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Technical Specification

Digital cellular telecommunications system (Phase 2+);
Universal Mobile Telecommunications System (UMTS);
LTE;
Open Service Access (OSA)
Application Programming Interface (API);
Part 4: Call control;
Subpart 4: Multimedia call control
Service Capability Feature (SCF)
(3GPP TS 29.198-04-4 version 9.0.0 Release 9)

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Foreword

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

The present document may refer to technical specifications or reports using their 3GPP identities, UMTS identities or GSM identities. These should be interpreted as being references to the corresponding ETSI deliverables.

The cross reference between GSM, UMTS, 3GPP and ETSI identities can be found under http://webapp.etsi.org/key/queryform.asp.

Contents

Foreword

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

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

Version x.y.z

where:

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

Introduction

The present document is part 4, sub-part 4 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 3GPP 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 4, Sub-part 4 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 Multi-Media Call Control Service Capability Feature (SCF) aspects of the interface. All aspects of the Multi-Media Call Control 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.

Maintenance of up to 3GPP Rel-8 and new OSA Stage 1, 2 and 3 work beyond Rel-9 was moved to OMA in June 2008.

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 22.002: "Circuit Bearer Services (BS) supported by a Public Land Mobile Network (PLMN)".

[5] void

[6] 3GPP TS 24.002: "GSM-UMTS Public Land Mobile Network (PLMN) Access Reference Configuration".

[7] 3GPP TS 22.003: "Circuit Teleservices supported by a Public Land Mobile Network (PLMN)"

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

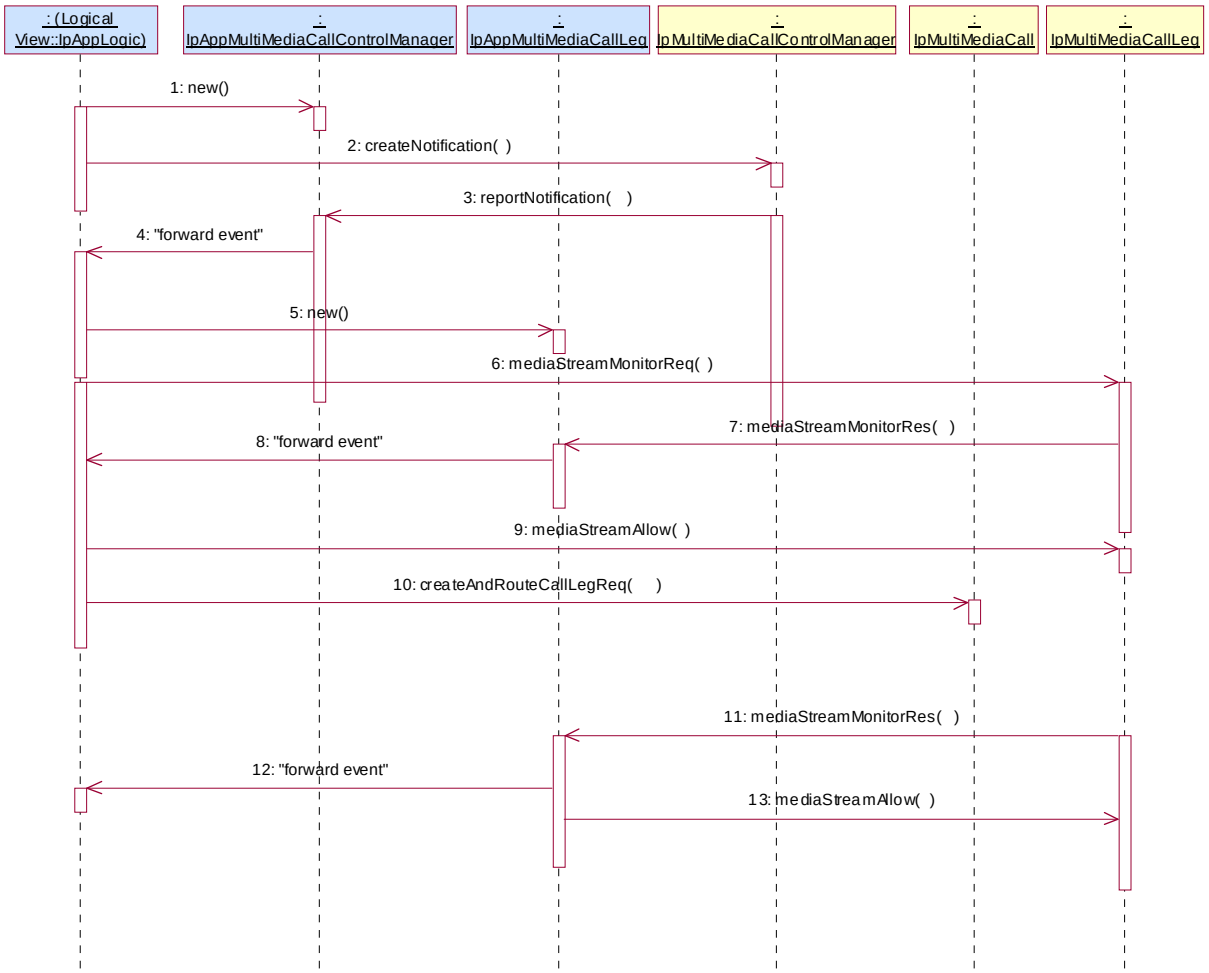
For the purposes of the present document, the abbreviations given in TS 29.198-1 [1] apply.

4 MultiMedia Call Control Service Sequence Diagrams

4.1 Barring for media combined with call routing, alternative 1

This sequence illustrates how one application can influence both the call routing and the media stream establishment of one call.

In this sequence there is one application handling both the media barring and the routing of the call.



1: The application creates an AppMultiMediaCallControlManager interface in order to handle callback methods.

2: The application expresses interest in all calls from subscriber A. Since createNotification is used and not createMediaNotification all calls are reported regardless of the media used.

3: A makes a call with the SIP INVITE with SDP media stream indicating video. The application is notified.

4: The event is forwarded to the application.

5: The application creates a new AppMultiMediaCallLeg interface to receive callbacks.

6: The application sets a monitor on video media streams to be established (added) for the indicated leg.

7: Since the video media stream was included in the SIP invite, the media streams monitored will be returned in the monitor result.

8: The event is forwarded to the application.

9: The application denies the video media stream, i.e. it is not included in the allowed media streams. This corresponds to removing the media stream from the setup.

10: The application requests to reroute the call to a different destination (or the same one).

11: Later in the call the A party tries to establish a lower bandwidth video media stream. This is again reported with MediaStreamMonitorRes.

12: The event is forwarded.

13: This time the application allows the establishment of the media stream by including the media stream in the allowed list.

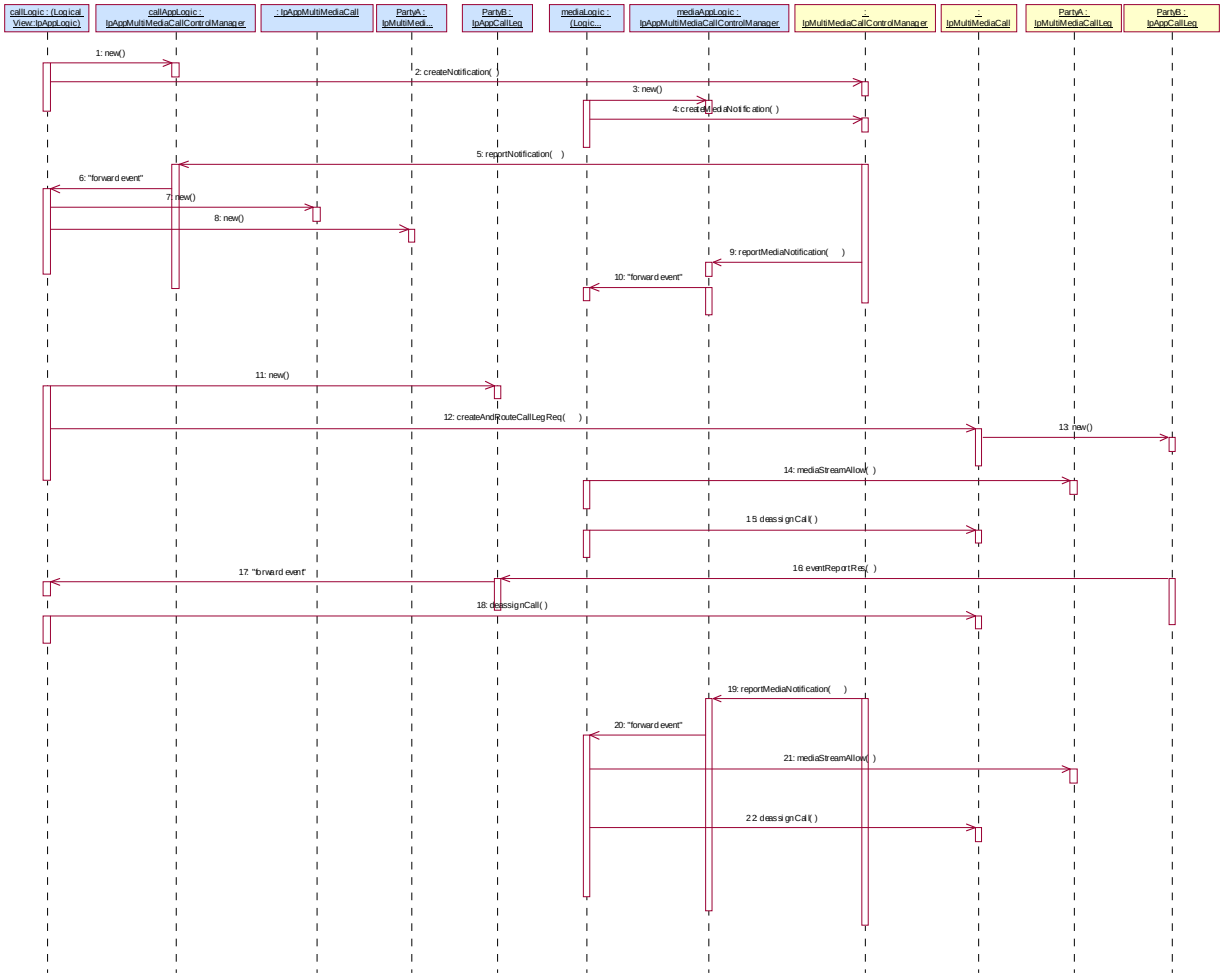
4.2 Barring for media combined with call routing, alternative 2

This sequence illustrates how one application can influence both the call routing and the media establishment of one call.

Media establishment and call establishment are regarded separately by the application.

From the gateway point of view it can actually be regarded as two separately triggered applications, one for media control and one for routing. This is also the way that it is shown here, for clarity.

However, an implementation of the application could combine the media logic and call logic in one object.



1: The application creates a new AppMultiMediaCallControlManager interface.

2: The application expresses interest in all calls from subscriber A for rerouting purposes.

3: The application creates a new AppMultiMediaCallControlManager interface. This is to be used for the media control only.

4: Separately the application expresses interest is some media streams for calls from and to A. The request indicates interrupt mode.

5: Subscriber A makes a call with the SIP INVITE with SDP media stream indicating video. Since the media establishment is combined with the SIP INVITE message, both applications are triggered (not necessarily in the order shown). Here the call application is notified about the call setup.

6: The event is forwarded to the call control application.

7: The call control application creates a new AppMultiMediaCall interface.

8: The call control application creates a new AppMultiMediaCallLeg interface.

9: The media application is notified about the call setup. All media streams from the setup will be indicated.

10: The event is forwarded to the media application.

11: The call control application creates a new AppMultiMediaCallLeg interface.

12: The call application decides to reroute the call to another address. Included in the request are monitors on answer and call end. However, since the media was also triggered in mode interrupt the call will not proceed until the media streams are confirmed or rejected.

14: The application allows the audio media stream, but refuses the high bandwidth video, by excluding it from the allowed list. Since both call processing and media handling is now acknowledged, the call routing can continue (with a changed SDP parameter reflecting the manipulated media).

15: The Media application is no longer interested in the call.

16: When the B subscriber answers the call application is notified.

17: The event is forwarded to the call application.

19: When later in the call A tries to establish a lower bandwidth video stream the media application is triggered.

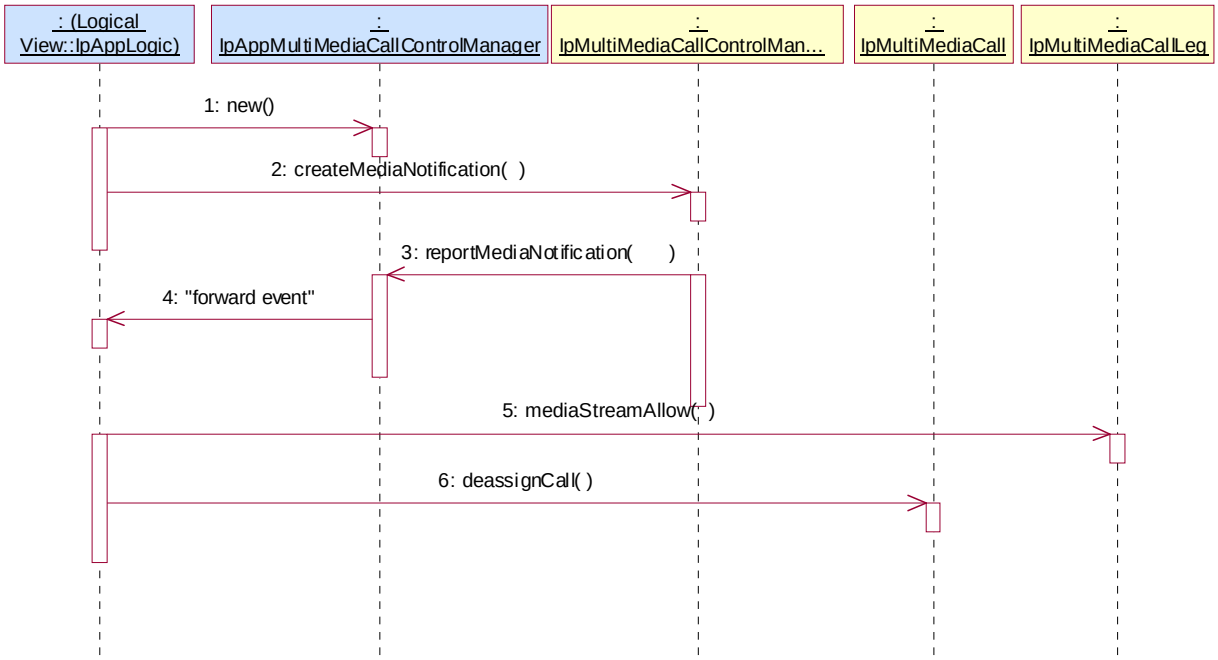
20: The triggering is forwarded to the media application.

21: The application now allows the establishment of the media stream by including the media stream in the mediaStreamAllow list.

22: The media application is no longer interested in the call.

4.3 Barring for media, simple

This sequence illustrates how an application can block the establishment of video streams for a certain user.



1: The application starts a new AppMultiMediaCallControlManager interface for reception of callbacks.

2: The application expresses interest in all calls from or to subscriber A that use video. The just created App interface is given as the callback interface.

3: Subscriber A makes a call with the SIP INVITE with SDP media stream indicating video.

4: The message is forwarded to the application.

5: The application indicates that the setup of the media stream is not allowed by not including the media stream in the allowed list. This has the effect of suppressing the video capabilities in the setup.

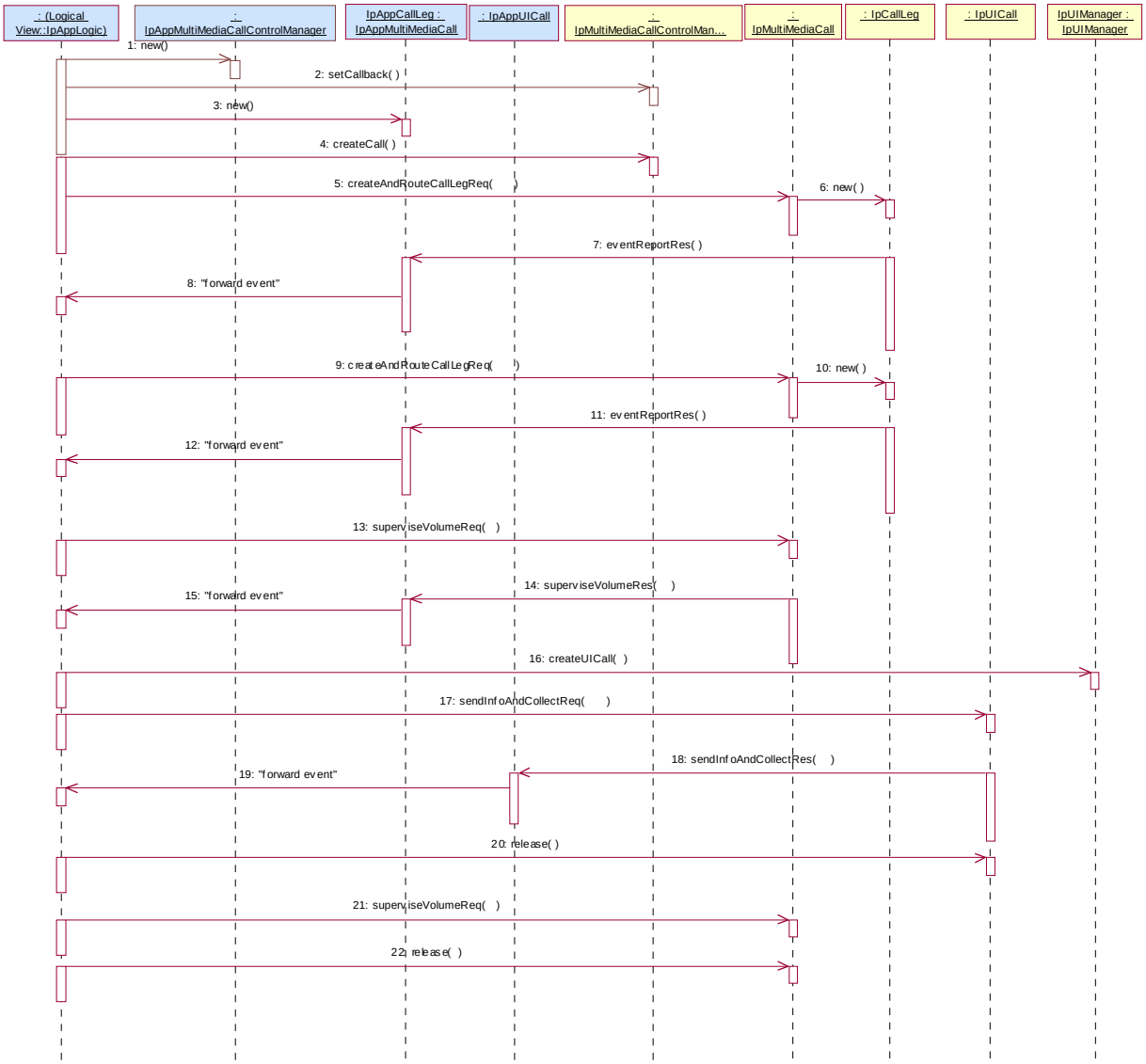
6: The application is no longer interested in the call.

New attempts to open video streams will again be indicated with a reportMediaNotification.

4.4 Call Volume charging supervision

This sequence illustrates how an application may supervise a call based on the number of bytes that are exchanged.

Note that in the sequence diagram below, a single box represents both an IpAppCall and an IpAppCallLeg for space reasons.



1: The application creates a new interface to receive callbacks on the call control manager.

2: The created interface is set as the callback interface for the call control manager.

3: The application creates a new interface to receive callback on the call.

4: The application requests the creation of a call.

5: The application initiates the call by routing to the origination. This will implicitly create a call leg. The application requests a notification when the party answers.

7: When the A party answers the application is notified.

8: The message is forwarded to the logic.

9: The application also routes the call to the destination. This implicitly creates a call leg. The application requests to be notified on answer of the B-party.

11: When the B-party answers the application is notified.

12: The message is forwarded to the logic.

13: The application requests to supervise the call. In the request the application specifies a limit on the amount of bytes that may be transferred. The application specifies that if the limit is reached the application should be notified.

14: When the limit is reached a notification is send to the application.

15: The message is forwarded to the logic.

17: The application plays an announcement to the user, asking whether the user wants to end the call or continue the call.

18: When the user answers whether the call should continue.

19: The message is forwarded to the logic.

20: The UIcall is released, since no further announcements are needed.

21: In case the user answers that the call should continue, the supervision is reset with a new maximum number of allowed bytes. (note that this might have charging consequences, not shown).

22: If the user answered that the call should not continue, the call is released.

5 Class Diagrams

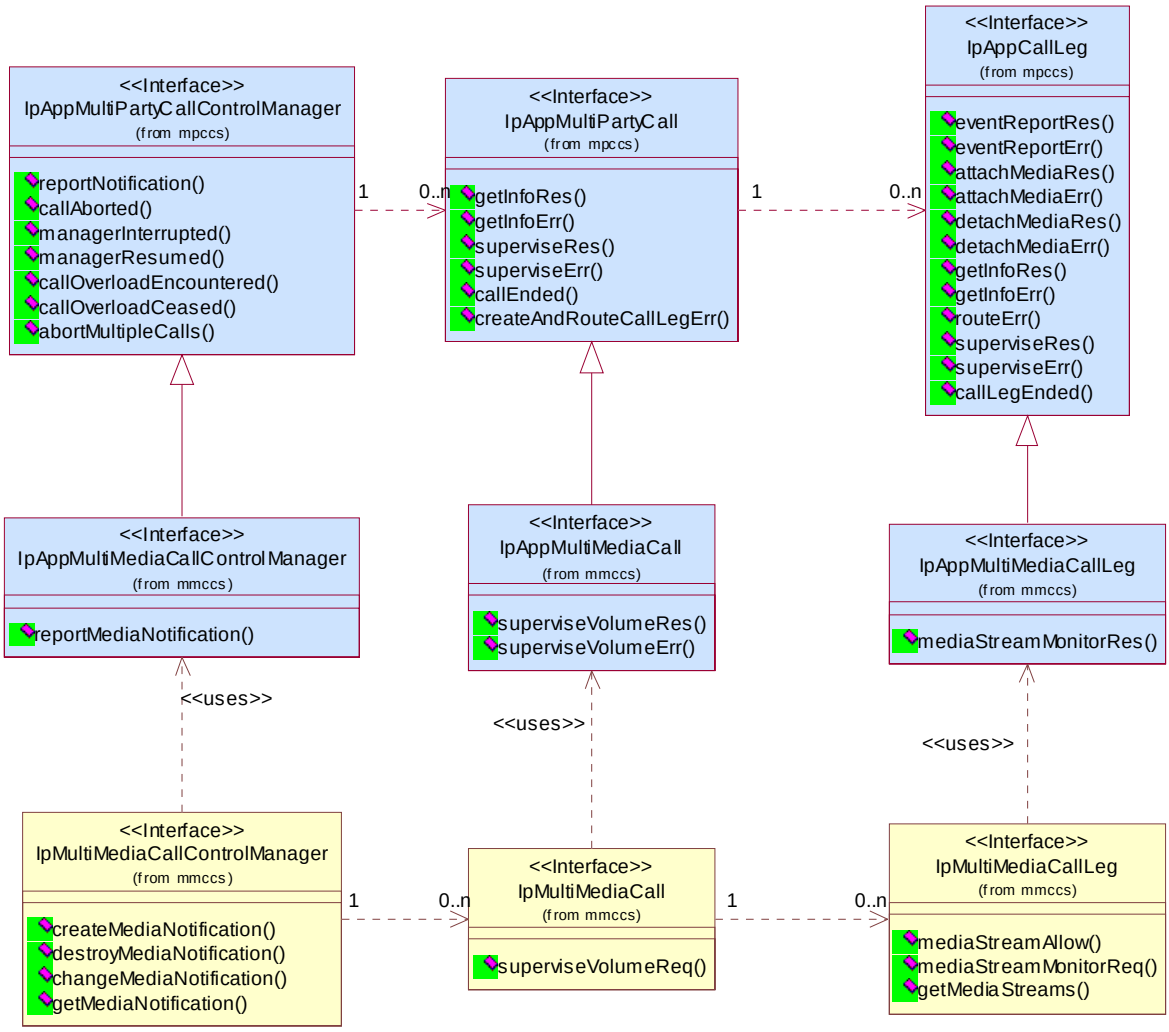


Figure: Application Interfaces

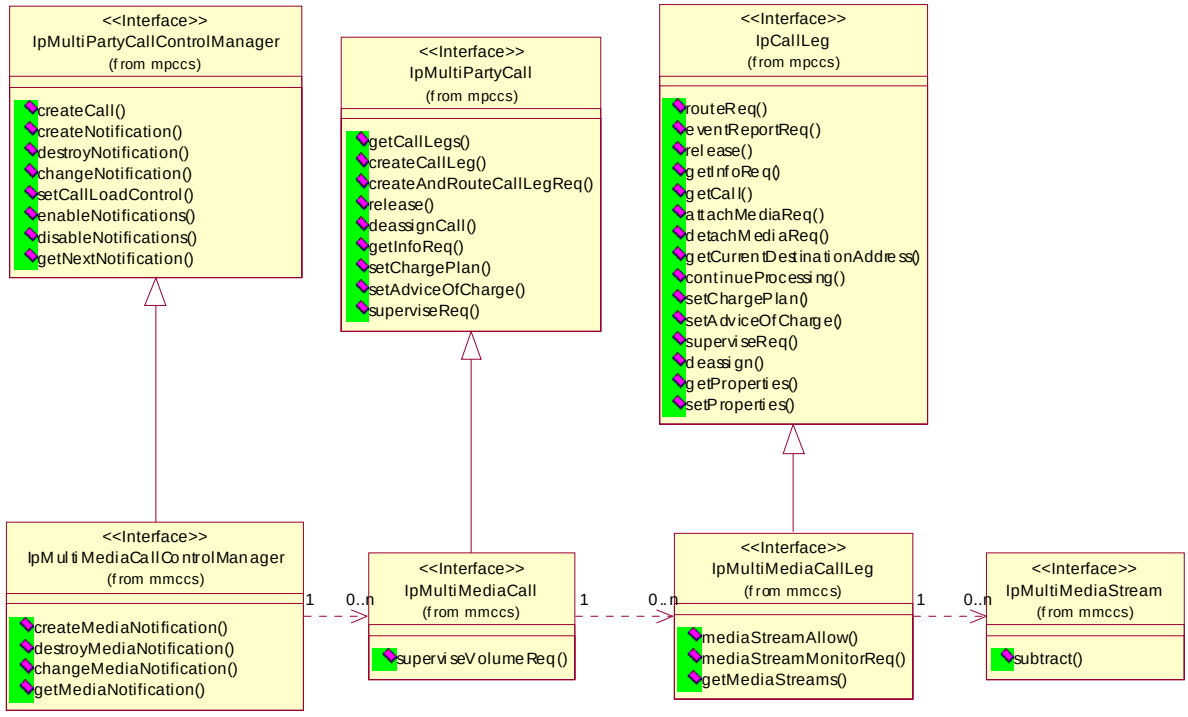


Figure: Service Interfaces

6 MultiMedia Call Control Service Interface Classes

The MultiMedia Call Control service enhances the functionality of the MultiParty Call Control Service with multi-media capabilities.

The MultiMedia Call Control Service is represented by the IpMultiMediaCallControlManager, IpMultiMediaCall, IpMultiMediaCallLeg and IpMultiMediaStream interfaces that interface to services provided by the network. Some 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 IpAppMultiMediaCallControlManager, IpAppMultiMediaCall and IpAppMultiMediaCallLeg to provide the callback mechanism.

To handle the multi-media aspects of a call the concept of media stream is introduced. A media stream is bi-directional media stream and is associated with a call leg. These media streams are usually negotiated between the terminals in the call. The multi-party Call Service gives the application control over the media streams associated with the legs in a multi-media call in the following way:

- the application can be triggered on the establishment of a media stream that meets the application defined characteristics;

- the application can monitor on the establishment (addition) or release (subtraction) of media streams of an ongoing call;

- the application can allow or deny the establishment of media streams (provided the stream establishment was monitored/notified in interrupt mode);

- the application can explicitly subtract already established media streams;

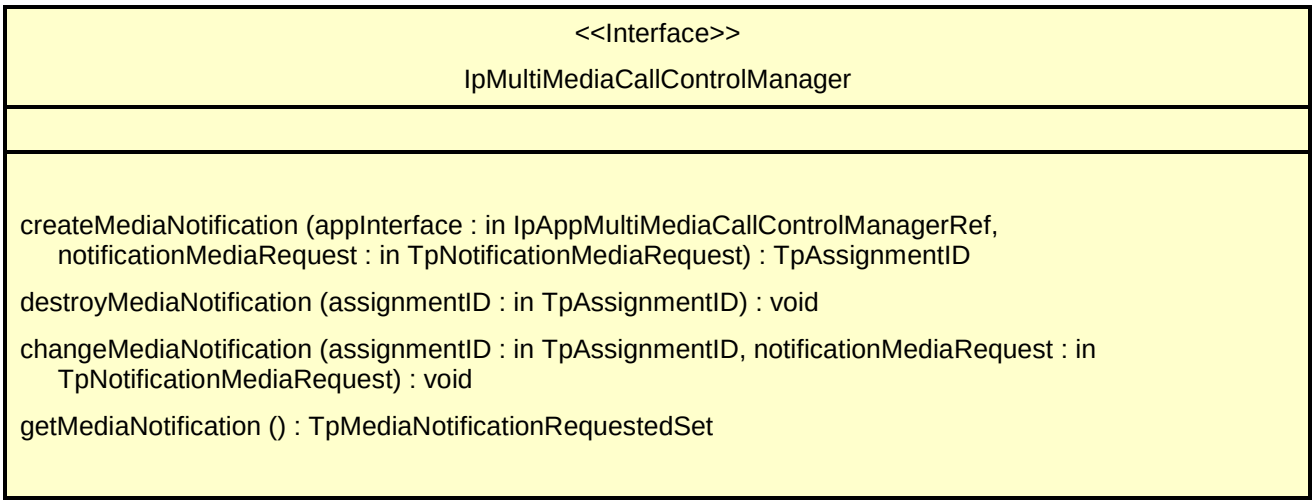
- the application can request the media streams associated with a specific leg.

6.1 Interface Class IpMultiMediaCallControlManager

Inherits from: IpMultiPartyCallControlManager

The Multi Media Call Control Manager is the factory interface for creating multimedia calls. The multi-media call control manager interface provides the management functions to the multi-media call control service. The application programmer can use this interface to create, destroy, change and get media stream related notifications.

This interface shall be implemented by a Multi Media Call Control SCF. As a minimum requirement the createMediaNotification() and destroyMediaNotification() methods shall be implemented. The minimum required methods from IpMultiPartyCallControlManager are also required.



6.1.1 Method createMediaNotification()

This method is used to create media stream notifications so that events can be sent to the application.

This applies both to callsetup media (e.g. SIP initial INVITE or H.323 with faststart) and for media setup during the call.

This is the first step an application has to do to get initial notifications of media streams happening in the network. When such an event happens, the application will be informed by reportMediaNotification(). In case the application is interested in other events during the context of a particular call session it has to use the mediaStreamMonitorReq() method on the Multi-Media call leg object.

The createMediaNotification method is purely intended for applications to indicate their interest to be notified when certain media stream events take place. It is possible to subscribe to a certain media stream event for a whole range of addresses, e.g. the application can indicate it wishes to be informed when a call is made to any number starting with 800.

If some application already requested notifications with criteria that overlap the specified criteria, the request is refused with P_INVALID_CRITERIA. The criteria are said to overlap if both originating and terminating ranges overlap and the same number plan is used.

If the same application invokes this method multiple times with exactly the same criteria but with different callback references, then these shall be treated as additional callback references. Each such notification request shall share the same assignmentID. The gateway 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.

In case the createMediaNotification contains no callback, at the moment the application needs to be informed the gateway will use as callback the one that has been registered by setCallback().

Returns assignmentID: Specifies the ID assigned by the multi-media call control manager interface for this newly-created notification.

Parameters

appInterface : in IpAppMultiMediaCallControlManagerRef

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

notificationMediaRequest : in TpNotificationMediaRequest

The mediaMonitorMode is a parameter of TpMediaStreamRequest and can be in interrupt or in notify mode. If in interrupt mode the application has to specify which media streams are allowed by calling mediaStreamAllow on the callLeg.

The notificationMediaRequest parameter specifies the event specific criteria used by the application to define the event required. This is the media portion of the criteria. Only events that meet the notificationMediaRequest are reported.

Individual addresses or address ranges may be specified for the destination and/or origination.

Returns

TpAssignmentID

Raises

TpCommonExceptions, P_INVALID_CRITERIA, P_INVALID_INTERFACE_TYPE, P_INVALID_EVENT_TYPE

6.1.2 Method destroyMediaNotification()

This method is used by the application to disable Multi Media Channel notifications.

Parameters

assignmentID : in TpAssignmentID

Specifies the assignment ID given by the Multi Media call control manager interface when the previous enableMediaNotification was called. If the assignment ID does not correspond to one of the valid assignment IDs, the exception P_INVALID_ASSIGNMENTID will be raised.

Raises

TpCommonExceptions

6.1.3 Method changeMediaNotification()

This method is used by the application to change the event criteria introduced with createMediaNotification. Any stored criteria associated with the specified assignmentID will be replaced with the specified criteria.

Parameters

assignmentID : in TpAssignmentID

Specifies the ID assigned by the multi-media call control manager interface for the media stream notification. If two callbacks have been registered under this assignment ID both of them will be changed.

notificationMediaRequest : in TpNotificationMediaRequest

Specifies the new set of event specific criteria used by the application to define the event required. Only events that meet these criteria are reported.

Raises

TpCommonExceptions, P_INVALID_ASSIGNMENT_ID, P_INVALID_CRITERIA, P_INVALID_EVENT_TYPE

6.1.4 Method getMediaNotification()

This method is used by the application to query the event criteria set with createMediaNotification or changeMediaNotification.

Returns notificationsMediaRequested: Specifies the notifications that have been requested by the application.

Parameters

No Parameters were identified for this method

Returns

TpMediaNotificationRequestedSet

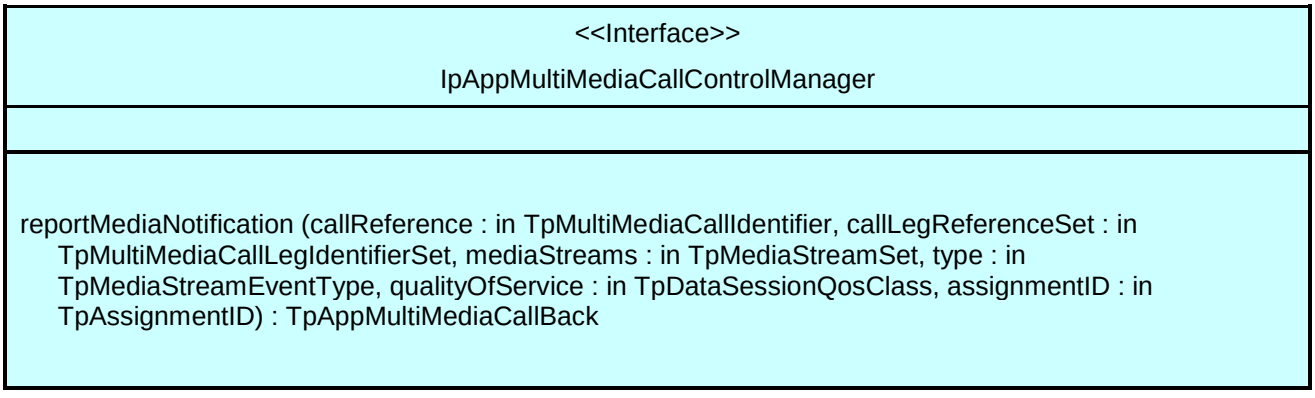
Raises

TpCommonExceptions

6.2 Interface Class IpAppMultiMediaCallControlManager

Inherits from: IpAppMultiPartyCallControlManager

The Multi Media call control manager application interface provides the application call control management functions to the multi media call control service.



6.2.1 Method reportMediaNotification()

This method is used to inform the application about the establishment of media streams.

If the corresponding monitor was in interrupt mode, then the application has to allow or deny the streams using mediaStreamAllow() method. If the application has previously explicitly passed a reference to the callback using a setCallbackWithSessionID() invocation, this parameter may be P_APP_CALLBACK_UNDEFINED, or if supplied must be the same as that provided during the setCallbackWithSessionID().

Returns appMultiMediaCallBack: Specifies references to the application interface which implements the callback interface for the new multi-media call and/or new call leg. This parameter may be null if the notification is being given in NOTIFY mode.

Parameters

callReference : in TpMultiMediaCallIdentifier

Specifies the call interface on which the media streams were added or subtracted, or for which the QoS class of the media stream has changed. It also gives the corresponding sessionID.

callLegReferenceSet : in TpMultiMediaCallLegIdentifierSet

Specifies set of all callLeg references (interface and sessionID) for which the media streams were established or subtracted.

First in the set is the reference to the originating callLeg. It indicates the call leg related to the originating party. In case there is a destination call leg this will be the second leg in the set. from the notificationInfo can be found on whose behalf the notification was sent.

However, this parameter will be null if the notification is being given in NOTIFY mode.

mediaStreams : in TpMediaStreamSet

Specifies all the media streams that are established. Note that this can be more media streams than requested in the createMediaNotification, e.g. when faststart is used in H.323 or in SIP when an INVITE method with SDP media stream parameters is used.

type : in TpMediaStreamEventType

Refers to the type of event on the media stream, i.e., added, subtracted, or QoS class changed.

qualityOfService : in TpDataSessionQosClass

Specifies the newly negotiated Quality of Service parameters for the media stream.

assignmentID : in TpAssignmentID

Specifies the assignment id which was returned by the createMediaNotification() method. The application can use assignment id to associate events with event specific criteria and to act accordingly.

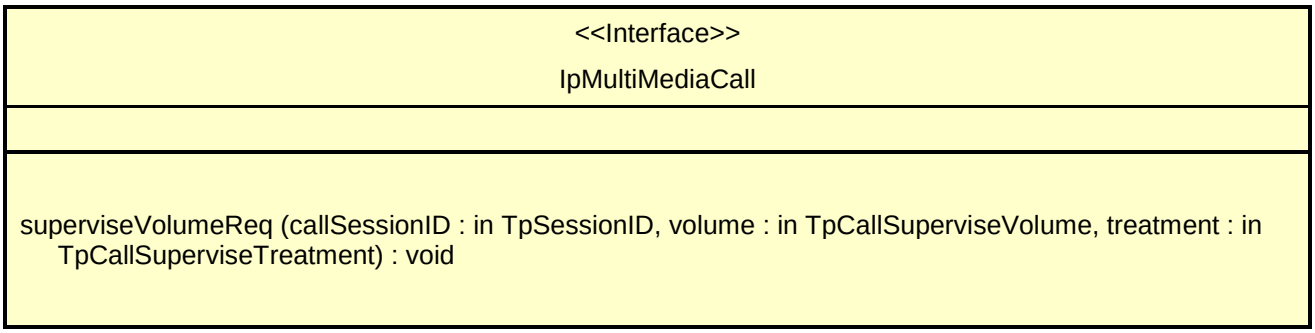
Returns

TpAppMultiMediaCallBack

6.3 Interface Class IpMultiMediaCall

Inherits from: IpMultiPartyCall

This interface shall be implemented by a Multi Media Call Control SCF. Implementation of the superviseVolumeReq() method is optional. The minimum required methods from IpMultiPartyCall are required.



6.3.1 Method superviseVolumeReq()

The application calls this method to supervise a call. The application can set a granted data volume this call.

Parameters

callSessionID : in TpSessionID

Specifies the call session ID of the call.

volume : in TpCallSuperviseVolume

Specifies the granted time in milliseconds for the connection.

treatment : in TpCallSuperviseTreatment

Specifies how the network should react after the granted volume expired.

Raises

TpCommonExceptions, P_INVALID_SESSION_ID

6.4 Interface Class IpAppMultiMediaCall

Inherits from: IpAppMultiPartyCall

The application multi-media call interface contains the callbacks that will be used from the multi-media call interface for asynchronous results to requests performed by the application. The application should implement this interface.

<<Interface>> IpAppMultiMediaCall
superviseVolumeRes (callSessionID : in TpSessionID, report : in TpCallSuperviseReport, usedVolume : in TpCallSuperviseVolume, qualityOfService : in TpDataSessionQosClass) : void superviseVolumeErr (callSessionID : in TpSessionID, errorIndication : in TpCallError) : void

6.4.1 Method superviseVolumeRes()

This asynchronous method reports a call supervision event to the application when it has indicated its interest in this kind of event.

It is also called when the connection is terminated before the supervision event occurs. Furthermore, this method is invoked as a response to the request also when the Quality of Service parameters were renegotiated during the active call.

Parameters

callSessionID : in TpSessionID

Specifies the call session ID of the call.

report : in TpCallSuperviseReport

Specifies the situation which triggered the sending of the call supervision response.

usedVolume : in TpCallSuperviseVolume

Specifies the used time for the call supervision (in milliseconds).

qualityOfService : in TpDataSessionQosClass

Specifies the newly negotiated Quality of Service parameters for the multimedia call.

6.4.2 Method superviseVolumeErr()

This asynchronous method reports a call supervision error to the application.

Parameters

callSessionID : in TpSessionID

Specifies the call session ID of the call.

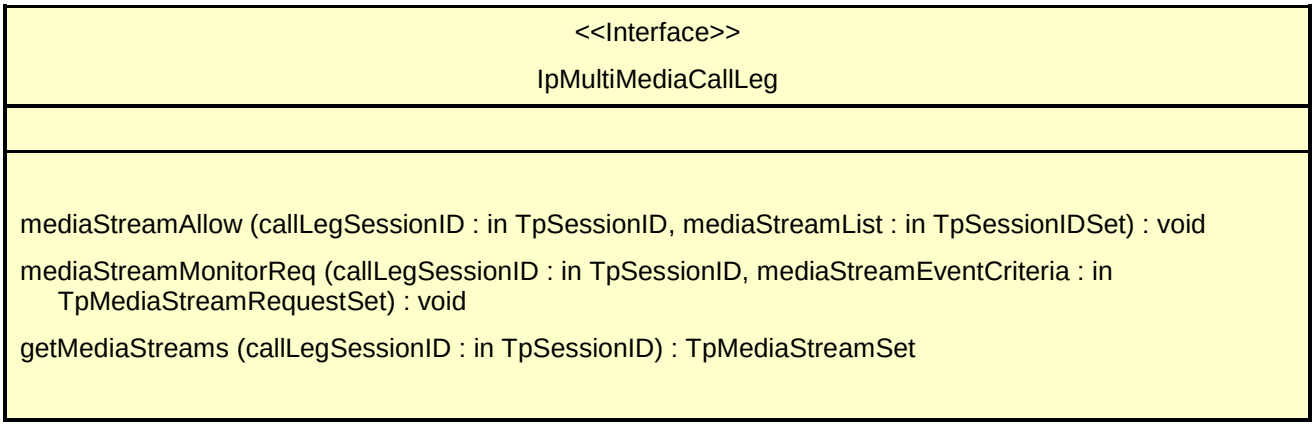
errorIndication : in TpCallError

Specifies the error which led to the original request failing.

6.5 Interface Class IpMultiMediaCallLeg

Inherits from: IpCallLeg

The Multi-Media call leg represents the signalling relationship between the call and an address. Associated with the signalling relationship there can be multiple media channels. Media channels can be started and stopped by the terminals themselves. The application can monitor on these changes and influence them. This interface shall be implemented by a Multi Media Call Control SCF. The mediaStreamAllow() and mediaStreamMonitorReq() methods shall be implemented as a minimum requirement. The minimum required methods from IpCallLeg are also required.



6.5.1 Method mediaStreamAllow()

This method can be used to allow setup of a media stream that was reported by a mediaStreamMonitorRes method.

Parameters

callLegSessionID : in TpSessionID

Specifies the call leg session ID of the call leg.

mediaStreamList : in TpSessionIDSet

Refers to the media streams (sessionIDs) as received in the mediaStreamMonitorRes() or in the reportMediaNotification() that is allowed to be established.

Raises

TpCommonExceptions, P_INVALID_SESSION_ID

6.5.2 Method mediaStreamMonitorReq()

With this method the application can set monitors on the addition and subtraction of media streams, and a change in QoS class of media streams. The monitors can either be general or restricted to certain types of codecs.

Monitoring on addition of media streams can be done in either interrupt of notify mode. In the first case the application has to allow or deny the establishment of the stream with mediaStreamAllow.

Monitoring on subtraction of media streams is only allowed in notify mode.

Parameters

callLegSessionID : in TpSessionID

Specifies the session ID of the call leg.

mediaStreamEventCriteria : in TpMediaStreamRequestSet

Specifies the event specific criteria used by the application to define the event required. The mediaMonitorMode is a parameter of TpMediaStreamRequest and can be in interrupt or in notify mode. If in interrupt mode the application has to respond with mediaStreamAllow().

Raises

TpCommonExceptions, P_INVALID_SESSION_ID, P_INVALID_CRITERIA, P_INVALID_EVENT_TYPE

6.5.3 Method getMediaStreams()

This method is used to return all currently established media streams for the leg.

Parameters

callLegSessionID : in TpSessionID

This method is used to return all currently open media channels for the leg.

Returns

TpMediaStreamSet

Raises

TpCommonExceptions, P_INVALID_SESSION_ID

6.6 Interface Class IpAppMultiMediaCallLeg

Inherits from: IpAppCallLeg

The application multi-media call leg interface contains the callbacks that will be called from the multi-media call leg for asynchronous results to requests performed by the application. The application should implement this interface.

<<Interface>> IpAppMultiMediaCallLeg
mediaStreamMonitorRes (callLegSessionID : in TpSessionID, streams : in TpMediaStreamSet, type : in TpMediaStreamEventType) : void

6.6.1 Method mediaStreamMonitorRes()

This method is used to inform the application about the media streams that are being established (added) or subtracted, or for which the QoS class changed.

If the corresponding request was done in interrupt mode, the application has to allow or deny the media streams using mediaStreamAllow().

Parameters

`callLegSessionID : in TpSessionID`

Specifies the session ID of the call leg for which the media channels are opened or closed.

`streams : in TpMediaStreamSet`

Specifies all the media streams that are added, or for which the QoS class changed. Note that this can be more media streams than requested in the createMediaNotification, e.g. when faststart is used in H.323 or SIP INVITE with SDP media stream parameters is used.

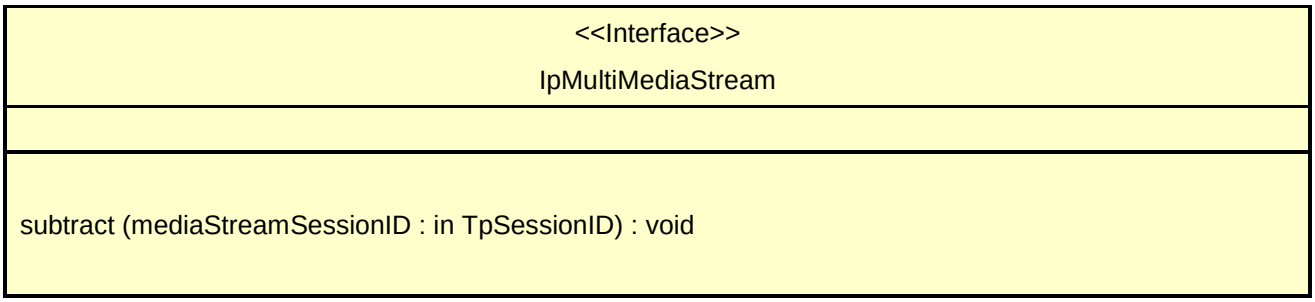
`type : in TpMediaStreamEventType`

Refers to the type of event on the media stream, i.e. added, subtracted, or QoS class changed.

6.7 Interface Class IpMultiMediaStream

Inherits from: IpService

The Multi Media Stream Interface represents a bi-directional information stream associated with a call leg. Currently, the only available method is to subtract the media stream. This interface and the subtract() method shall be implemented by a Multi Media Call Control SCF.



6.7.1 Method subtract()

This method can be used to subtract the multi-media stream.

Parameters

mediaStreamSessionID : in TpSessionID

Specifies the sessionID for the media stream.

Raises

TpCommonExceptions, P_INVALID_SESSION_ID

7 MultiMedia Call Control Service State Transition Diagrams

There are no State Transition Diagrams for the MultiMedia Call Control Service package

8 Multi-Media Call Control Data Definitions

This clause provides the Multi-Media call control data definitions necessary to support the API specification.

The general format of a data definition specification is described below.

- Data Type:

This shows the name of the data type.

- Description:

This describes the data type.

- Tabular Specification:

This specifies the data types and values of the data type.

- Example:

If relevant, an example is shown to illustrate the data type.

All data types referenced in the present document but not defined in this clause are defined either in the common call control data definitions in 3GPP TS 29.198-4-1 or in the common data definitions which may be found in 3GPP TS 29.198-2.

8.1 Event Notification Data Definitions

8.1.1 TpMediaStreamRequestSet

Defines a `Numbered Set of Data Elements` of `TpMediaStreamRequest`

8.1.2 TpMediaStreamRequest

Defines the `Sequence of Data Elements` that specify the type of media stream.

Sequence Element Name	Sequence Element Type
Direction	TpMediaStreamDirection
DataTypeRequest	TpMediaStreamDataTypeRequest
MediaMonitorMode	TpCallMonitorMode
EventType	TpMediaStreamEventType

8.1.3 TpMediaStreamDirection

Defines the direction in which the media stream is established (as seen from the leg).

Name	Value	Description
P_SEND_ONLY	0	Indicates that the offerer is only willing to send this media stream
P_RECEIVE_ONLY	1	Indicates that the offerer is only willing to receive this media stream
P_SEND_RECEIVE	2	Indicates that the offerer is willing to send and receive this media stream

8.1.4 TpMediaStreamDataTypeRequest

Defines the Tagged Choice of Data Elements that specify the media type and associated codecs that are of interest.

	Tag Element Type	
	TpMediaStreamDataTypeRequestType	

Tag Element Value	Choice Element Type	Choice Element Name
P_AUDIO_CAPABILITIES	TpAudioCapabilitiesType	Audio
P_VIDEO_CAPABILITIES	TpVideoCapabilitiesType	Video
P_DATA_CAPABILITIES	TpDataCapabilities	Data

8.1.5 TpMediaStreamDataTypeRequestType

Defines the media type of a media stream data type request.

Name	Value	Description
P_AUDIO_CAPABILITIES	1	Audio stream capabilities
P_VIDEO_CAPABILITIES	2	Video stream capabilities
P_DATA_CAPABILITIES	3	Data stream (e.g., ITU-T Rec. T.120) capabilities

8.1.6 TpAudioCapabilitiesType

Defines the audio codec. The requested capabilities can be indicated by adding the values together (i.e., a logical OR function). e.g., 28 indicates interest in all G.722 codes (4+8+16).

Name	Value	Description
P_G711_64K	1	ITU-T Rec. G.711 on 64k, both A-Law and µ-Law
P_G711_56K	2	ITU-T Rec. G.711 on 56k, both A-Law and µ-Law
P_G722_64K	4	ITU-T Rec. G.722 at 64kbit/s
P_G722_56K	8	ITU-T Rec. G.722 at 56kbit/s
P_G722_48K	16	ITU-T Rec. G.722 at 48kbit/s
P_G7231	32	ITU-T Rec. G.723.1
P_G728	64	ITU-T Rec. G.728
P_G729	128	ITU-T Rec. G.729
P_G729_ANNEX_A	256	ITU-T Rec. G.729 Annex A
P_IS11172_3	512	ISO/IEC 11172-3 (MPEG-1 audio)
P_IS13818_3	1024	ISO/IEC 13818-3 (MPEG-2 audio)
P_G729_ANNEXB	2048	ITU-T Rec. G.729 Annex B
P_G729_ANNEX_A_AND_B	4096	ITU-T Rec. G.729 Annex A and B
P_G7231_ANNEX_C	8192	ITU-T Rec. G.723.1 Annex C
P_GSM_FULLRATE	16384	GSM Full Rate Codec
P_GSM_HALFRATE	32768	GSM Half Rate Codec
P_GSM_ENHANCED	65536	GSM Enhanced Full Rate Codec
P_UMTS_AMR_NB	131072	UMTS Narrowband Adaptive Multirate Codec
P_UMTS_AMR_WB	262144	UMTS Wideband Adaptive Multirate Codec

8.1.7 TpVideoCapabilitiesType

Defines the video codec. The requested capabilities can be indicated by adding the values together (i.e., a logical OR function). e.g., 3 indicates both H.261 and H.262 codecs.

Name	Value	Description
P_H261	1	ITU-T Rec. H.261
P_H262	2	ITU-T Rec. H.262
P_H263	4	ITU-T Rec. H.263
P_IS11172_2	8	ISO/IEC 11172-2 (MPEG-1 video)
P_IS14496_2	16	ISO/IEC 14496-2 (MPEG-4 video)

8.1.8 TpDataCapabilities

A TpInt32 defining the minimum maxBitRate in bit/s. I.e., all data media streams whose maxBitRate exceeds this number are reported.

8.1.9 TpMediaStreamEventType

Defines the action performed on the media stream.

Name	Value	Description
P_MEDIA_STREAM_ADDED	0	The media stream is added.
P_MEDIA_STREAM_SUBTRACTED	1	The media stream is subtracted.
P_MEDIA_STREAM_QOS_CLASS_CHANGED	2	A change in QoS class has taken place during the life of the media stream.

8.1.10 TpMediaStreamSet

Defines a Numbered Set of Data Elements of TpMediaStream

8.1.11 TpMediaStream

Defines the Sequence of Data Elements that specify the type of media stream.

Sequence Element Name	Sequence Element Type
Direction	TpMediaStreamDirection
DataType	TpMediaStreamDataType
ChannelSessionID	TpSessionID
MediaStream	IpMultiMediaStream

8.1.12 TpMediaStreamDataType

Defines the type of the reported media stream. It is identical to TpMediaStreamDataTypeRequest, only now the values are not used as a mask, but as the actual codec should be indicated for audio and video. For data the actual maximum bit rate is indicated.

8.2 Multi-Media Call Control Data Definitions

8.2.1 IpMultiMediaCall

Defines the address of an `IpMultiMediaCall` Interface.

8.2.2 IpMultiMediaCallRef

Defines a `Reference` to type IpMultiMediaCall.

8.2.3 IpAppMultiMediaCall

Defines the address of an `IpAppMultiMediaCall` Interface.

8.2.4 IpAppMultiMediaCallRef

Defines a `Reference` to type IpAppMultiMediaCall.

8.2.5 IpMultiMediaCallLeg

Defines the address of an `IpMultiMediaCallLeg` Interface.

8.2.6 IpMultiMediaCallLegRef

Defines a `Reference` to type IpMultiMediaCallLeg.

8.2.7 IpAppMultiMediaCallLeg

Defines the address of an `IpAppMultiMediaCallLeg` Interface.

8.2.8 IpAppMultiMediaCallLegRef

Defines a `Reference` to type IpAppMultiMediaCallLeg.

8.2.9 TpAppMultiMediaCallLegRefSet

Defines a `Numbered Set of Data Elements of IpAppMultiMediaCallLegRef`

8.2.10 TpMultiMediaCallIdentifier

Defines the Sequence of Data Elements that unambiguously specify the MultiMediaCall object

Sequence Element Name	Sequence Element Type	Sequence Element Description
`MMCallReference`	`IpMultiMediaCallRef`	This element specifies the interface reference for the call object.
`MMCallSessionID`	`TpSessionID`	This element specifies the call session ID of the call created.

8.2.11 TpMultiMediaCallIdentifierSet

Defines a Numbered Set of Data Elements of TpMultiMediaCallIdentifier

8.2.12 TpMultiMediaCallLegIdentifier

Defines the Sequence of Data Elements that unambiguously specify the Call Leg object

Sequence Element Name	Sequence Element Type	Sequence Element Description
MMCallLegReference	IpMultiMediaCallLegRef	This element specifies the interface reference for the callLeg object.
MMCallLegSessionID	TpSessionID	This element specifies the callLeg session ID of the call created.

8.2.13 TpMultiMediaCallLegIdentifierSet

Defines a Numbered Set of Data Elements of TpMultiMediaCallLegIdentifier.

8.2.14 IpAppMultiMediaCallControlManager

Defines the address of an IpAppMultiMediaCallControlManager Interface.

8.2.15 IpAppMultiMediaCallControlManagerRef

Defines a Reference to type IpAppMultiMediaCallControlManager.

8.2.16 TpAppMultiMediaCallBack

Defines the Tagged Choice of Data Elements that references the application callback interfaces

	Tag Element Type	
	TpAppMultiMediaCallBackRefType	

Tag Element Value	Choice Element Type	Choice Element Name
P_APP_CALLBACK_UNDEFINED	NULL	Undefined
P_APP_MULTIMEDIA_CALL_CALLBACK	IpAppMultiMediaCallRef	AppMultiMediaCall
P_APP_CALL_LEG_CALLBACK	IpAppMultiMediaCallLegRef	AppMultiMediaCallLeg
P_APP_CALL_AND_CALL_LEG_CALLBACK	TpAppMultiMediaCallLegCallBack	AppMultiMediaCallAndCallLeg

8.2.17 TpAppMultiMediaCallBackRefType

Defines the type application call back interface.

Name	Value	Description
P_APP_CALLBACK_UNDEFINED	0	Application Call back interface undefined
P_APP_MULTIMEDIA_CALL_CALLBACK	1	Application Multi-Media Call interface referenced
P_APP_CALL_LEG_CALLBACK	2	Application Multi-Media CallLeg interface referenced
P_APP_CALL_AND_CALL_LEG_CALLBACK	3	Application Multi-Media Call and CallLeg interface referenced

8.2.18 TpAppMultiMediaCallLegCallBack

Defines the Sequence of Data Elements that references a call and a call leg application interface.

Sequence Element Name	Sequence Element Type	
AppMultiMediaCall	IpAppMultiMediaCallRef	
AppCallLegSet	TpAppMultiMediaCallLegRefSet	Specifies the set of all call leg call back references. First in the set is the reference to the call back of the originating callLeg. In case there is a call back to a destination call leg this will be second in the set.

8.2.19 TpCallSuperviseVolume

Defines the Sequence of Data Elements that specify the amount of volume that is allowed to be transmitted for the specific connection.

Sequence Element Name	Sequence Element Type	Sequence Element Description
VolumeQuantity	TpInt32	This data type is identical to a TpInt32, and defines the quantity of the granted volume that can be transmitted for the specific connection.
VolumeUnit	TpInt32	This data type is identical to a TpInt32, and defines the unit of the granted volume that can be transmitted for the specific connection. Unit must be specified as 10^n number of bytes, where n denotes the power. When the unit is for example in kilobytes, VolumeUnit must be set to 3.

8.2.20 TpNotificationMediaRequest

Defines the Sequence of Data Elements that specify the criteria for a media stream notification.

Sequence Element Name	Sequence Element Type	Description
MediaNotificationScope	TpCallNotificationScope	Defines the scope of the notification request.
MediaStreamsRequested	TpMediaStreamRequestSet	Defines the media stream events which are requested.

8.2.21 TpMediaNotificationRequested

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

Sequence Element Name	Sequence Element Type
AppNotificationMediaRequest	TpNotificationMediaRequest
AssignmentID	TpInt32

8.2.22 TpMediaNotificationsRequestedSet

Defines a numbered Set of Data Elements of TpMediaNotificationRequested

Annex A (normative): OMG IDL Description of Multi-Media Call Control SCF

The OMG IDL representation of this interface specification is contained in the text file mmccs.idl (contained in archive 2919804-4V800IDL.ZIP) which accompany the present document.

Annex B (informative): W3C WSDL Description of Multi-Media Call Control SCF

The W3C WSDL representation of this interface specification is contained in zip file 2919804-4V800WSDL.ZIP, which accompanies the present document.

Annex C (informative): Java API Description of the Call Control 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 2919804-4V800J2SE.ZIP that accompanies the present document.

The J2EE representation of this interface specification is provided as Java Code, contained in archive 2919804-4V800J2EE.ZIP that accompanies the present document.

Annex D (informative): Description of Call Control Sub-part 4: Multimedia call control 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 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: MultiMedia Call Control Service Sequence Diagrams

There are no additions or exclusions.

D.2.5 Clause 5: Class Diagrams

There are no additions or exclusions.

D.2.6 Clause 6: MultiMedia Call Control Service Interface Classes

There are no additions or exclusions.

D.2.7 Clause 7: MultiMedia Call Control Service State Transition Diagrams

There are no additions or exclusions.

D.2.8 Clause 8: Multi-Media Call Control Data Definitions

There are no additions or exclusions.

D.2.9 Annex A (normative): OMG IDL Description of Multi-Media Call Control SCF

There are no additions or exclusions.

D.2.10 Annex B (informative): W3C WSDL Description of Multi-Media Call Control SCF

There are no additions or exclusions.

D.2.11 Annex C (informative): Java™ API Description of the Call Control 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	0025	--	Update document for conversion to Release 7	6.5.1	7.0.0
Dec 2008	CT_42				Upgraded unchanged from Rel-7	7.0.0	8.0.0
2009-12	-	-	-	-	Update to Rel-9 version (MCC)	8.0.0	9.0.0

History

Document history		
V9.0.0	January 2010	Publication