

11.2.22 TpPeriodicLocationRequestSet

Defines a numbered Set of Data Elements of TpPeriodicLocationRequest.

11.2.23 TpPeriodicLocationRequest

Defines the Sequence of Data Elements that specify the criteria relating to periodic location requests.

Sequence Element Name	Sequence Element Type
`Users`	`TpAddressSet`
`Request`	`TpLocationRequest`
`ReportingInterval`	`TpDuration`
`AssignmentID`	`TpAssignmentID`

11.3 User Location Camel Data Definitions

11.3.1 IpUserLocationCamel

Defines the address of an `IpUserLocationCamel` Interface.

11.3.2 IpUserLocationCamelRef

Defines a `Reference` to type `IpUserLocationCamel.`

11.3.3 IpAppUserLocationCamel

Defines the address of an `IpAppUserLocationCamel` Interface.

11.3.4 IpAppUserLocationCamelRef

Defines a `Reference` to type `IpAppUserLocationCamel.`

11.3.5 TpLocationCellIDOrLAI

This data type is identical to a `TpString`. It specifies the Cell Global Identification or the Location Area Identification (LAI).

The Cell Global Identification (CGI) is defined as a string of characters in the following format:

MCC-MNC-LAC-CI

where:

MCC Mobile Country Code (three decimal digits)

MNC Mobile Network Code (two or three decimal digits)

LAC Location Area Code (four hexadecimal digits)

CI Cell Identification (four hexadecimal digits)

The Location Area Identification (LAI) is defined as a string of characters in the following format:

MCC-MNC-LAC

where:

MCC Mobile Country Code (three decimal digits)

MNC Mobile Network Code (two or three decimal digits)

LAC Location Area Code (four hexadecimal digits)

The length of the parameter indicates, which format is used. See 3GPP TS 29.002 [4] for the detailed coding.

11.3.6 TpLocationTriggerCamel

Defines the `Sequence of Data Elements` that specify the criteria for a triggered location report to be generated.

Sequence Element Name	Sequence Element Type	Description
`UpdateInsideVlr`	`TpBoolean`	Generate location report, when a location update occurs inside the current VLR area.
`UpdateOutsideVlr`	`TpBoolean`	Generate location report, when the user moves to another VLR area.

11.3.7 TpUserLocationCamel

Defines the `Sequence of Data Elements` that specify the location of a mobile telephony user. Note that if the StatusCode is indicating an error , then neither `GeographicalPosition, Timestamp, VlrNumber, LocationNumber, CellIdOrLai` nor their associated presence flags are defined.

Sequence Element Name	Sequence Element Type	Description
`UserID`	`TpAddress`	The address of the user.
`StatusCode`	`TpMobilityError`	Indicator of error.
`GeographicalPositionPresent`	`TpBoolean`	Flag indicating if the geographical position is present.
`GeographicalPosition`	`TpGeographicalPosition`	Specification of a position and an area of uncertainty.
`TimestampPresent`	`TpBoolean`	Flag indicating if the timestamp is present.
`Timestamp`	`TpDateAndTime`	Timestamp indicating when the request was processed.
`VlrNumberPresent`	`TpBoolean`	Flag indicating if the VLR number is present.
`VlrNumber`	`TpAddress`	Current VLR number for the user.
`LocationNumberPresent`	`TpBoolean`	Flag indicating if the location number is present.
`LocationNumber` (see Note)	`TpAddress`	Current location number.
`CellIdOrLaiPresent`	`TpBoolean`	Flag indicating if cell-id or LAI of the user is present.
`CellIdOrLai`	`TpLocationCellIDOrLAI`	Cell-id or LAI of the user.
NOTE: The location number is the number to the MSC or in rare cases the roaming number.		

11.3.8 TpUserLocationCamelSet

Defines a `Numbered Set of Data Elements` of TpUserLocationCamel.

11.4 User Location Emergency Data Definitions

11.4.1 IpUserLocationEmergency

Defines the address of an `IpUserLocationEmergency` Interface.

11.4.2 IpUserLocationEmergencyRef

Defines a `Reference` to type `IpUserLocationEmergency.`

11.4.3 IpAppUserLocationEmergency

Defines the address of an `IpAppUserLocationEmergency` Interface.

11.4.4 IpAppUserLocationEmergencyRef

Defines a `Reference` to type `IpAppUserLocationEmergency.`

11.4.5 TpIMEI

This data type is identical to a `TpString`. It specifies the International Mobile Equipment Identity (IMEI).

11.4.6 TpNaESRD

This data type is identical to a `TpString`. It specifies the North American Emergency Services Routing Digits (NA-ESRD).
NA-ESRD is a telephone number in the North American Numbering Plan that can be used to identify a North American emergency services provider and its associated Location Services client. The NA-ESRD also identifies the base station, cell site or sector from which a North American emergency call originates.

11.4.7 TpNaESRK

This data type is identical to a `TpString`. It specifies the North American Emergency Services Routing Key (NA-ESRK).
NA-ESRK is a telephone number in the North American Numbering Plan that is assigned to an emergency services call for the duration of the call. The NA-ESRK is used to identify (e.g. route to) both, the emergency services provider and the switch, currently serving the emergency caller. During the lifetime of an emergency services call, the NA-ESRK also identifies the calling subscriber.

11.4.8 TpUserLocationEmergencyRequest

Defines the `Sequence of Data Elements` that specify the request for the location of an emergency service user. The emergency service user is identified by a combination of *user address*, *NaESRD*, *NaESRK* and *IMEI*. *NaESRD*, *NaESRK* and *IMEI* may be provided, if the emergency service user has originated the emergency service call in North America.

Sequence Element Name	Sequence Element Type	Description
UserAddressPresent	TpBoolean	Flag indicating if the user address is present.
UserAddress	TpAddress	The address of the user.
NaEsrdPresent	TpBoolean	Flag indicating if the NaESRD is present.
NaEsrd	TpNaESRD	Current NaESRD for the user.
NaEsrkPresent	TpBoolean	Flag indicating if the NaESRK is present.
NaEsrk	TpNaESRK	Current NaESRK for the user.
ImeiPresent	TpBoolean	Flag indicating if the IMEI is present.
Imei	TpIMEI	IMEI for the user.
LocationReq	TpLocationRequest	The actual location request.

11.4.9 TpUserLocationEmergency

Defines the `Sequence of Data Elements` that specify the identity and location of an emergency service user. The emergency service user is identified by a combination of *UserID*, *NaESRD*, *NaESRK* and *IMEI*.
NaESRD, *NaESRK* and *IMEI* may be provided, if the emergency service user has originated the emergency service call in North America.
The horizontal location is defined by an 'ellipsoid point with uncertainty ellipse' (see TpUlExtendedData).

Sequence Element Name	Sequence Element Type	Description
StatusCode	TpMobilityError	Indicator of error.
UserIdPresent	TpBoolean	Flag indicating if the user address is present.
UserId	TpAddress	The user address.
NaEsrdPresent	TpBoolean	Flag indicating if the NaESRD is present.
NaEsrd	TpNaESRD	Current NaESRD for the user.
NaEsrkPresent	TpBoolean	Flag indicating if the NaESRK is present.
NaEsrk	TpNaESRK	Current NaESRK for the user.
ImeiPresent	TpBoolean	Flag indicating if the IMEI is present.
Imei	TpIMEI	IMEI for the user.
TriggeringEvent	TpUserLocationEmergencyTrigger	The reason for this location report.
GeographicalPositionPresent	TpBoolean	Flag indicating if the geographical position is present.
GeographicalPosition	TpGeographicalPosition	Specification of a position and an area of uncertainty.
AltitudePresent	TpBoolean	Flag indicating if the altitude is present.
Altitude	TpFloat	Decimal altitude in meters.
UncertaintyAltitude	TpFloat	Uncertainty of the altitude.
TimestampPresent	TpBoolean	Flag indicating if a timestamp is present.
Timestamp	TpDateAndTime	Timestamp indicating when the request was processed.
UsedLocationMethod	TpString	Specifying which location method was used.

11.4.10 TpUserLocationEmergencyTrigger

Defines which event triggered the emergency User Location report.

Name	Value	Description
P_ULE_CALL_ORIGINATION	0	An emergency service user originated an emergency call.
P_ULE_CALL_RELEASE	1	An emergency service user released an emergency call.
P_ULE_LOCATION_REQUEST	2	The report is a response to an emergency location report request.

11.5 User Status Data Definitions

11.5.1 IpUserStatus

Defines the address of an `IpUserStatus` Interface.

11.5.2 IpUserStatusRef

Defines a `Reference` to type `IpUserStatus.`

11.5.3 IpAppUserStatus

Defines the address of an `IpAppUserStatus` Interface.

11.5.4 IpAppUserStatusRef

Defines a `Reference` to type `IpAppUserStatus.`

11.5.5 TpUserStatus

Defines the `Sequence of Data Elements` that specify the identity and status of a user.

Sequence Element Name	Sequence Element Type	Description
UserID	TpAddress	The user address.
StatusCode	TpMobilityError	Indicator of error.
Status	TpUserStatusIndicator	The current status of the user.
TerminalType	TpTerminalType	The kind of terminal used by the user.

11.5.6 TpUserStatusSet

Defines a `Numbered Set of Data Elements` of TpUserStatus.

11.5.7 TpUserStatusIndicator

Defines the status of a user.

Name	Value	Description
P_US_REACHABLE	0	User is reachable
P_US_NOT_REACHABLE	1	User is not reachable
P_US_BUSY (see Note)	2	User is busy (only applicable for interactive user status request, not when triggers are used)
NOTE: Only applicable to mobile (Camel) telephony users.		

11.5.8 TpTriggeredStatusRequestSetEntry

Defines the Sequence of Data Elements that specify a set of triggered requests and an indication whether more triggered status requests can be requested.

Sequence Element Name	Sequence Element Type	Description
Requests	TpTriggeredStatusRequestSet	Numbered set of requests.
Final	TpBoolean	Indication whether the set of triggered requests is the final set (TRUE) or if there are more triggered requests (FALSE).

11.5.9 TpTriggeredStatusRequestSet

Defines a numbered Set of Data Elements of TpTriggeredStatusRequest.

11.5.10 TpTriggeredStatusRequest

Defines the Sequence of Data Elements that specify the criteria relating to triggered status requests.

Sequence Element Name	Sequence Element Type
Users	TpAddressSet
AssignmentID	TpAssignmentID

11.5.11 TpUserStatusExtended

Defines the Sequence of Data Elements that specify the identity and status of a user.

Sequence Element Name	Sequence Element Type	Description
UserID	TpAddress	The user address.
StatusCode	TpMobilityError	Indicator of error.
Status	TpUserStatusIndicatorExtended	The current status of the user.
TerminalType	TpTerminalType	The kind of terminal used by the user.
AuthenticationStatus	TpAuthStatusIndicator	The current authentication status of the user
NetworkStatus	TpNetworkStatusIndicator	Country code, Mobile network code, technology and Roaming status.
UserIPAddress	TpString	The allocated IP address for the user. If there is no IPAddress allocated then this is represented with the empty string.
UserMSISDN	TpString	The user MSISDN. If the MSISDN address is not known, then this is represented with the empty string.
UserInfo	TpUserInfo	Used to reference the user name and password supplied by the user during user-network authentication, if known by the network.
UserConnectionID	TpString	Combination of User IP Address and TCP port. This combination uniquely identifies the user"s TCP connection, because one user can have several TCP connections ongoing at the same time. The User IP Address contained in UserConnectionID can be the same as the userIPAddress, but this is not always the case since a router in the data network might have translated the UserIPAddress to another IP-address. The latter is then contained in UserConnectionID.
AccessPointName	TpString	Provides the Access Point Name of the Internet Service Provider

11.5.12 TpUserStatusExtendedSet

Defines a Numbered Set of Data Elements of TpUserStatusExtended.

11.5.13 TpUserStatusIndicatorExtended

Defines the status of a user.

Sequence Element Name	Sequence Element Type	Description
UserStatusIndicator	TpUserStatusIndicator	Indication whether the user is busy, reachable or not reachable
PDPContextActive	TpBoolean	Indication whether the user currently has an ongoing data session (i.e. PDP context established)

11.5.14 TpAuthStatusIndicator

Used to indicate if and how the user has been authenticated during data session establishment

Name	Value	Description
P_AUTHENTICATED_FOR_NETWORK_ONLY	0	Authenticated only for the network
P_AUTHENTICATED_FOR_NETWORK_AND_IP_SERVICES	1	Authenticated for the network and IP services
P_NOT_AUTHENTICATED	2	Not authenticated

11.5.15 TpUserInfo

Used to reference the user name and password supplied by the user, if known by the network.

Name	Structure Element Type	Description
UserName	TpString	User name as provided in a PPP/CHAP message.
Password	TpString	Password as provided in a PPP/CHAP message.

11.5.16 TpNetworkStatusIndicator

Specifies the country code, mobile network code, access network technology used by the user for the data session and roaming status.

Name	Structure Element Type	Description
CountryCode	TpString	Network CC Identification, Country code
MobileNetworkCode	TpString	Network MNC Identification, Mobile network code
AccessTechnology	TpAccessTechnology	Network access technology used by the user to connect
RoamingStatus	TpRoamingStatus	Roaming Status

11.5.17 TpAccessTechnology

Defines the derived access technology utilised by the user.

Name	Value	Description
P_MOBILE_ACCESS_PS	0	Access via packet switched connection in mobile network
P_MOBILE_ACCESS_CS	1	Access via a circuit switched connection in mobile network
P_FIXED_ACCESS	2	Access via a fixed network

11.5.18 TpRoamingStatus

Defines the roaming status of the user.

Name	Value	Description
P_UNKNOWN_ROAMING_STATUS	0	No information on Roaming status has been found
P_HOME_USER	1	User is in the home network
P_NATIONAL_ROAMING	2	User has roamed to another operator in the same country
P_INTERNATIONAL_ROAMING	3	User has roamed to another operator abroad
P_OPERATOR_ROAMING	4	User has roamed to a partner operator abroad

11.6 User Binding Data Definitions

11.6.1 TpBindingSet

Defines a Numbered Set of Data Elements of TpBindingEntrySet.

11.6.2 TpBindingEntrySet

Defines a Numbered Set of Data Elements of TpBindingEntry.

11.6.3 TpBindingEntry

Defines the Tagged Choice of Data Elements that specifies binding information.

	Tag Element Type	
	TpBindingEntryType	

Tag Element Value	Choice Element Type	Choice Element Name	Description
P_UB_EXPIRES	TpInt32	UBExpires	This field can be used to enforce time limits on session duration and is defined as an integral number of seconds.
P_UB_CONTACT_ADDRESS	TpAddress	UBContactAddress	This field informs the network of the subscriber's desired binding address.
P_UB_PREFERENCE	TpFloat	UBPreference	This field conveys a relative order among subscriber bindings.

11.6.4 TpBindingEntryType

Defines the type of binding information.

Name	Value	Description
P_UB_UNDEFINED	0	Undefined
P_UB_EXPIRES	1	A number indicating the number of seconds the binding is valid
P_UB_CONTACT_ADDRESS	2	The address representing the user's contact address
P_UB_PREFERENCE	3	A number between 0 and 1 indicating the contact address' relative preference

11.6.5 TpBindingNotificationCriteriaSet

Defines a Numbered Set of Data Elements of TpBindingNotificationCriteria.

11.6.6 TpBindingNotificationCriteria

Defines the Sequence of Data Elements that specifies the criteria relating to binding report requests.

Sequence Element Name	Sequence Element Type
NotificationCriteriaType	TpBindingNotificationCriteriaType
ContactAddressSet	TpAddressSet

11.6.7 TpBindingNotificationCriteriaType

Defines the binding operations to be reported. The values may be combined by a logical 'OR' function.

Name	Value	Description
P_UB_NEW	1	Indicates attempt to create a new binding
P_UB_REMOVE	2	Indicates removal of an existing binding
P_UB_UPDATE	4	Indicates attempt to update an existing binding

11.7 Units and Validations of Parameters

This clause describes the units that shall be used for data elements, where this is not obvious.

Altitude
Unit: Metric meter

Angle
Unit: Degrees

Value constraint: 0 ≤ 'Angle' ≤ 360

AreaSemiMajor and AreaSemiMinor
Unit: Metric meter

Value constraint: 0 ≤ 'AreaSemi…'

ReportingInterval
Unit: Milliseconds

Value constraint: 0 < 'ReportingInterval'

UncertaintyAltitude
Unit: Metric meter

Value constraint: 0 ≤ 'UncertaintyAltitude'

Semantic: (Altitude – UncertaintyAltitude) ≤ 'Terminal actual altitude' ≤ ('Altitude' + 'UncertaintyAltitude')

UncertaintyInnerSemiMajor and UncertaintyInnerSemiMinor
Unit: Metric meter

Value constraint: 0 ≤ 'UncertaintyInner…'

UncertaintyOuterSemiMajor and UncertaintyOuterSemiMinor
Unit: Metric meter

Value constraint: 0 ≤ 'UncertaintyInner…'

UsedLocationMethod
Predefined strings are listed in clause Location Methods.

12 Exception Classes

The following are the list of exception classes which are used in this interface of the API.

Name	Description
P_INVALID_REPORTING_INTERVAL	The requested reporting interval is not valid
P_REQUESTED_ACCURACY_CANNOT_BE_DELIVERED	The requested location accuracy cannot be delivered
P_REQUESTED_RESPONSE_TIME_CANNOT_BE_DELIVERED	The requested response time cannot be delivered
P_TRIGGER_CONDITIONS_NOT_SUBSCRIBED	Trigger conditions not subscribed

Each exception class contains the following structure:

Structure Element Name	Structure Element Type	Structure Element Description
ExtraInformation	TpString	Carries extra information to help identify the source of the exception, e.g. a parameter name

Annex A (normative): OMG IDL Description of Mobility SCF

The OMG IDL representation of this interface specification is contained in a text file (mm.idl contained in archive 2919806V700IDL.ZIP) which accompanies the present document.

Annex B (informative): W3C WSDL Description of Mobility SCF

The W3C WSDL representation of this interface specification is contained in zip file 2919806V700WSDL.ZIP, which accompanies the present document.

Annex C (informative): Java API Description of the Mobility SCFs

The Java API realisation of this interface specification is produced in accordance with the Java Realisation rules defined in Part 1 of this specification. These rules aim to deliver for Java, a developer API, provided as a realisation, supporting a Java API that represents the UML specifications. The rules support the production of both J2SE and J2EE versions of the API from the common UML specifications.

The J2SE representation of this interface specification is provided as Java Code, contained in archive 2919806V700J2SE.ZIP that accompanies the present document.

The J2EE representation of this interface specification is provided as Java Code, contained in archive 2919806V700J2EE.ZIP that accompanies the present document.

Annex D (informative): Description of Mobility SCF for 3GPP2 cdma2000 networks

This annex is intended to define the OSA API Stage 3 interface definitions and it provides the complete OSA specifications. It is an extension of OSA API specifications capabilities to enable operation in cdma2000 systems environment. They are in alignment with 3GPP2 Stage 1 requirements and Stage 2 architecture defined in

[1] 3GPP2 P.S0001-B: "Wireless IP Network Standard", Version 1.0, September 2000;

[2] 3GPP2 S.R0037-0: "IP Network Architecture Model for cdma2000 Spread Spectrum Systems", Version 2.0, May 14, 2002;

[3] 3GPP2 X.S0013: "All-IP Core Network Multimedia Domain", December 2003.

These requirements are expressed as additions to and/or exclusions from the 3GPP Release 7 specification. The information given here is to be used by developers in 3GPP2 cdma2000 network architecture to interpret the 3GPP OSA specifications.

D.1 General Exceptions

The terms 3GPP and UMTS are not applicable for the cdma2000 family of standards. Nevertheless these terms are used (3GPP TR 21.905) mostly in the broader sense of "3G Wireless System". If not stated otherwise there are no additions or exclusions required.

CAMEL and CAP mappings are not applicable for cdma2000 systems.

D.2 Specific Exceptions

D.2.1 Clause 1: Scope

There are no additions or exclusions.

D.2.2 Clause 2: References

Normative references on 3GPP TS 23.078 and on 3GPP TS 29.078 are not applicable for cdma2000 systems.

D.2.3 Clause 3: Definitions and abbreviations

There are no additions or exclusions.

D.2.4 Clause 4: Mobility SCF

There are no additions or exclusions. UL-User Location UMTS term may be mapped onto LCS-Location Services cdma2000 term. CAMEL is not applicable for cdma2000 systems.

D.2.5 Clause 5: Sequence Diagrams

There are no additions. User Location Camel Sequence Diagrams are not applicable for cdma2000 systems.

D.2.6 Clause 6 Class Diagrams

There are no additions. User Location Camel Class Diagrams are not applicable for cdma2000 systems.

D.2.7 Clause 7: The Service Interface Specifications

There are no additions or exclusions.

D.2.8 Clause 8: Mobility Interface Classes

There are no additions. User Location Camel Interface Classes are not applicable for cdma2000 systems

D.2.9 Clause 9: State Transition Diagrams

Since CAMEL protocol is not applicable for cdma2000 systems, User Location Camel state transition diagrams are not applicable for cdma2000 systems.

D.2.10 Clause 10: Service Properties

Since CAMEL protocol is not applicable for cdma2000 systems, an SCS shall indicate support for the CAMEL feature through service properties. For cdma2000 systems the service properties shall be disabled (CAMEL shall be turned always off in the case of the 3GPP2 networks; e.g.: UserLocationCamel shall be set to false).

D.2.11 Clause 11: Data Definitions

There are no additions. UserLocationCamel data definitions are not applicable for cdma2000 systems.

D.2.12 Clause 12: Exception Classes

There are no additions or exclusions.

D.2.13 Annex A (normative): OMG IDL Description of Mobility SCF

There are no additions or exclusions.

D.2.14 Annex B (informative): W3C WSDL Description of Mobility SCF

There are no additions or exclusions.

D.2.15 Annex C (informative): Java™ API Description of Mobility SCF

There are no additions or exclusions.

Annex E (informative): Change history

Change history							
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**
Mar 2007	CT_35	CP-070047	0062	--	Update document for conversion to Release 7	6.6.1	7.0.0

History

Document history		
V7.0.0	March 2007	Publication