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Technical Specification

Universal Mobile Telecommunications System (UMTS);
LTE;
Multimedia Resource Function Controller (MRFC)
- Multimedia Resource Function Processor (MRFP)
Mp interface: Procedures descriptions
(3GPP TS 23.333 version 10.3.0 Release 10)

Reference

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

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

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

Foreword

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

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1   Scope

This specification describes the functional requirements and information flows that generate procedures between the Multimedia Resource Function Controller (MRFC) and the Multimedia Resource Function Processor (MRFP), the Mp Interface.

This specification is limited to information flows relevant to the Mp Interface; in order to define these procedures and make the functional requirements clear some triggers from an external interface may be described; these may be specified within the Mr interface for example or within an AS in which the MRFC function resides. However for the overall stage 2 procedures of IMS see 3GPP TS 23.228 [1].

The protocol on the Mp interface is defined to comply with ITU-T H.248.1 Gateway Control Protocol; see [3].The goal of this specification is to provide the input to defining a formal Profile within the H.248 protocol toolbox specifically for the Mp application.

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 23.228: "IP Multimedia Subsystem (IMS); Stage 2".

[2]   3GPP TS 23.002: "Network architecture".

[3]   ITU-T Recommendation H.248.1 (05/2002), Gateway control protocol: Version 2 + Corrigendum 1 (03/2004) and ITU-T Recommendation H.248.1 (09/2005), Gateway control protocol: Version 3 for Floor Control requirements.

[4]   3GPP TS 24.147: "Conferencing using the IP Multimedia (IM) Core Network (CN) subsystem; Stage 3".

[5]   3GPP TS 26.244: "Transparent end-to-end packet switched streaming service (PSS); 3GPP file format (3GP) ".

[6]   3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[7]   3GPP TS 23.205: "Bearer independent circuit-switched core network; Stage 2".

[8]   3GPP TS 26.235: "Packet switched conversational multimedia applications; Default codecs".

[9]   3GPP TS 29.163: "Interworking between the IP Multimedia (IM) Core Network (CN) subsystem and Circuit Switched (CS) networks".

[10]   IETF RFC 2833: "RTP Payload for DTMF Digits, Telephony Tones and Telephony Signals".

[11]   W3C Recommendation (September 2004): "Speech Synthesis Markup Language (SSML) Version 1.0".

[12]   W3C Recommendation (September 2004): "Speech Recognition Grammar Specification (SRGS) Version 1.0".

[13]   W3C Recommendation (September 2005): "Extensible MultiModal Annotation markup language (EMMA) (draft work in progress)" .

[14]   3GPP TS 32.260: "Telecommunication management; Charging management; IP Multimedia Subsystem (IMS) charging".

[15]   W3C Recommendation (November 2000): "Natural Language Semantics Markup Language (NLSML) for the Speech Interface Framework".

[16]   3GPP TS 29.333: "Multimedia Resource Function Controller (MRFC) – Multimedia Resource Function Processor (MRFP) Mp Interface - Stage 3".

[17]   3GPP TS 24.247: "Messaging service using the IP Multimedia (IM) Core Network (CN) subsystem - Stage 3".

[18]   IETF RFC 4975: "The Message Session Relay Protocol (MSRP)" .

[19]   IETF RFC 4376: "Requirements for Floor Control Protocols".

[20]   IETF RFC 4582: "The Binary Floor Control Protocol (BFCP)".

[21]   IETF RFC 4583: "Session Description Protocol (SDP) Format for Binary Floor Control Protocol (BFCP) Streams".

[22]   3GPP TS 26.140: "Multimedia Messaging Service; Media formats and codecs".

[23]   3GPP TS 26.114: "IP Multimedia Subsystem (IMS); Multimedia Telephony; Media handling and interaction".

[24]   IETF RFC 3168: "The Addition of Explicit Congestion Notification (ECN) to IP".

[25]   IETF draft-ietf-avtcore-ecn-for-rtp-05: "Explicit Congestion Notification (ECN) for RTP over UDP".

Editor's Note: The above document cannot be formally referenced until it is published as an RFC.

3   Definitions, symbols and abbreviations

3.1   Definitions

For the purposes of the present document, the terms and definitions given in 3GPP TR 21.905 [6] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in 3GPP TR 21.905 [6].

Media Gateway: See Recommendation H.248.1 [3].
Media Gateway Controller: See Recommendation H.248.1 [3].
Multimedia Resource Function Controller: See 3GPP TS 23.228 [1].
Multimedia Resource Function Processor: See 3GPP TS 23.228 [1].

3.2   Symbols

For the purposes of the present document, the following symbols apply:

Mr   Interface between the MRFC and S-CSCF
Mp   Interface between the MRFC and MRFP
Mb   Interface between MRFP and the other bearer entity

3.3 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [6] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in 3GPP TR 21.905 [6].

ASR	Automatic Speech Recognition
DTMF	Dual Tone Multi Frequency
ECN	Explicit Congestion Notification
ECN-CE	ECN Congestion Experienced
EMMA	Extensible MultiModal Annotation markup language
IP	Internet Protocol
MGW	Media Gateway
MGC	Media Gateway Controller
MRFC	Multimedia Resource Function Controller
MRFP	Multimedia Resource Function Processor
NLSML	Natural Language Semantics Markup Language
SDP	Session Description Protocol
SIP	Session Initiation Protocol
SRGS	Speech Recognition Grammar Specification
SSML	Speech Synthesis Markup Language
TTS	Text to Speech
VXML	Voice Extensible Markup Language

4 Architecture

The architecture concerning the Multimedia Resource Function is presented in Figure 4.1 below.
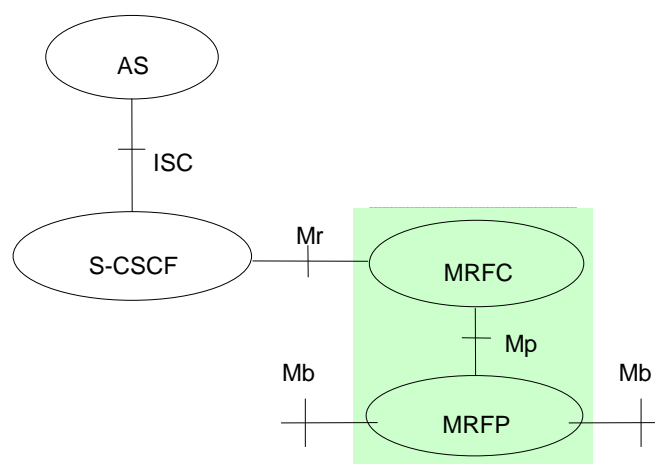
Figure 4.1: Architecture of MRF

The scope of this specification is limited to the area shown within the green shading.

The MRF is split into Multimedia Resource Function Controller (MRFC) and Multimedia Resource Function Processor (MRFP).

Tasks of the MRFC may consist of the following:

- Control the media stream resources in the MRFP.

- Interpret information coming from an AS and S-CSCF (e.g. session identifier) and control MRFP accordingly.

- Generation of CDRs.

- Advanced control of conferences (e.g. floor control)

Tasks of the MRFP may consist of the following:

- Control of the bearer on the Mb reference point.

- Provide resources to be controlled by the MRFC.

- Mixing of incoming media streams (e.g. for multiple parties).

- Media stream source (e.g. for multimedia announcements).

- Media stream processing (e.g. audio transcoding, media analysis).

- Manage access rights to shared resources in a conferencing environment (e.g. floor control).

The Mp reference point allows an MRFC to control media stream resources provided by an MRFP.

5 Functional Requirements

5.1 General

All functions are optional. Within a given function some components and procedures might be optional to still support the function but some will be required. Normative text in the following sections thus describes requirements for support within an optional feature where it is desired to differentiate between optional and mandatory parts of the feature.

5.2 Play Tone

The MRFC shall request the MRFP to send tones to one, one of several, multiple or all parties connected in a call/session with a given tone identifier for each specific tone.

The MRFC may request the tone to be played continuously until requested to be stopped.

The MRFC may include in the request the length of time that the tone shall be played; the duration may be provisioned.

The MRFC may then request a notification from the MRFP when the tone is completed.

The MRFC may request DTMF detection while playing a tone.

The MRFC may request that upon DTMF detection the MRFP stops playing a tone.

5.3 Play Announcement

The function of playing announcement is to play audio media streams to the subscriber. The function can be used in services such as audio announcements, mail box services, play back recorded audio etc.

The MRFC shall request the MRFP to play announcements to one, one of several, multiple or all parties connected in a call/session.

The announcement may be referenced by identifiers that may be pre-configured, or dynamically obtained from the same MRFP for example due to Audio Record.

The MRFC shall request sequences of predefined fixed announcements within one request to the MRFP.

The MRFC may request announcements to be played in a loop until it commands the MRFP to stop.

The MRFC may request the MRFP to play an announcement for a fixed number of times.

The MRFC may request DTMF detection while playing an announcement.

The MRFC may request the MRFP to stop playing an announcement when a DTMF digit is detected.

The MRFC may request the MRFP to add the following variants to the announcements:

- Date/Day/Month

- Time

- Digits (the announcement may contain a number of digits to be controlled by the MRFC for example a telephone number)

- Money (currency)

- Integer (a value within the announcement that is controlled by the MRFC, e.g. "you are caller number 3 in the queue")

- Variants may have predefined default values for a given network.

The MRFC may request the MRFP to indicate when a specific announcement previously requested has been played successfully.

The MRFP shall indicate error cases such as announcement not played successfully.

5.4 Text to Speech

TTS (Text To Speech) is the process of automatic generation of speech output from text or annotated text input.

The MRFC shall request the MRFP to play the text to one, one of several, multiple or all parties connected in a call/session.

The text format shall comply with the SSML format as specified in [11].

The MRFC shall extract the SSML script from the VXML or other format XML script if received

If the received text is another format than SSML, the MRFC shall generate a SSML script that may include the basic SSML text and the language type.

The MRFC shall indicate to the MRFP the text-to-speech, by sending the SSML script or sending an URI reference to this SSML script.

If the MRFC indicates the SSML script to the MRFP, the SSML text is sent inline in a H.248 command of Mp; the size shall be limited to avoid the segmentation in the Mp interface. The MRFC may remove unnecessary elements, such as the comments element, from the SSML document, providing that the result is a Conforming Speech Synthesis Markup Language Fragment as described in section 2.2.1 of SSML ref [11]. This is however outside the scope of the current Mp specification work. If the SSML script size pre-processed results in segmentation in the Mp interface, the URI reference should be used.

When the MRFC indicates the SSML script using an URI reference to the MRFP, two options can exist:

- the file (referenced by the URI) is located in the MRFP and it is a SSML text, hence the MRFP should play the text;

- the file (referenced by the URI) is located outside the MRFP; the MRFP may fetch the text and play it to the user otherwise the MRFP indicates an error.

The MRFP shall execute the basic SSML elements and may ignore the SSML elements not supported. The basic SSML elements include the root element "speak", language type and spoken text.

The MRFC may request the MRFP to play a text in a loop until it commands the MRFP to stop.

The MRFC may request the MRFP to play a text for a fixed number of times.

The MRFC may request DTMF detection while playing a text.

The MRFC may request the MRFP to stop playing a text when a DTMF digit is detected.

The MRFC may request the MRFP to indicate when a text has been played successfully.

The MRFP shall indicate error cases such as text not played successfully. Ignoring a non-supported SSML element shall not result in an error.

5.5　Audio Record

The function requirement of audio record is to record the audio media stream(s) and store it into a file. The function can be used in some services, such as the voice mail box service, conference service, etc.

The MRFC shall request the MRFP to start the audio record from one or all parties connected in a call/session. If it is to record one party in a call/session, only the input stream of the party is recorded. If it is to record all parties in a call/session, the mixed stream of all parties is recorded.

The MRFP file format shall comply with the 3GPP multimedia file formats as specified in the 3GPP TS 26.244[5].

The MRFC may request the MRFP to detect the DTMF digit while recording an audio.

The MRFC may request the MRFP to stop recording and still retain the recording file.

The MRFC may indicate to the MRFP the file format and the URI to store the recorded file or request the MRFP to return the record file URI.

The MRFC may indicate to the MRFP the maximum record time.

The MRFC shall request the MRFP to indicate the result and the cause of record completion when an audio has been recorded successfully.

The MRFP shall indicate error cases such as audio not recorded successfully.

The MRFC may indicate the MRFP to execute other functions, such as playing an announcement, when the MRFP is recording audio.

5.6　DTMF Collection

The MRFC shall request the MRFP to detect and report the DTMF digits.

The MRFP shall report DTMF Digits detected as RTP Telephony Events (see IETF RFC 2833 [10]) if the Telephony Event for DTMF Payload Type has been assigned to that interface. The MRFP shall report only single DTMF Digits.

5.7　Automatic Speech Recognition

ASR (Automatic Speech Recognition) function is that the recognizer processes the user input voice and may match that input against a target data to produce a recognition result that represents the detected input. In the IMS, the MRFP acts as the recognizer that is under control of the MRFC and finish the function of recognition.

The MRFC shall request the MRFP to start the automatic speech recognition.

The MRFC shall extract the SRGS recognition grammar script or URI from the VXML script if received or other format XML script if received.

The grammar format shall comply with the SRGS format as specified in W3C Recommendation [12].

The MRFC shall indicate the SRGS script or the SRGS URI to the MRFP using H.248 packages. If the SRGS script is sent inline,. the size of the SRGS script shall be limited to avoid segmentation in the Mp interface.

The MRFC may indicate to the MRFP the recognition mode: Normal Recognition Mode or Hotword Recognition Mode.

- If the MRFC indicates the Normal Recognition Mode to the MRFP, the MRFP shall attempt to match all of the speech against a recognition grammar and returns a no-match status if the input fails to match or the method times out.

- If the MRFC indicates the Hot-word Recognition Mode to the MRFP, the MRFP shall look for a match against specific speech grammar and ignores speech that does not match. The recognition completes only for a successful match of the recognition grammar or if the subscriber cancels the request or if the recognition time elapses.

The MRFP shall execute the recognition against the SRGS grammar and may ignore SRGS elements which are not supported.

The MRFC may request DTMF detection while executing ASR.

The MRFC may request the MRFP to stop ASR when a DTMF digit is detected.

The MRFC may request the MRFP to indicate when a specific ASR has been completed successfully.

When ASR is completed successfully, the MRFP may notify the MRFC the recognition result.

The recognition result shall comply with a single recognition format (e.g. the EMMA format as specified in W3C Recommendation [13] or the NLSML format as specified in W3C Recommendation [15]).

NOTE: The mandatory recognition result format may be defined in Stage 3 specification 3GPP TS 29.333 [16].The MRFP may notify the MRFC multiple recognition results that are mutually exclusive. Each result may be structured by multiple parts in time sequence with the input time, may include the text token that the value will correspond to tokens as defined by the SRGS grammar, may include the interpretation of application specific markup, may include the confidence score that represents the recognition quality.

The MRFP shall indicate error cases such as ASR not executed successfully.

5.8   Play Multimedia

5.8.1   General Play Multimedia

The function of playing multimedia is to play any combination of audio, video and messaging media streams (except for audio only play which is specified according to clause 5.2 or clause 5.3) to the subscriber. When playing combination of audio and video media stream(s), the media stream(s) shall be synchronized. The function can be used in the services, such as multimedia announcement, multimedia mail box service, etc.

The MRFC shall request MRFP to play multimedia to one, one of several, multiple or all parties connected in a call/session.

The multimedia to be played may be referenced by pre-configured identifiers or by reference to a file (location).

The MRFC shall request sequences of predefined fixed multimedia announcements within one request to the MRFP.

The MRFP multimedia of synchronized audio and video file format shall comply with the 3GPP multimedia file formats as specified in the 3GPP TS 26.244[5].

The MRFP may transcode the input codec into the session codec, if the multimedia file provides a different audio or video codec with the session codec.

The MRFC may request MRFP to play multimedia of synchronized audio and video in a loop until it commands the MRFP to stop.

The MRFC may request the MRFP to play multimedia of synchronized audio and video for a fixed number of times.

The MRFC may request DTMF detection while playing multimedia of synchronized audio and video.

The MRFC may request the MRFP to stop playing multimedia when a DTMF digit is detected.

The MRFC may indicate to the MRFP the multimedia file identifier and file format.

The MRFC may request the MRFP to indicate when a specific multimedia previously requested has been played successfully.

The MRFC may be able to decouple the play audio and play video request to the MRFP via separate sources for each media.

The MRFP shall indicate error cases such as multimedia not played successfully.

5.8.2   Play Message

The function specified in clause 5.8.1 for "General Play Multimedia" shall be followed. This clause describes the additional requirements to play the messaging media stream.

To detect DTMF digits is not required for message media stream.

To play message in a loop or in a loop with a fixed number of times is not required.

The MRFP message file formats shall comply with the file formats used inside MMS (Multimedia Messaging Service) as specified in the 3GPP TS 26.140 [22] in the current version.

5.9   Multimedia Record

5.9.1   General Multimedia Record

The function of the multimedia record is to record the any combination of audio, video and messaging media stream(s) (except for audio only record which are specified according to clause 5.5). When recording combination of audio and video media stream(s), the media stream(s) shall be synchronized and be stored into a multimedia file. The multimedia record function can be used in the services, such as multimedia mail box service, multimedia conference, etc.

The MRFC shall request the MRFP to start the multimedia record to one or all parties connected in a call/session. If it is to record one party in a call/session, only the input stream of the party shall be recorded.

If it is to record all parties in a call/session, the mixed stream of all parties shall be recorded. The MRFC may request the MRFP to detect the digit while recording a multimedia of synchronized audio and video.

The MRFP multimedia of synchronized audio and video file format shall comply with the 3GPP multimedia file formats as specified in the 3GPP TS 26.244[5].

The MRFC may request the MRFP to detect DTMF digits while recording multimedia of synchronized audio and video.

The MRFC may request the MRFP to stop recording and still retain the recording file.

The MRFC may indicate to the MRFP the file format and URI to store the recorded file or request the MRFP to return the URI.

The MRFC may indicate to the MRFP the maximum record time.

The MRFC may request the MRFP to indicate the result and the cause of record completion when a multimedia has been recorded successfully.

The MRFP shall indicate error cases such as multimedia not recorded successfully.

The MRFC may indicate the MRFP to execute other functions, such as playing an announcement, when the MRFP is recording multimedia.

5.9.2   Message Record

The function specified in clause 5.9.1 for "General Multimedia Record" shall be followed. This clause describes the additional requirements to record the messaging media stream.

The function of the message record is to record the messaging media stream(s) and store into a message file. The message record function can be used in the services, message conference, etc.

To detect DTMF digits is not required for message media stream.

The message file formats shall comply with the file formats used inside MMS (Multimedia Messaging Service) as specified in the 3GPP TS 26.140[22] in current version.

5.10 Audio Conference

Audio conferences allow users participating in the conference to communicate with all other participants simultaneously.

The details for conferencing within the IP Multimedia Core Network subsystem (IMS) are specified in 3GPP TS 24.147 [4].

The conference mixer is located in the MRFP.

The MRFC shall request the MRFP to create resources for an audio conference.

The MRFC shall create resources for users to join an existing conference, and to release resources for users to leave an existing conference.

The MRFC may request the MRFP to collect DTMF (according to clause5.5), play tones (according to clause 5.1) or announcements (according to clause 5.2), or record the audio during the conference (according to 5.4).

The MRFP may support transcoding between different users.

5.11 Multimedia Conference

5.11.1 General Multimedia Conferencing

Multimedia conferences allow users participating in the conference to communicate with all other participants simultaneously using any combination of voice, video and messaging (except for audio only conferences which are specified according to clause 5.10).

The details for conferencing within the IP Multimedia Core Network subsystem (IMS) are specified in 3GPP TS 24.147 [4].

The conference mixer is located in the MRFP.

The MRFC shall request the MRFP to create resources for a multimedia conference.

The MRFC shall create resources for users to join an existing conference, and to release resources for users to leave an existing conference.

The MRFC may indicate to the MRFP to collect the DTMF (according to clause 5.6), play multimedia (according to clause 5.8), or record the multimedia (according to clause 5.9) during the conference. It is not required to collect DTMF when creating messaging conference separately.

The MRFP may support audio transcoding between different users.

The MRFP may support video transcoding between different users.

The MRFC may indicate to the MRFP to modify the media attribute, including:

- To create a video stream or close a video stream.

- To create an audio stream or close an audio stream.

- To create a messaging stream or close a messaging stream.

- To modify the codec of audio or video.

5.11.2   Message Conferencing

Messaging conferences allow users participating in the conference to communicate with all other participants simultaneously using session based message. Message content shall be possible to carry different media including text, image, video and audio.

The details for messaging conference within the IP Multimedia Core Network subsystem (IMS) are specified in 3GPP TS 24.247 [17].

The MRFC shall request the MRFP to create resources for a messaging conference.

The MRFC shall request the MRFP to create resources for users to join an existing conference, and to release resources for users to leave an existing conference.

The MRFC may indicate the granted quotas and valid time to the MRFP. The granted quotas indicate the units specifying the number of messages or volume (size) of messages allowed to be received or sent by users. The valid time indicates the validity time of the granted service units.

The MRFP may report statistics information of messages according to the indication by the MRFC when the granted quota is reached or the valid time elapses even if the granted service units have not been consumed within the validity time. The statistics information of messages may include any of the following received or sent by users in the conference:

-    number of messages sent

-    number of messages received

-    volume (size) of messages sent

-    volume (size) of messages received.

The MRFC may request the MRFP to report the statistics information of messages sent and/or received at the end of the session or during the session.

The MRFP may report the statistics information at the end of the session or during the session as requested by the MRFC. The statistics information of messages may includeany of the following received or sent by users in the conference:

-    number of messages sent

-    number of messages received

-    volume (size) of messages sent

-    volume (size) of messages received

The MRFP shall utilize the Message Session Relay Protocol (MSRP) (see IETF RFC 4975 [18]) to transport messages carrying different media including text, images, video and audio. The Media types shall be MIME encoded.

The MRFC may request the MRFP to play messaging (according to clause 5.8) during the conference.

The MRFC may request the MRFP to support the message record (according to clause 5.9), including global storage of sessions and personal storage during the conference.

The MRFC may request the MRFP to filter the message of the recipient. If the filtering capabilities are supported:

-    The MRFC shall request the MRFP to start/stop message filtering.

-    The MRFC shall indicate the filtering criteria to the MRFP. The filtering criteria may include sender address, message size, message content type (e.g. video, audio), message content format (e.g. mpeg, jpeg) and message subject.

-    The MRFC shall indicate the message treatments to the MRFP. The message treatments include block the delivery of the message content, store the message content and redirect the message to another address.

-    The MRFP shall execute the message treatment when the criteria is reached.

5.12 Audio Transcoding

The MRFP shall support audio transcoding between streams of two Terminations within the same context where the streams are encoded differently, in accordance with standard H.248.1 principles, see ITU-T H.248.1 [3]. As minimum

requirement the MRFP shall support the default 3GPP audio codec AMR (narrowband), and optionally any other audio codecs as specified in 3GPP TS 26.235 [8].

5.13 Video Transcoding

The MRFP shall support video transcoding between streams of two Terminations within the same context where the streams are encoded differently, in accordance with standard H.248 principles, see ITU-T H.248.1 [3]. As minimum

requirement the MRFP shall support the default 3GPP video codec H.263, and optionally any other video codecs as specified in 3GPP TS 26.235 [8].

5.14 Floor Control Service Requirement

5.14.1 General

Floor control is a means to manage joint or exclusive access to shared resources in a (multiparty) conferencing environment. It enables applications or users to gain safe and mutually exclusive or non-exclusive input access to the shared object or resource. The "Floor" is an individual temporary access or manipulation permission for a specific shared resource (or group of resources) IETF RFC 4376 [19]. Floor control is an optional procedure; where "shall" is used it is meant that this is basic required functionality within the feature.

5.14.2 Architecture

The functional architecture concerning Floor control is presented in Figure 5.14.2.1 below.
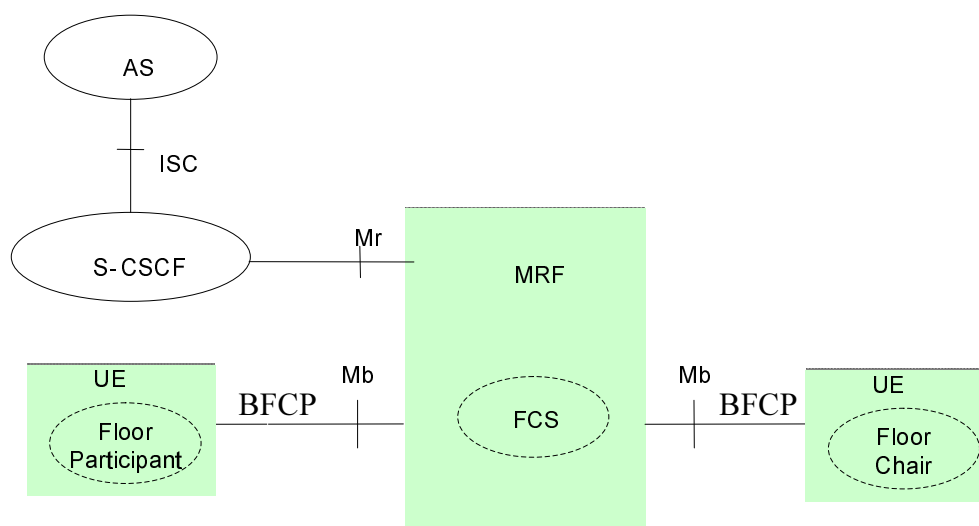
Figure 5.14.2.1: Functionality Architecture of Floor Control

The functional entities are described by solid line, and the roles are described by broken line.

The functional entities consist of the following:

- User Equipment (UE), a UE shall support the "Client" role of BFCP as specified by IETF RFC 4582 [20]. the Client may be a "Floor Participant" or "Floor Chair" .

- Media Resource Function (MRF), an MRF shall support the "Floor Control Server" role.

The roles consist of the following:

- Floor Participant, the Floor Participant shall support general Client operations and Floor Participant operations as described in IETF RFC 4582 [20].

- Floor Chair, the Floor Chair shall support Client operations and Floor Chair operations as described in IETF RFC 4582 [20].

- Floor Control Server, the Floor Control Server (FCS) shall support Floor Control Server operations as described in IETF RFC 4582 [20].

5.14.3 Services Requirements

The MRF shall support the Floor Control function, including: the "conference policy" related to Floor control and the communication between the Floor control functional entities (the Floor Participant, the Floor Chair and the Floor Control Server).

1. The MRF shall support the following Floor control policy related to Floor control:

- Whether the Floor control is in use or not.

- The algorithm to be used in granting the Floor.

    The following algorithms shall be supported:

    - FCFS (First Come First Served)

    The following algorithms may be supported:

    - Chair-Controlled

- The maximum number of users who can hold the Floor at the same time.

- To assign and modify the Floor Chair, if the Floor is Chair-controlled.

The MRF may support the following:

- Announcements/tones from network for indicating when a user gets and looses the hold of the Floor (note: announcement may also be text or indication in video)

2. The MRF, acting as FCS, shall support the communication with the Floor Participants and the Floor Chairs according to the BFCP protocol as described in IETF RFC 4582 [20] , providing:

- Communication between Floor Participant and FCS such that the participant shall be able to request/ modify /release a Floor for the Floor Participant himself or a third-party Floor Participant;

- Communication between Floor Chair and FCS such that the Chair shall be able to receive Floor requests and to grant/ reject/ revoke the Floor requests.

5.14.4 Information Flows

This clause covers the information flows between the UE and MRF.

5.14.4.1 User requesting the Floor during a conference

Figure 5.14.4.1.1 shows a Floor Participant requesting the Floor to obtain the right to talk during a conference. The UE#1 is a Floor Participant, the Floor of the "right to talk" is Chair-controlled and the UE#2 is the Floor Chair of the conference.
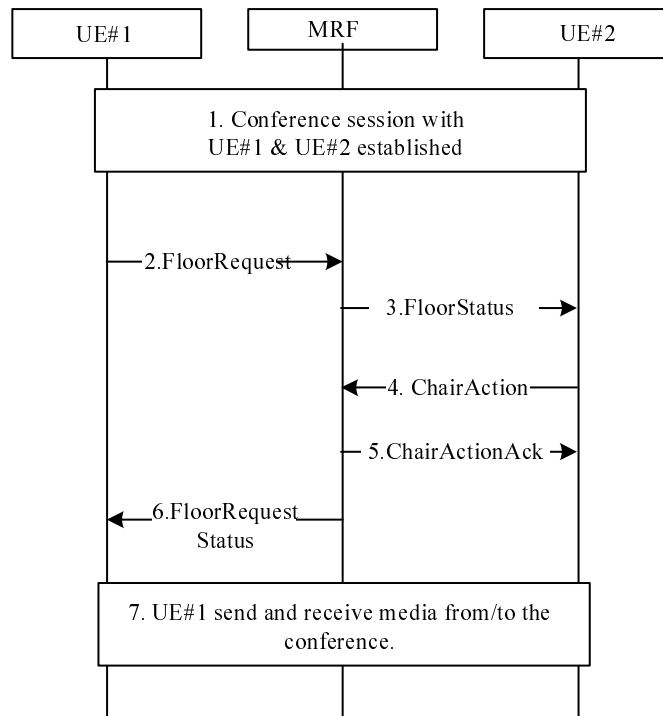
Figure 5.14.4.1.1: User requesting the Floor to obtain the right to talk during a conference

The details of the flows are as follows:

1. Conference session with UE#1 & UE#2 established

The UE#1 and UE#2 are participants of an existing conference. The BFCP connections between the participant and the MRF need to be established before the BFCP communication.

2. FloorRequest

The UE#1 requests the MRF for the Floor of the "right to talk". The message format is described in IETF RFC 4582 [20].

3. FloorStatus

The MRF notifies the UE#2 the Floor request from UE#1. The message format is described in IETF RFC 4582[20].

4. ChairAction

The UE#2 grants the Floor request and sends instruction to the MRF to action. The message format is described in IETF RFC 4582[20].

5. ChairActionAck

The MRF acknowledges the ChairAction message. The message format is described in IETF RFC 4582[20].

6. Floor RequestStatus

The MRF informs UE#1 about the status of their Floor requests. The message format is described in IETF RFC 4582[20].

7. UE#1 send and receive media (or audio) from/to the conference

Now the UE#1 has been granted the Floor of the "right to talk", it may send and receive the audio stream to the MRF.

5.14.4.2 User releasing the Floor during a conference

Figure 5.14.4.2.1 shows a Floor Participant requesting to release the Floor to give up the right to talk during a conference. The UE#1 is a Floor Participant and owns the Floor of the "right to talk", the Floor is Chair-controlled and the UE#2 is the Floor Chair of the conference.
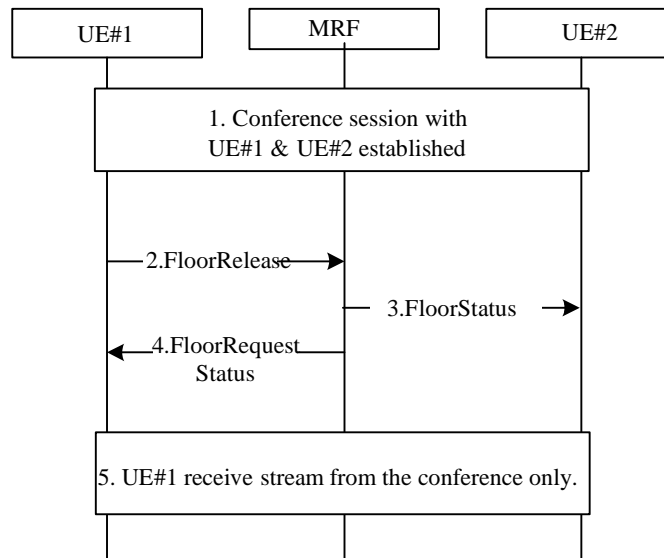
Figure 5.14.4.2.1: User releasing the Floor to give up the right to talk during a conference

The details of the flows are as follows:

1. Conference session with UE#1 & UE#2 established

The UE#1 and UE#2 are participants of an existing conference. The BFCP connections between the participant and the MRF need to be established before the BFCP communication.

2. FloorRelease

The UE#1 requests to release the MRF for the Floor of the "right to talk". The message format is described in IETF RFC 4582 [20].

3. FloorStatus

The MRF notifies the UE#2 the Floor release request from UE#1. The message format is described in IETF RFC 4582[20].

4. Floor RequestStatus

The MRF informs UE#1 about the status of the Floor release request. The message format is described in IETF RFC 4582[20].

5. UE#1 receive stream from the conference

Now the UE#1 has been revoked the right to talk, he may receive the audio stream from the MRF only.

5.14.5 Requirements on Mp interface

5.14.5.1 Requirements for MRFP based FCS

The MRFC shall indicate to the MRFP the Floor Control Policy:

- The algorithm to be used in granting the Floor.

- The FCFS algorithm shall be supported.

- The Chair-controlled algorithm may be supported.

- The maximum number of users who can hold the same Floor at the same time.

- To assign and modify the Floor Chair, if the Floor is Chair-controlled.

- The Floor media type shall be audio, video or a combination of one or more media type.

- The association between Floors and resources.

The MRFP shall maintain the state of the Floor(s), including which Floors exists, which terminations hold which Floors, and which termination is the Floor Chair, if the floor is Chair-controlled.

The MRFC may request the MRFP to establish a BFCP connection between the MRFP (FCS) and the Client (via Floor control Client Termination).

The MRFP shall support the communication with a Floor Participant such that the participant may request/ modify /release a Floor for the Floor Participant himself or a third-party Floor Participant according to the BFCP protocol [20].

The MRFP may support the communication with Floor Chair such that the Chair shall be able to receive Floor requests and to grant/ reject/ revoke the Floor according to the BFCP protocol [20].

The MRFP shall (if requested by the MRFC) report to the MRFC any requests to change the Floor holding status. The MRFC shall indicate to the MRFP to modify the Client's access right to the media according to the changes in Floor status.

The MRFC may request the MRFP to play tones (according to clause 5.1) or announcements (according to clause 5.2) for indicating when a Client gains or loses a Floor.

5.15 Explicit Congestion Notification Service Requirement

5.15.1 General

A MRFC/MRFP may support Multimedia Telephony using Explicit Congestion Notification see IETF RFC 3168 [24], and may act as an ECN endpoint to enable ECN with a local ECN-capable terminal within a local network that properly handles ECN-marked packets.

This requires that the MRFC performs the following:

- support SDP ability to negotiate ECN as described in 3GPP TS 26.114 [23].

This requires the MRFP to be capable of enabling end-to-end rate adaptation due to congestion between the local Multimedia Telephony terminal and the MRFP by performing the following towards the local Multimedia Telephony terminal:

- trigger rate adaptation request towards the Multimedia Telephony terminal when receiving incoming IMS media flow IP packets marked with ECN-CE;

- perform media adaptation (e.g. reduce media bit-rate) towards the Multimedia Telephony terminal when receiving from the latter an adaptation request;

- if requested by the MRFC, provide notification and an ECN failure event if ECN errors or packet losses occur.

6 MRFC-MRFP Procedures

6.1 Non-Call Related Procedures

6.1.1 General

The non-call related procedures are based on corresponding procedures of 3GPP TS 23.205[7] when the MRFC takes the place of the MSC server and the MRFP takes the place of the MGW.

6.1.2 MRFP Unavailable

The MRFC recognises that the MRFP is unavailable in the following 4 cases:

1. The signalling connection is unavailable
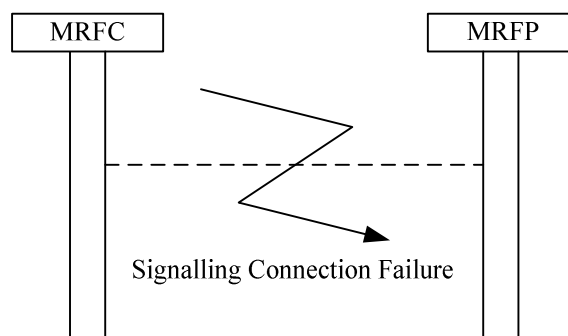
Figure 6.1.2.1: Signalling connection failure

2. The MRFP indicates the failure condition to all connected MRFCs
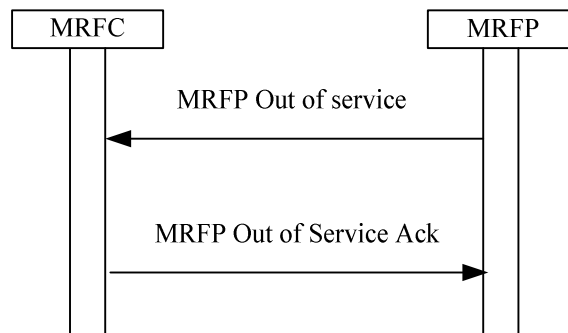
Figure 6.1.2.2: MRFP indicates the Failure/Maintenance locking

The failure indication indicates that the MRFP will soon go out of service and that no new connections should be established using this MRFP. The MRFP can choose between the "graceful" and the "forced" method. In the graceful method the connections are cleared when the corresponding calls are disconnected. In the forced method all connection are cleared immediately.

3. The MRFC recognises that the MRFP is not functioning correctly, e.g. because there is no reply on periodic sending of Audits. The periodic sending of Audits by MRFC should persist.

4. The MRFP indicates the maintenance locking condition to all concerned MRFCs.

The maintenance locking indication indicates that the MRFP is locked for new calls and that no new connections shall be established using this MRFP. The MRFP can choose between the "graceful" and the "forced" method. In the graceful method the connections are cleared when the corresponding calls are disconnected. In the forced method all connection are cleared immediately

In all of the above cases the MRFC shall prevent the usage of the MRFP until the MRFP has recovered or the communication with the MRFP is restored.

6.1.3 MRFP Available

The MRFC discovers that the MRFP is available when it receives an MRFP Communication Up message or an MRFP Restoration message. When the MRFC discovers that the MRFP is available the following shall occur:

1. Signalling recovery

The MRFP indicates to all connected MRFCs that the signalling connection is restored.
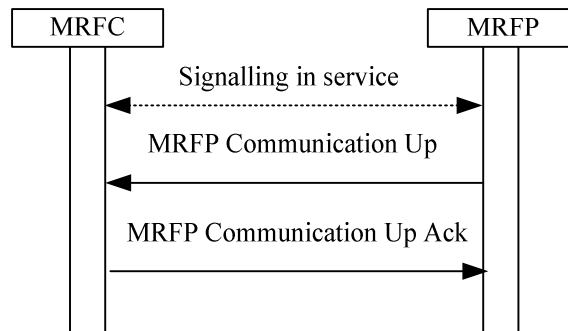
Figure 6.1.3.1: Communication goes up

2. MRFP restoration/maintenance unlocking indication.

The MRFP indicates to all connected MRFCs that normal operation has resumed.
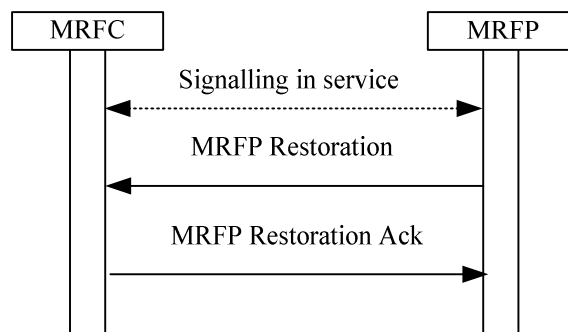
Figure 6.1.3.2: MRFP indicates recovery from a failure/or maintenance unlocking

NOTE: This procedure may be used after recovery from a signalling failure.

3. The MRFC recognises that the MRFP is now functioning correctly, e.g. because there is a reply on periodic sending of Audits.

After this the MRFC can use the MRFP. If none of 1,2, or 3 happens the MRFC can initiate the MRFC Ordered Re-register procedure.

6.1.4 MRFP Recovery

If the MRFP recovers from a failure, is maintenance unlocked, or it has been restarted, it registers to its known MRFCs using the MRFP Restoration procedure or the MRFP Registration procedure. The MRFP can indicate whether the Service has been restored or whether it has restarted with a cold or warm boot. The response sent to the MRFP indicates a signalling address to be used by the MRFP.
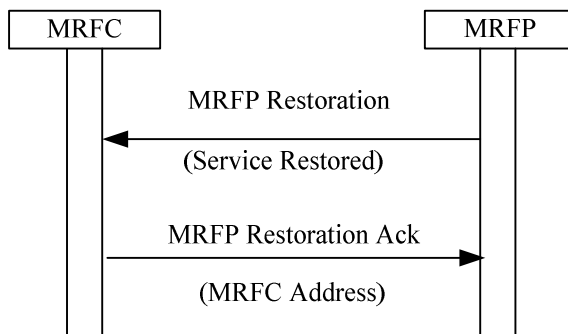
Figure 6.1.4.1: MRFP Restoration
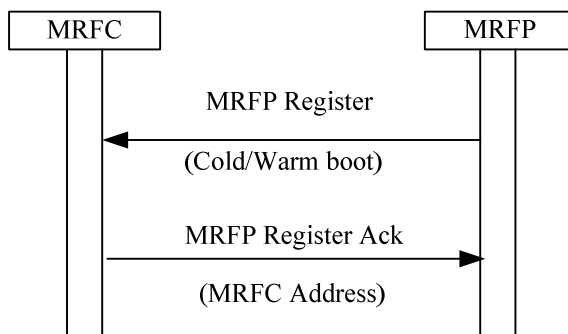
Figure 6.1.4.2 MRFP Registration

After the recovery the MRFC can use the MRFP.

6.1.5 MRFC Recovery

6.1.5.1 General

If an MRFP-unavailable condition is provoked by a failure/recovery action, the MRFC recovery sequence will, from an information flow point of view, look like MRFP unavailable and then MRFP available. If an MRFP-unavailable condition is not provoked, the MRFC recovery sequence will look like MRFP available.

After the information flow, the terminations affected by the recovery action are released.

6.1.5.2 MRFC Restoration
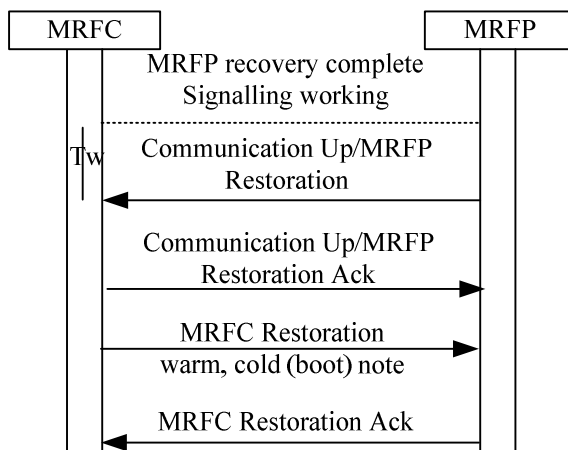
Figure 6.1.5.2.1: MRFC Restoration

NOTE: Normal release procedure may also be initiated.

After the recovery action is complete and it is possible to signal to the MRFP the MRFC starts a timer Tw. If recovery indications are not received (MRFP Communication Up or MRFP Restoration) from the MRFP during Tw an Audit is sent. If the MRFC receives a recovery indication or MRFP communication up indication, it shall acknowledge the indication before the MRFC Restoration may be sent or the release procedure is initiated.

6.1.6 MRFP Re-register

When the MRFC requests an MRFP to perform a registration (see clause 6.1.7), the MRFP performs a re-registration to the MRFC which is defined in the MRFC address.
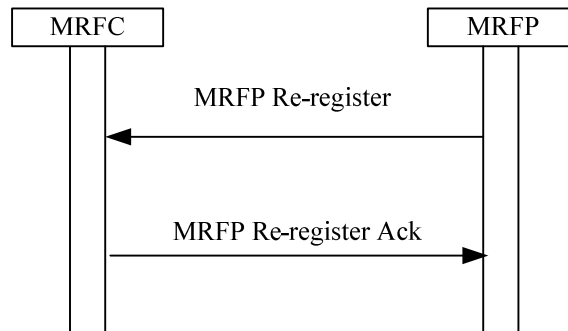
Figure 6.1.6.1: Re-registration of an MRFP

6.1.7 MRFP Re-registration Ordered by MRFC

If the MRFC knows that communication is possible, but the MRFP has not registered, the MRFC can order re-registration of the MRFP.
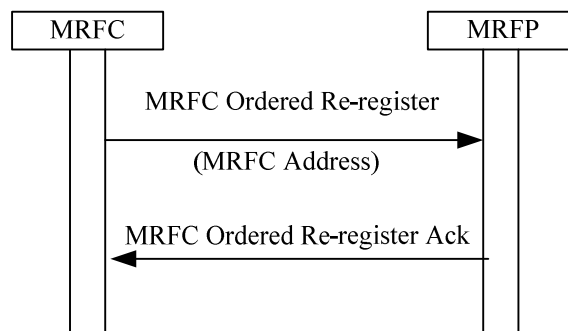
Figure 6.1.7.1: Re-registration ordered by the MRFC

If the re-registration request is accepted the MRFP uses the MRFP Re-register procedure to register with the MRFC.

6.1.8 Audit of MRFP

6.1.8.1 Audit of Value

The MRFC may request the MRFP to report the current values assigned to distinct objects in the MRFP.

```
        ┌─────────┐                          ┌─────────┐
        │  MRFC   │                          │  MRFP   │
        └─────────┘                          └─────────┘
             │ │                                 │ │
             │ │          Audit Value            │ │
             │ ├────────────────────────────────▶│ │
             │ │                                 │ │
             │ │          (Object(s))            │ │
             │ │                                 │ │
             │ │        Audit Value Ack          │ │
             │ │◀────────────────────────────────┤ │
             │ │    (values per requested object)│ │
             │ │                                 │ │
```
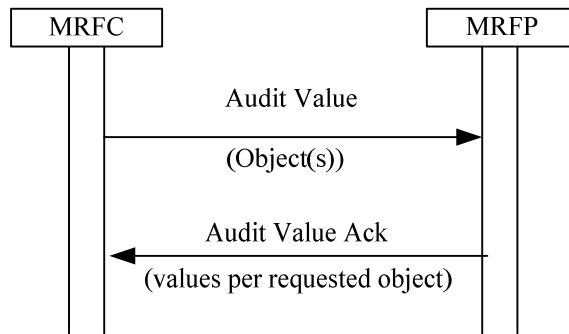
Figure 6.1.8.1.1: Audit Value

6.1.8.2   Audit of Capability

The MRFC may request the MRFP to report the capabilities of distinct objects in the MRFP.

```
        ┌─────────┐                          ┌─────────┐
        │  MRFC   │                          │  MRFP   │
        └─────────┘                          └─────────┘
             │ │                                 │ │
             │ │        Audit Capability         │ │
             │ ├────────────────────────────────▶│ │
             │ │                                 │ │
             │ │          (Object(s))            │ │
             │ │                                 │ │
             │ │      Audit Capability Ack       │ │
             │ │◀────────────────────────────────┤ │
             │ │ (capabilities per requested object)│ │
             │ │                                 │ │
```
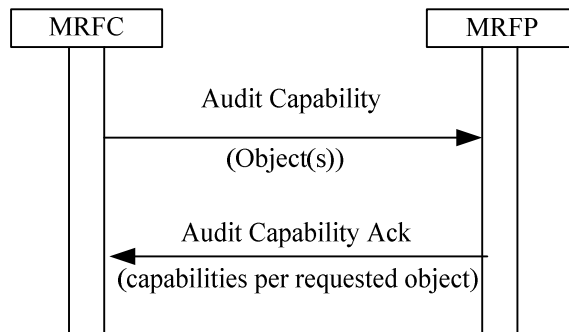
Figure 6.1.8.2.1: Audit Capability

6.1.9   MRFP Capability Change

The MRFP reports a change of capability of distinct objects in the MRFP.

```
        ┌─────────┐                          ┌─────────┐
        │  MRFC   │                          │  MRFP   │
        └─────────┘                          └─────────┘
             │ │                                 │ │
             │ │       Capability Update         │ │
             │ │◀────────────────────────────────┤ │
             │ │                                 │ │
             │ │          (Object(s))            │ │
             │ │                                 │ │
             │ │     Capability Update Ack       │ │
             │ ├────────────────────────────────▶│ │
             │ │                                 │ │
```
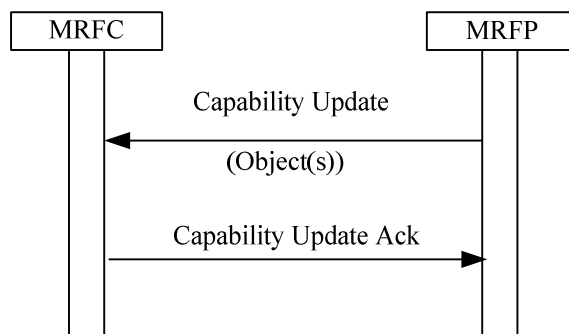
Figure 6.1.9.1: Capability Update

The MRFC can use the Audit Value and/or Audit Capability procedures to obtain further information, about the objects whose capabilities have changed.

6.1.10   MRFC Out of service
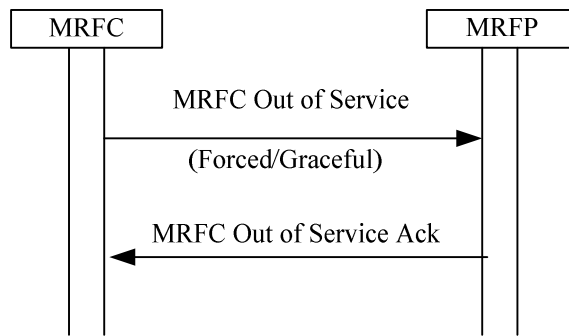
Figure 6.1.10.1: MRFC Out of Service

If an MRFC discovers that it wants to go out of service it starts an MRFC Out of Service procedure. The MRFC can indicate whether it requires the context to be cleared immediately (forced) or cleared when all terminations are released.(Graceful)

6.1.11   MRFP Resource Congestion Handling – Activate

When the MRFC requires that an MRFP congestion notification mechanism be applied in the MRFP, the MRFC shall use the MRFP Resource Congestion Handling - Activate procedure towards the MRFP.
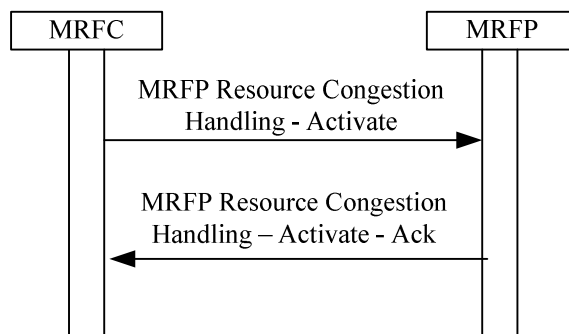
Figure 6.1.11.1: MRFP Resource Congestion Handling - Activate

6.1.12   MRFP Resource Congestion Handling -Indication

When the MRFC receives a load reduction notification from the MRFP via the MRFP Resource Congestion Handling - Indication procedure, the MRFC tries to reduce the processing load that the MRFC creates on the MRFP. The MRFP shall decide the actual level of traffic reduction.
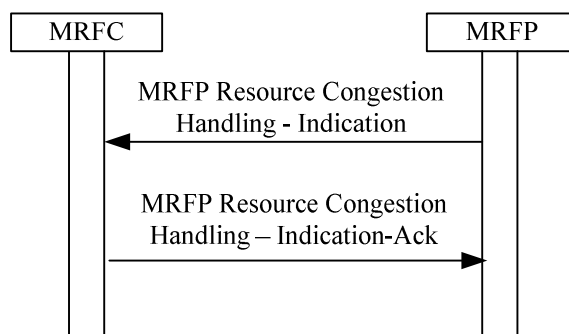
Figure 6.1.12.1: MRFP Resource Congestion Handling-Indication

6.1.13 Hanging termination detection

Whenever requesting new IP bearer terminations, the MRFC shall request the MRFP to periodically report termination heartbeat indications to detect hanging context and termination in the MRFP that may result e.g. from a loss of communication between the MRFC and the MRFP.

When the MRFC receives a termination heartbeat notification from the MRFP via the Termination heartbeat - Indication procedure, the MRFC shall return a Termination heartbeat –Indication Ack (without an error) if the context id / termination identity combination exists in the MRFC. If it does not exist, the MRFC shall return an error and shall correct the mismatch, e.g. by requesting the MRFP to subtract the indicated termination and to clear any associated context.
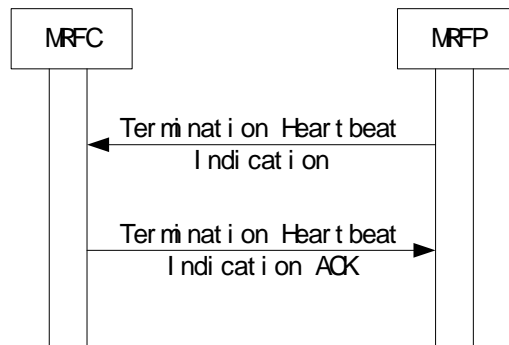
Figure 6.1.13.1: Termination heartbeat – Indication

6.2 Call Related Procedures

6.2.1 Play Tone Procedure

6.2.1.1 General

The following procedure assumes the IMS session has been established and the bearer is through-connected and the MRFC has received a trigger to play a tone and the MRFP selected for the call has the capabilities to provide tones.

   NOTE: This procedure may also be ordered in combination with the session establishment procedure.

6.2.1.2 Send tone

After reception of a trigger to play a tone, the MRFC shall initiate the Send tone procedure. The MRFC may request the MRFP to send tone to one, multiple or all terminations in a context simultaneously with the tone identifier. The tone identifier may be a pre-configured identifier.

The MRFC may request the MRFP to send tone continuously until requested to be stopped. Alternatively, duration may be indicated or provisioned in the MRFP. When the duration elapses, the tone shall be stopped.

The MRFC may request the MRFP to detect DTMF digits, and may request the MRFP to stop sending tone when a DTMF digit is detected. For the second case, only the tone completion event is notified.

The MRFC may request the MRFP to detect the tone completion, and notify the completion event and cause to the MRFC. The   tone is completed when either of the following has occurred;

-    the duration has elapsed or:

-    a DTMF digit is detected by the MRFP or:

-    the sending tone is not successful.

6.2.1.3 Stop tone

On receipt of a trigger to stop a tone, the MRFC shall request the MRFP to stop the tone.

6.2.1.4 Tone completed

When a tone is completed, if the MRFC has requested the MRFP to notify the tone completion, the MRFP shall notify the tone completion event and the cause to the MRFC. The cause that the tone is completed may be that the duration has elapsed, a DTMF digit is detected by the MRFP, or that the tone is not successful. Then the MRFC may indicate to the AS that the tone has been stopped.

6.2.1.5 Message sequence chart

Figure 6.2.1.1 shows the message sequence chart example for sending tone.
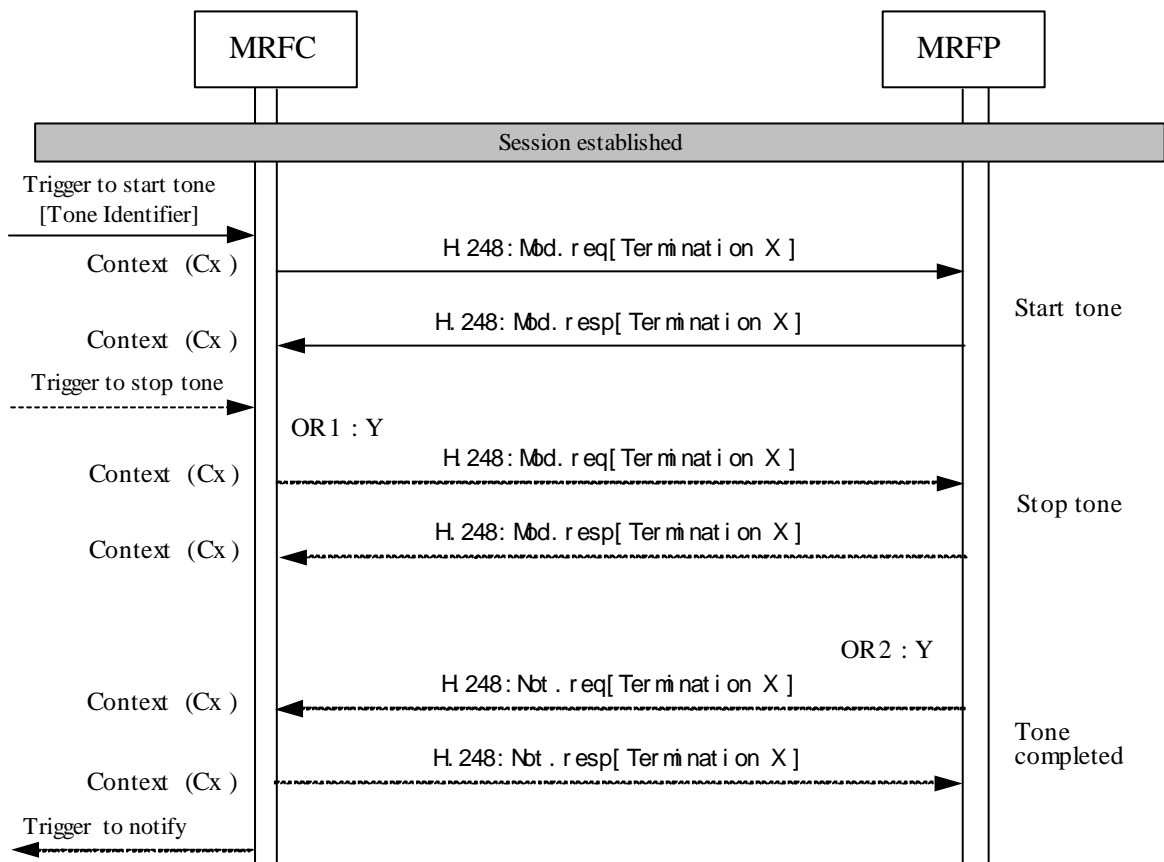
NOTE : OR 1: Stop the tone (Y:yes N:no)
OR 2: Notification of completion required   (Y:yes N: no)

Figure 6.2.1.1 Sending tone (message sequence chart)

6.2.2 Play Announcement Procedure

6.2.2.1 General

The following procedure assumes the IMS session has been established and the bearer is through-connected, and the MRFC has received a trigger to play announcement, and the MRFP selected for the call has the capabilities to provide announcement.

  NOTE: This procedure may also be ordered in combination with the session establishment procedure.

6.2.2.2 Start announcement

After reception of a trigger to play the announcement, the MRFC should initiate the Start announcement procedure. The MRFC shall request the MRFP to play announcement to one, multiple or all terminations in a context with the announcement identifier. The announcement identifier may be a pre-configured identifier (such as a number).

If it is a sequence of announcements, the MRFC shall request the MRFP to play all the announcements with one request. The MRFC may request the MRFP to play the announcement in a loop continuously until requested to be stopped or in a loop with a fixed number of times. For the second case, if the fixed number of times is exhausted, the announcement is completed successfully.

If it is a variable announcement, the MRFC may indicate to the MRFP the following variants to the announcements:

- Date: A date variant is made up of three components: day, month and year. The MRFC shall indicate the date value and the date format to the MRFP, such as " day-month-year" or "year-month-day".

- Time: A time variant is made up of two components: hour and minute, The MRFC shall indicate the time value and the time format to the MRFP, such as "12-hours format" or "24-hours format".

- Digits (the announcement may contain a number of digits to be controlled by the MRFC for example a telephone number): a digits variant is made up of a sequence digit.

- Money (currency).

- Integer (a value within the announcement that is controlled by the MRFC, e.g. "you are caller number 3 in the queue"): an integer variant may be spoken as a cardinal or ordinal value. The MRFC shall indicate to the MRFP the value and type to be spoken.

The MRFC may request the MRFP to detect DTMF digit while playing an announcement, and may request the MRFP to stop playing an announcement when a DTMF digit is detected. For the latter case, only the announcement completion event is notified.

The MRFC may request the MRFP to detect the announcement completion, and notify the completion event and cause to the MRFC. The announcement is completed when either of the following has occurred;

- the announcement has been completed successfully or:

- a DTMF digit is detected by the MRFP or:

- the playing announcement is not successful.

6.2.2.3 Stop announcement

On receipt of a trigger to stop the announcement, the MRFC shall request the MRFP to stop the announcement.

6.2.2.4 Announcement completed

When an announcement is completed, if the MRFC has requested the MRFP to notify the announcement completion, the MRFP shall notify the announcement completion event and the cause to the MRFC. The cause that the announcement is completed may be the announcement has been completed successfully, or a DTMF digit is detected by the MRFP, or the playing announcement is not successful. Then the MRFC may indicate to the AS that the announcement has been stopped.

6.2.2.5 Message sequence chart

Figure 6.2.2.1 shows the message sequence chart example for playing announcement.
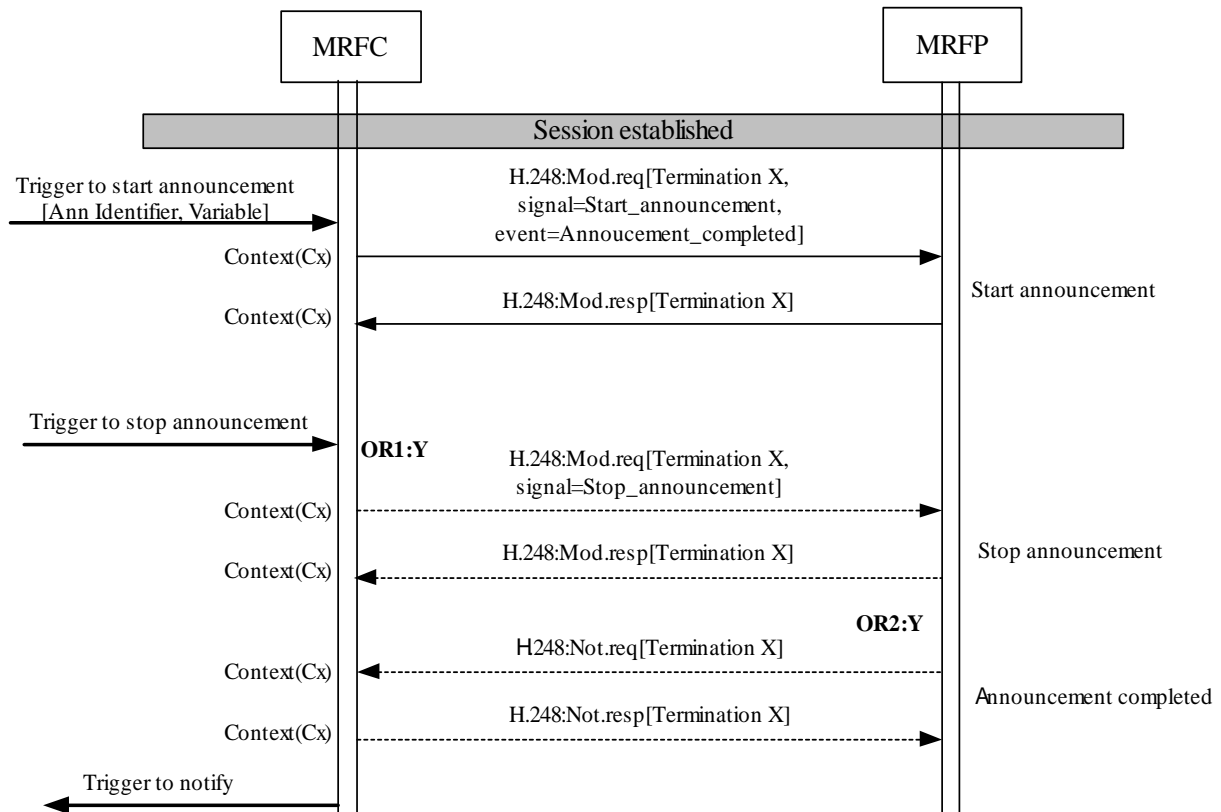
Note: OR1:Stop announcement (Y:yes, N:no)
        OR2:Notification of completion required(Y:yes, N:no)

Figure 6.2.2.1 Playing announcement (message sequence chart)

6.2.3   Text to Speech Procedure

6.2.3.1   General

The following procedure assumes the IMS session has been established and the bearer is through-connected, and the MRFC has received a trigger to play TTS, and the MRFP selected for the call has the capabilities to provide TTS.

    NOTE: This procedure may also be ordered in combination with the session establishment procedure.

6.2.3.2   Start TTS

After reception of a trigger to play TTS, the MRFC should initiate the Start TTS procedure.

If the MRFC receives a VXML script, the MRFC shall extract the SSML script or the SSML file identifier from the VXML script. If the MRFC receives plain text, the MRFC shall generate a SSML script that includes this plain text (<speak>) and the language type (xml:lang) used the basic SSML format. If the size of the SSML script is larger than the transport capability of the Mp interface, the MRFC shall stop the Start TTS procedure and return error.

Then the MRFC shall indicate to the MRFP the SSML script or the SSML file identifier to play the SSML text to one, one of many, multiple or all terminations in a context. If the MRFP does not support an element of the SSML, the MRFP may ignore the element.

The MRFC may request the MRFP to play the TTS in a loop continuously until requested to be stopped or in a loop with a fixed number of times.   For the second case, if the fixed number of times is exhausted, the TTS is completed successfully.

The MRFC may request the MRFP to detect DTMF digit while playing a TTS, and may request the MRFP to stop TTS when a DTMF digit is detected. For the second case, only the TTS completion event is notified.

The MRFC may request the MRFP to detect the TTS completion and notify the completion event and cause to the MRFC. The TTS is completed when either of the following has occurred;

- the TTS has been completed successfully or:

- a DTMF digit is detected by the MRFP or:

- the playing TTS is not successful.

6.2.3.3 Stop TTS

On receipt of a trigger to stop TTS, the MRFC shall request the MRFP to stop the TTS.

6.2.3.4 TTS Completed

When a TTS is completed, if the MRFC has requested the MRFP to notify the TTS completion, the MRFP shall notify the TTS completion event and the cause to the MRFC. The cause that the TTS is completed may be the TTS has been completed successfully, or a DTMF digit is detected by the MRFP, or the playing TTS is not successful. Then the MRFC may indicate to the AS that the TTS has been stopped.

6.2.3.5 Message sequence chart

Figure 6.2.3.5.1 shows the message sequence chart example for playing TTS.

Figure 6.2.3.5.1 Playing TTS (message sequence chart)

6.2.4   Audio Record Procedure

6.2.4.1   General

The following procedure assumes the IMS session has been established and the bearer is through-connected, and the MRFC has received a trigger to record audio, and the MRFP selected for the call has the capabilities to provide audio record.

> NOTE: This procedure may also be ordered in combination with the session establishment procedure.

6.2.4.2   Start audio record

After reception of a trigger to record audio, the MRFC should initiate the Start audio record procedure. The MRFC shall request the MRFP to record audio from one or all terminations in a context with the record file URI and record file format. If it is to record one party, only the input stream of the party is recorded. If it is to record all parties, the mixed stream of all parties is recorded.

When recording audio from all terminations in a context (for two-party sessions or a conference) the MRFC may request the MRFP to assign a new termination to record the audio in the context.

If other signals such as playing announcement are requested to be executed on the same termination as the termination to perform the recording the signals shall not override each other, e.g. the recording shall not be interrupted.

The record file URI can be generated by the AS/MRFC or by the MRFP. For the second case, the MRFC shall indicate the MRFP to generate the URI and return the generated URI to the MRFC. The record file format is the 3GPP multimedia file format, defined in the 3GPP TS 26.244[5], and only the audio track is used for the audio recording. The MRFC may indicate the maximum record time to the MRFP. When the maximum record time has elapsed, the MRFP shall stop the audio recording.

The MRFC may request the MRFP to detect the audio recording completion, and notify the completion event and cause to the MRFC. The audio recording is completed when either of the following has occurred;

-    the maximum time period of audio recording has elapsed,

-    no input is detected,

-    DTMF digits are detected by the MRFP where the DTMF key sequence shall stop or cancel the audio recording ,

-    the MRFC requests the MRFP to stop the audio recording, or:

-    the audio recording is not successful.

6.2.4.3   Stop audio record

After reception of a trigger to stop audio record, the MRFC shall request the MRFP to stop the audio recording. If the audio recording termination is added, the MRFC shall request the MRFP to subtract it.

6.2.4.4   Audio record completed

When an audio recording is completed, if the audio recording is successful, the MRFP shall save the record file to the specified URI. If the audio recording is not successful, the MRFP shall delete the record file. If the MRFC has requested the MRFP to notify the audio recording completion, the MRFP shall notify the audio recording completion event and the cause to the MRFC. The cause of the audio recording completed may be no voice has been input during a specific period, the maximum record time has elapsed, a DTMF digit that represents to finish or cancel the audio recording is detected by the MRFP, or the audio recording is not successful. Then the MRFC may indicate to the AS that the audio record has been stopped.

6.2.4.5   Message sequence chart

Figure 6.2.4.1 shows the message sequence chart example for audio recording.
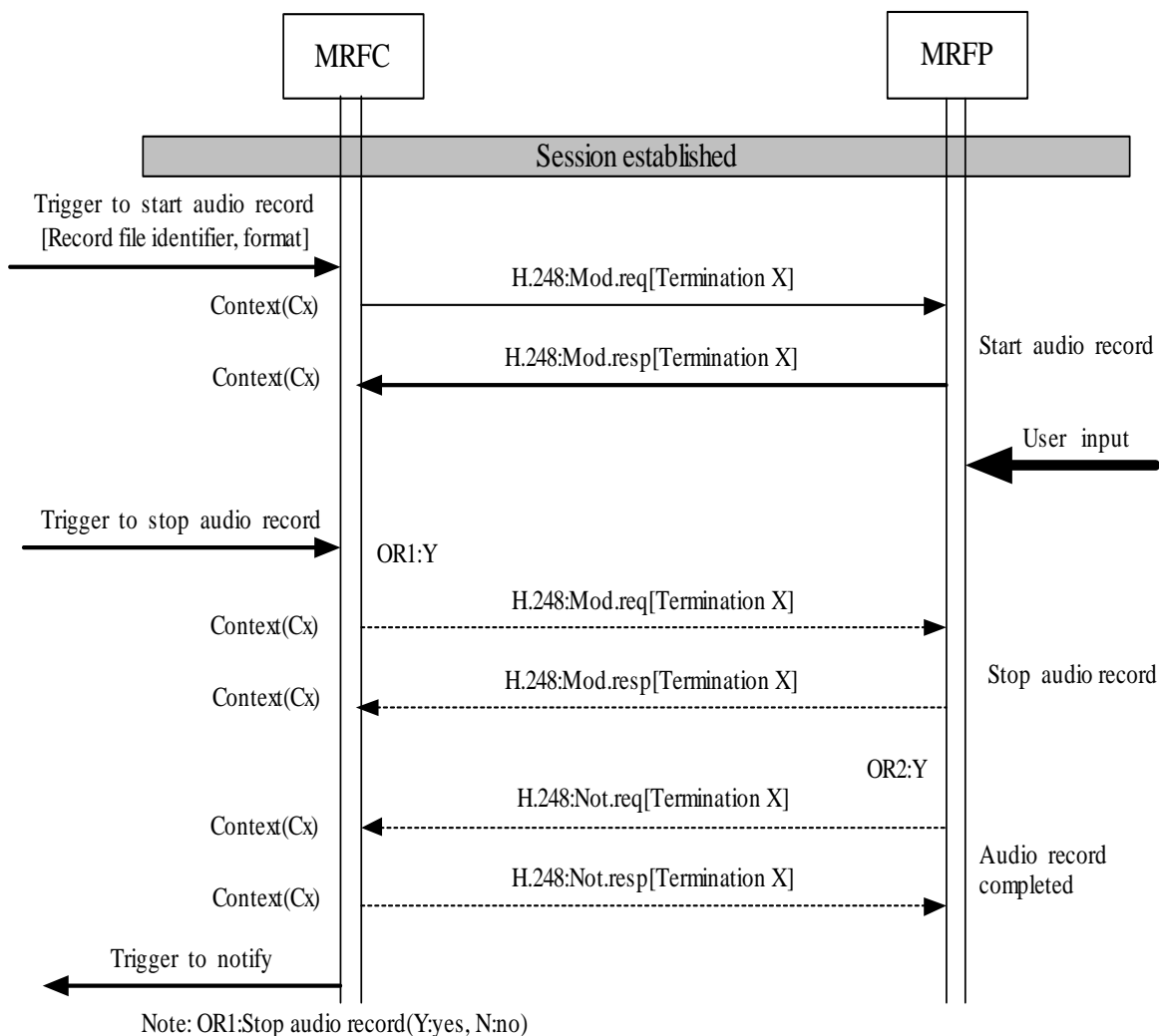
Figure 6.2.4.1 Audio record (message sequence chart)

6.2.5 DTMF Collection Procedure

On receipt of a request to detect DTMF Digits, the MRFC may command the MRFP to report DTMF Digits as defined in the Detect DTMF Procedure.

MRFC shall assign the RTP Payload Type for DTMF Telephony Events. When a DTMF Digit has been detected by the MRFP it shall report it to the MRFC.

When requested to detect DTMF the MRFP shall not forward the reported digit toward another connection.

An example sequence is shown in Figure 6.2.5.1.
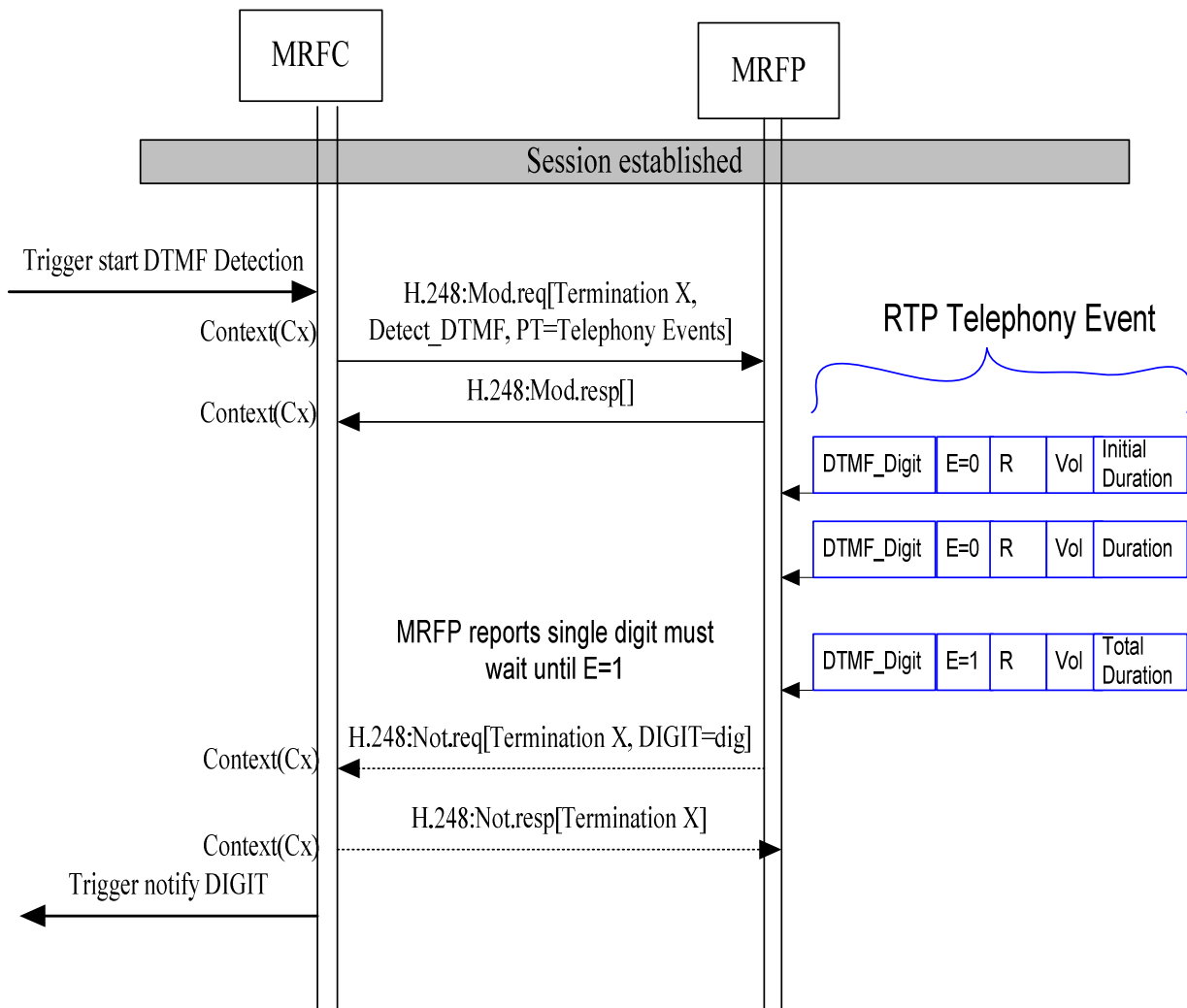
Figure 6.2.5.1 DTMF Telephony Event Detection

DTMF digit detection may be stopped by the MRFC sending the procedure Stop DTMF Detection. The MFRP, once it has acknowledged this request will no longer check for DTMF digits or report them to the MRFC.

6.2.6 Automatic Speech Recognition Procedure

6.2.6.1 General

The following procedure assumes the IMS session has been established and the bearer is through-connected, and the MRFC has received a trigger to play ASR, and the MRFP selected for the call has the capabilities to provide Automatic Speech Recognition.

NOTE: This procedure may also be ordered in combination with the session establishment procedure.

6.2.6.2 Start ASR

If the MRFC receives a request to initiate ASR, the MRFC shall extract the SRGS script or the SRGS URI from the received script.

If the size of the SRGS script is larger than the transport capability of the Mp interface, the MRFC shall terminate ASR procedure and return error.

Otherwise the MRFC initiates the Start ASR procedure; the MRFC shall indicate to the MRFP the SRGS script or the SRGS URI to play ASR to one termination in a context.

The MRFC may indicate to the MRFP the recognition mode: Normal Recognition Mode, Hotword Recognition Mode. If the MRFC indicate the Normal Recognition Mode to the MRFP, the MRFP shall match all of the speech against a recognition grammar and returns a no-match status if the input fails to match or the method times out. If the MRFC indicates the Hot-word Recognition Mode to the MRFP, the MRFP shall look for a match against specific speech grammar and ignores speech that does not match.

The MRFP shall recognize the subscriber"s input speech stream according to the SRGS grammar, and output the result as the EMMA format.

If the MRFP does not support an element of the SRGS, the MRFP may ignore the element.

The MRFC may request the MRFP to detect DTMF digit while executing ASR, and may request the MRFP to stop ASR when a DTMF digits is detected. For the latter case, only the ASR result is notified.

The MRFC may request the MRFP to detect the ASR completion and notify the completion event and cause to the MRFC. The ASR is completed when either of the following has occurred;

- the ASR has been completed successfully,

- a DTMF digit is detected by the MRFP,

- the executing of ASR is not successful or

- the recognition time elapses.

6.2.6.3 Stop ASR

On receipt of a trigger to stop ASR, the MRFC shall request the MRFP to stop the ASR.

6.2.6.4 ASR Completed

When an ASR is completed, if the MRFC has requested the MRFP to notify the ASR completion, the MRFP shall notify the ASR result and the cause to the MRFC. The cause of the ASR completed may be that the ASR has been completed successfully, a DTMF digit is detected by the MRFP, or the executing ASR is not successful.

The MRFP shall generate the ASR result as the EMMA format. The EMMA result may include multiple recognition results that are mutually exclusive. Each result may be structured by multiple parts in time sequence with the input time. Each result may include the text token that the value will correspond to tokens as defined by the SRGS grammar. Each result may include the interpretation of application specific markup. Each result may include the confidence score that represents the recognition quality.

If the size of the EMMA script is larger than the transport capability of the Mp interface, the MRFP shall return the MRFC the ASR is not successful.

Then the MRFC may indicate to the AS that the ASR has been stopped and the ASR result.

6.2.6.5 Message sequence chart

Figure 6.2.6.5.1 shows the message sequence chart example for executing ASR.
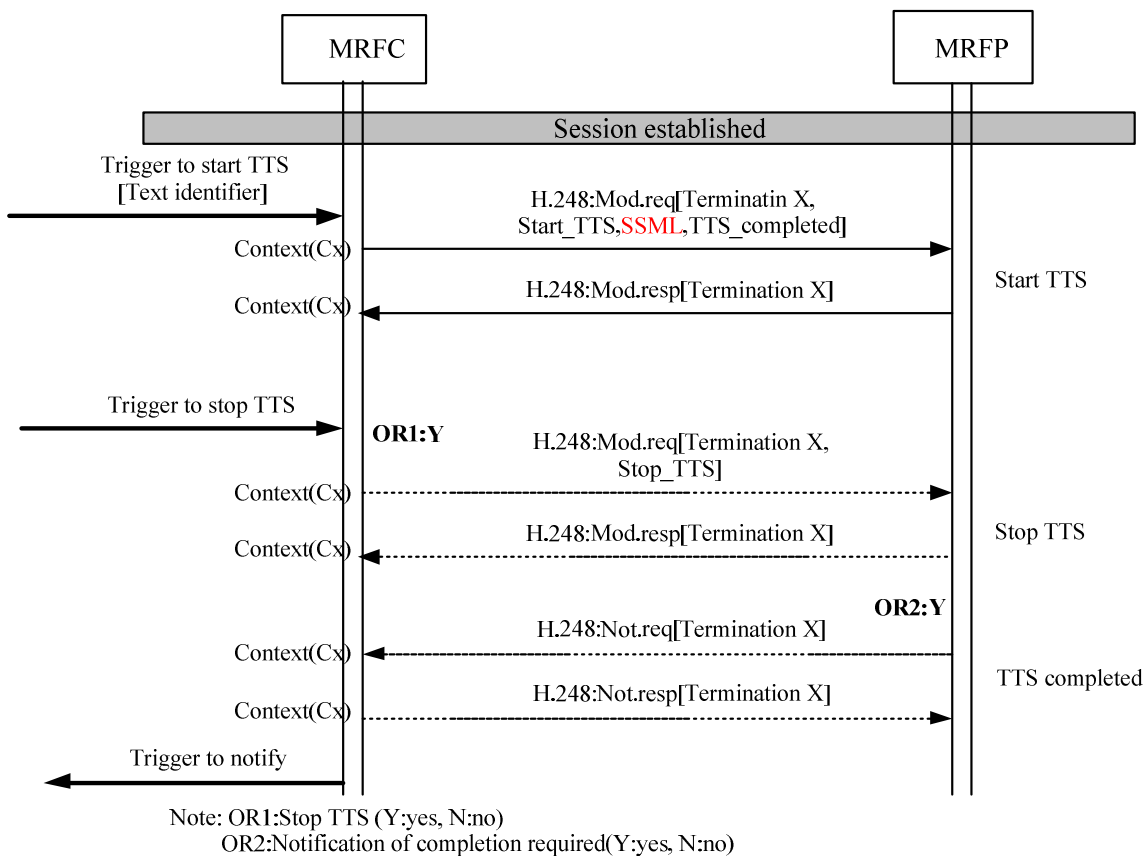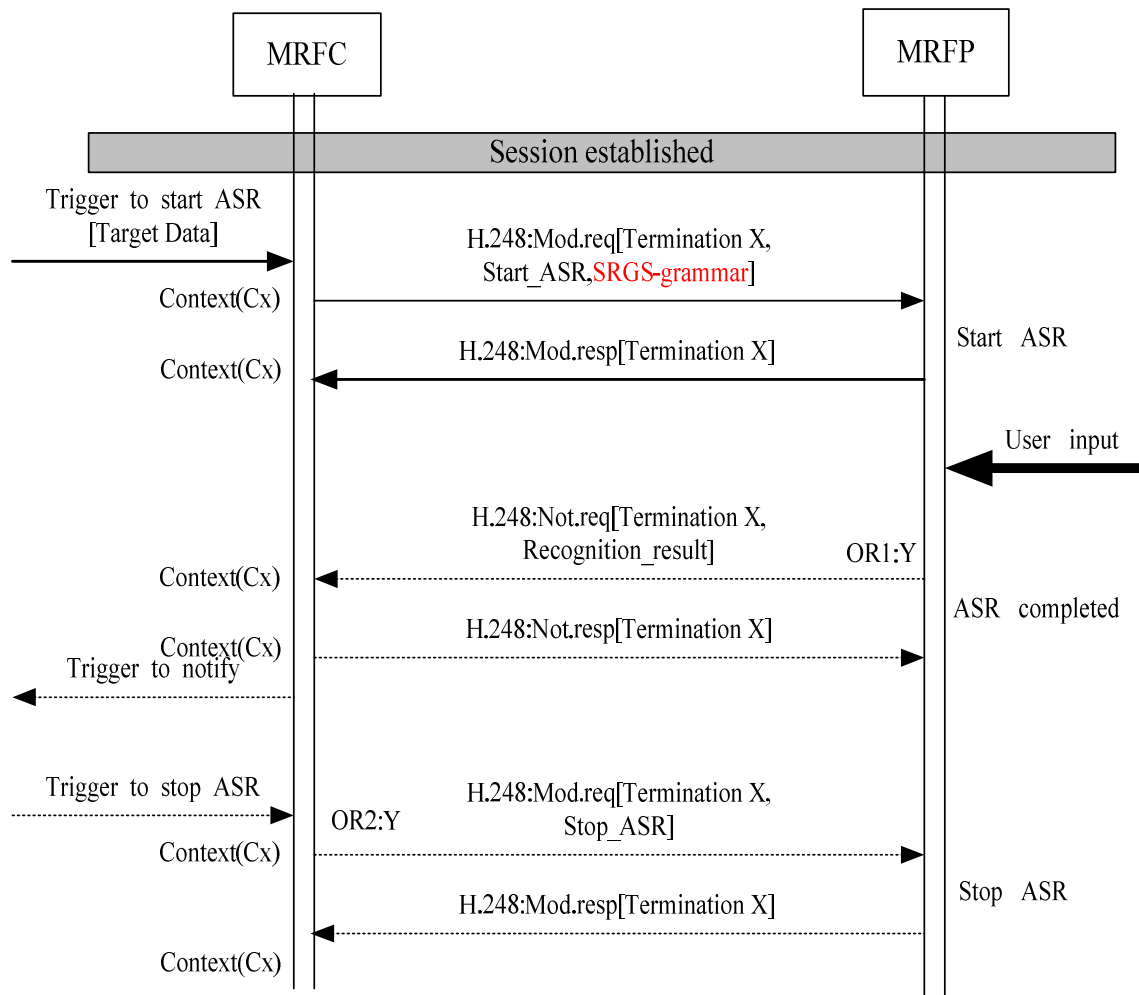
Figure 6.2.6.5.1 ASR (message sequence chart)

6.2.7 Play Multimedia Procedure

6.2.7.1 General

The following procedure assumes the IMS session has been established and the bearer is through-connected, and the MRFC has received a trigger to play multimedia, and the MRFP selected for the call has the capabilities to provide playing multimedia. The clauses 6.2.7.3- 6.2.7.6 specify the procedures to play the synchronized audio and video media stream(s). The clauses 6.2.7.aa- 6.2.7.dd describe the procedures for playing message.

NOTE: This procedure may also be ordered in combination with the session establishment procedure.

6.2.7.2 H.248 context model

The figure 6.2.7.1 shows the H.248 context model for playing multimedia. There may be up to three streams in the termination that is used for playing multimedia, which are any combination of audio, video and messaging media stream(s). The H.248 command can be processed in the termination to play multimedia and detect the playing multimedia completed event.
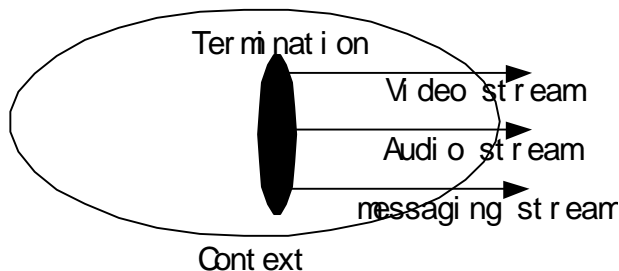
Figure 6.2.7.1: Playing Multimedia H.248 context model

6.2.7.3 Start playing multimedia

After reception of a trigger to play multimedia, the MRFC shall initiate the Start playing multimedia procedure.

If it is to play multimedia to one party, the multimedia shall be played in the external direction of the existing termination.

The MRFC shall indicate to the MRFP the multimedia identifier which may be a single identifier or list of identifiers. The MRFC may use a single identifier or separate identifiers per stream. If it is multiple identifiers, the MRFC shall request the MRFP to play all media in one request. If the identifier references a file, the file format shall be indicated. The multimedia file format is the 3GPP multimedia file format in current version. If the multimedia file provides different audio or video codec than the session codec, the MRFP shall transcode the input codec into the session codec.

The MRFC may request the MRFP to play the multimedia in a loop continuously until requested to be stopped or in a loop with a fixed number of times. For the latter case, if the fixed number of times is exhausted, the playing multimedia is completed successfully.

The MRFC may request the MRFP to detect DTMF digit while playing multimedia, and may request the MRFP to stop playing multimedia when DTMF digits is detected. For the latter case, only the multimedia completion is notified.

The MRFC may request the MRFP to detect the multimedia completion, and notify the completion event and cause to the MRFC. The play multimedia is completed when either of the following has occurred;

- the multimedia has been completed successfully,

- a DTMF digit is detected by the MRFP or:

- the playing multimedia is not successful.

6.2.7.4 Stop playing multimedia

After reception of a trigger to stop playing multimedia, the MRFC shall request the MRFP to stop playing multimedia.

6.2.7.5 Playing multimedia completed

When a playing multimedia is completed, if the MRFC has requested the MRFP to notify the playing multimedia completion, the MRFP shall notify the multimedia completion event and the cause to the MRFC. The cause of the playing multimedia completion may be the playing multimedia has been completed successfully, or a DTMF digit is detected by the MRFP, or the playing multimedia is not successful. Then the MRFC may indicate to the AS that the playing multimedia has been stopped.

6.2.7.6 Message sequence chart

Figure 6.2.7.2 shows the message sequence chart example for playing multimedia.
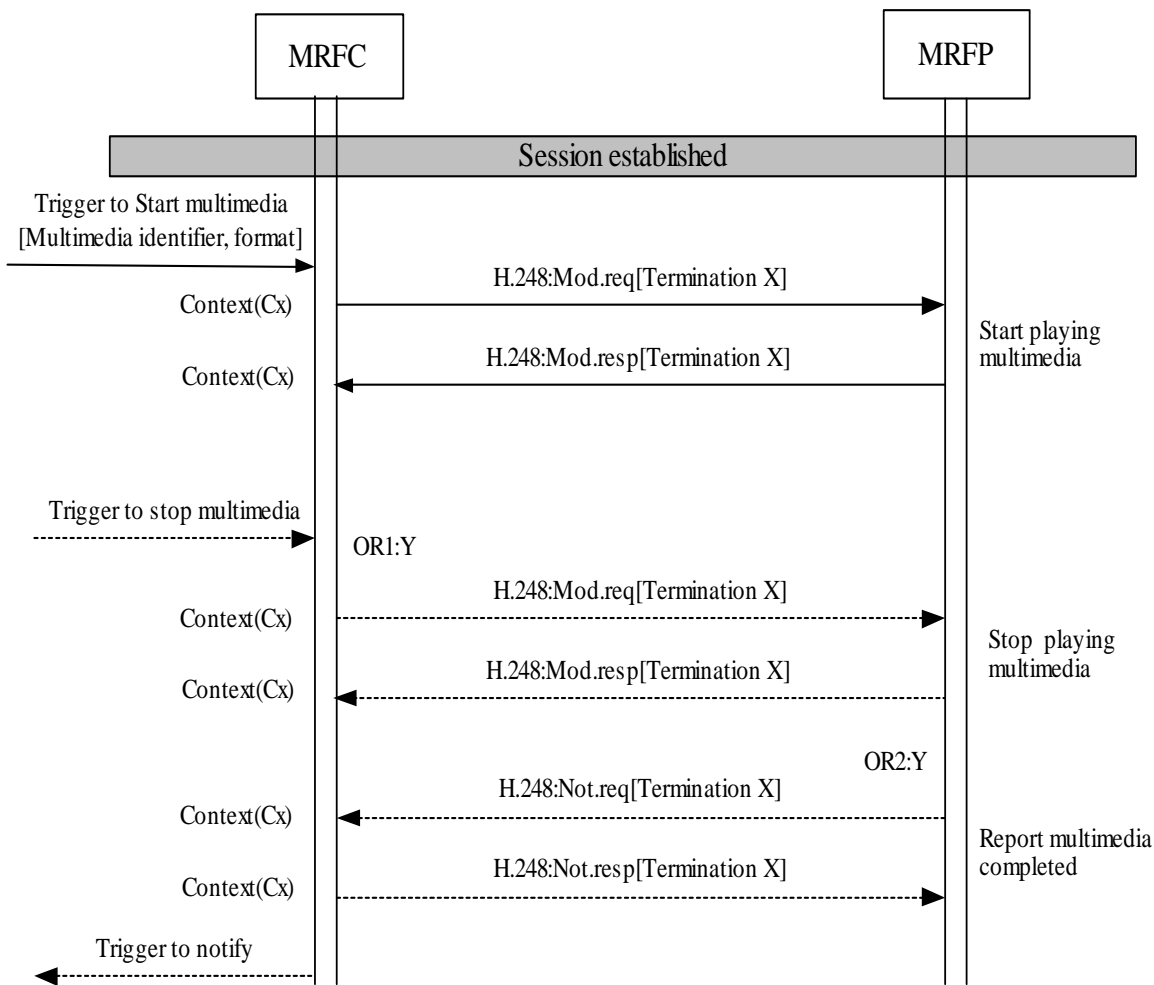
Note: OR1:Stop playing multimedia (Y:yes, N:no)

OR2:Notification of completion required(Y:yes, N:no)

Figure 6.2.7.2 Play multimedia (message sequence chart)

6.2.7.7 Start playing message

After reception of a trigger to play message, the MRFC shall initiate the Start playing message procedure.

If it is to play message to one party, the message shall be played in the external direction of the existing termination.

The MRFC shall indicate to the MRFP the message identifier which may be a single identifier or list of identifiers. The MRFC may use a single identifier or separate identifiers per stream. If it is message identifiers, the MRFC shall request the MRFP to play all media in one request. If the message references a file, the file message file formats shall comply with the file formats used inside MMS(Multimedia Messaging Service) as specified in the 3GPP TS 26.140 [22] in current version.

The MRFC may request the MRFP to notify the completion event and cause to the MRFC. The play message is completed when either of the following has occurred;

- the message has been completed successfully, or:

- the playing message is not successful.

6.2.7.8 Stop playing message

After reception of a trigger to stop playing message, the MRFC shall request the MRFP to stop playing message.

6.2.7.9 Playing message completed

When a playing message is completed, if the MRFC has requested the MRFP to notify the playing message completion, the MRFP shall notify the message completion event and the cause to the MRFC. The cause of the playing message completion may be the playing message has been completed successfully, or the playing message is not successful. Then the MRFC may indicate to the AS that the playing message has been stopped.

6.2.7.10 Message sequence chart

Figure 6.2.7.3 shows the message sequence chart example for playing message.
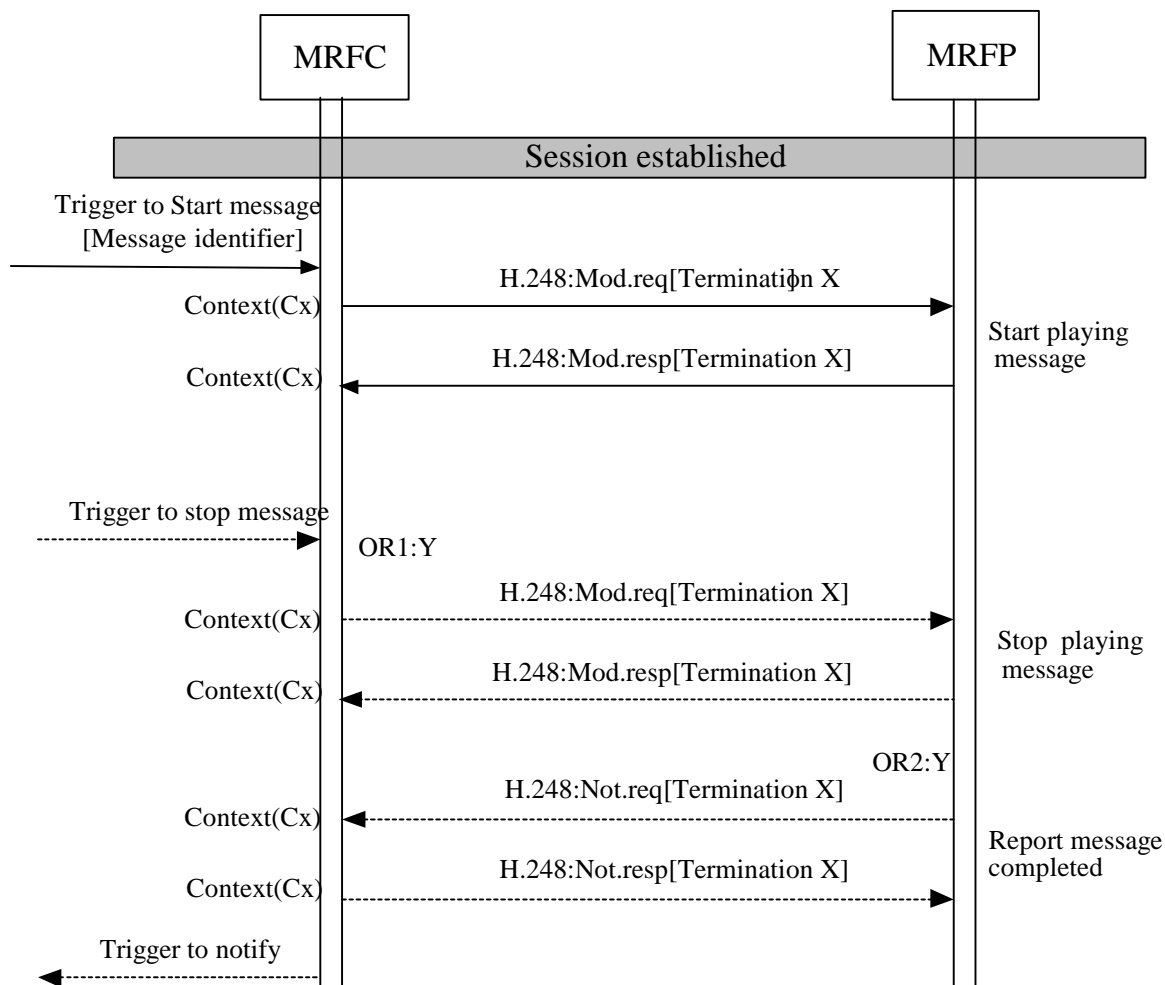
Note: OR1:Stop playing message (Y:yes, N:no)

OR2:Notification of completion required(Y:yes, N:no)

Figure 6.2.7.3 Play message (message sequence chart)

6.2.8 Multimedia Record Procedure

6.2.8.1 General

The following procedure assumes the IMS session has already been established and the bearer is through-connected, and the MRFC has received a trigger to record multimedia, and the MRFP selected for the call has the capabilities to provide multimedia record. The clauses 6.2.8.3- 6.2.8.6 specify the procedures to record the synchronized audio and video media stream(s). The clauses 6.2.8.aa- 6.2.8.dd describe the procedures for message record.

NOTE: This procedure may also be ordered in combination with the session establishment procedure.

6.2.8.2 H.248 context model

The figure 6.2.8.1 shows the H.248 context model for the multimedia record. The termination used for recording may have up to three streams, which are any combination of audio, video and messaging media stream(s). The H.248 command can be processed in the termination to record multimedia and detect the record multimedia completed event.
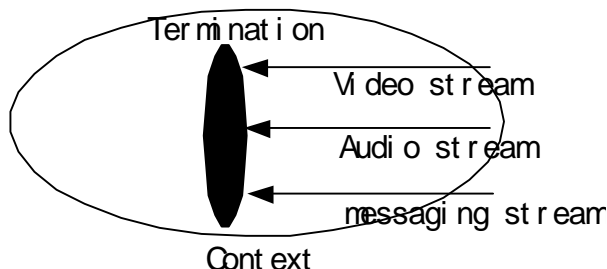
Figure 6.2.8.1: Multimedia Record Context Model

6.2.8.3 Start multimedia Record

After reception of a trigger to record multimedia, the MRFC shall initiate the Start multimedia record procedure.

If it is to record one party, only the input stream of the party is recorded. If it is to record all parties, the mixed stream of all parties is recorded.

When recording multimedia from all terminations in a context (for two-party sessions or a conference) the MRFC may request the MRFP to assign a new termination to record the multimedia in the context.

If other signals such as playing announcement are requested to be executed on the same termination as the termination to perform the recording the signals shall not override each other, e.g. the recording shall not be interrupted.

The MRFC shall indicate the record file URI and the record file format to the MRFP. The record file URI can be generated by the AS/MRFC or by the MRFP. For the second case, the MRFC shall indicate the MRFP to generate the URI and return the generated URI to the MRFC. The record file format is the 3GPP multimedia file format, defined in the 3GPP TS 26.244[5]. The MRFC may indicate the maximum record time to the MRFP, when this time has elapsed, the MRFP shall stop the multimedia recording.

The MRFC may request the MRFP to detect the multimedia recording completion, and notify the completion event and cause to the MRFC. The multimedia recording is completed when either of the following occurs;

- the maximum time period of multimedia recording has elapsed,

- a DTMF digit is detected by the MRFP where the DTMF key sequence shall stop or cancel the multimedia recording,

- DTMF digits are detected by the MRFP where the DTMF key sequence shall stop or cancel the audio recording,

- the MRFC requests the MRFP to stop the audio recording, or

- the media recording is not successful.

6.2.8.4 Stop multimedia record

After reception of a trigger to stop multimedia record, the MRFC shall request the MRFP to stop the multimedia recording. If the multimedia recording termination is added, the MRFC shall request the MRFP to subtract it.

6.2.8.5 Multimedia record Completed

When a multimedia recording is completed, if the multimedia recording is successful, the MRFP shall save the recorded content to the specified URI. If the multimedia recording is not successful, the MRFP shall discard the recorded content. If the MRFC has requested the MRFP to notify the multimedia recording completion, the MRFP shall notify the multimedia recording completion event to the MRFC. The cause of the multimedia recording completion may be that

the maximum record time has elapsed, a DTMF digit that represents to finish or cancel the multimedia recording is detected by the MRFP, or the multimedia recording is not successful. Then the MRFC may indicate to the AS that the multimedia record has been stopped.

6.2.8.6　　Message sequence chart

Figure 6.2.8.2 shows the message sequence chart example for multimedia record.
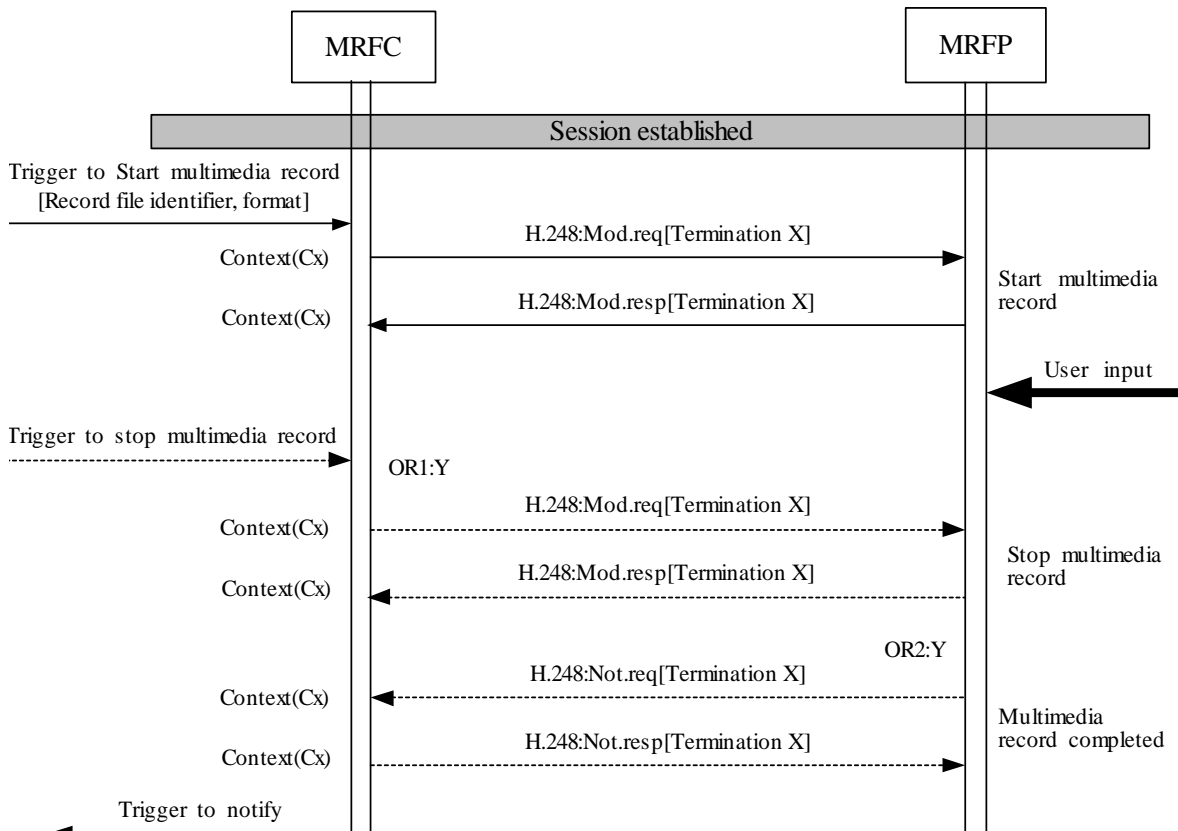
Figure 6.2.8.2 Multimedia record (message sequence chart)

6.2.8.7　　Start Message Record

After reception of a trigger to record message, the MRFC shall initiate the Start message record procedure.

If it is to record one party, only the input stream of the party is recorded. If it is to record all parties, the message streams of all parties are recorded.

When recording message from all terminations in a context (for two-party sessions or a conference) the MRFC may request the MRFP to assign a new termination to record the message in the context.

If other signals such as playing announcement are requested to be executed on the same termination as the termination to perform the recording the signals shall not override each other, e.g. the recording shall not be interrupted.

The MRFC may indicate the record file URI and the record file format to the MRFP. The record file URI can be generated by the AS/MRFC or by the MRFP. For the second case, the MRFC shall indicate the MRFP to generate the URI and return the generated URI to the MRFC. The record file formats shall comply with the file formats used inside MMS(Multimedia Messaging Service) as specified in the 3GPP TS 26.140 [22] in the current version. The MRFC may indicate the maximum record time to the MRFP, when this time has elapsed, the MRFP shall stop the message recording.

The MRFC may request the MRFP to detect the message recording completion, and notify the completion event and cause to the MRFC. The message recording is completed when either of the following occurs;

- the maximum time period of message recording has elapsed,

- the MRFC requests the MRFP to stop the recording, or

- the media recording is not successful.

6.2.8.8 Stop Message record

After reception of a trigger to stop message record, the MRFC shall request the MRFP to stop the message recording. If the message recording termination is added, the MRFC shall request the MRFP to subtract it.

6.2.8.9 Message record Completed

When a message recording is completed, if the message recording is successful, the MRFP shall save the recorded content to the specified URI. If the message recording is not successful, the MRFP shall discard the recorded content. If the MRFC has requested the MRFP to notify the message recording completion, the MRFP shall notify the message recording completion event to the MRFC. The cause of the message recording completion may be that the maximum record time has elapsed, or the message recording is not successful. Then the MRFC may indicate to the AS that the message record has been stopped.

6.2.8.10 Message sequence chart

Figure 6.2.8.10.1 shows the message sequence chart example for message record.

Note: OR1:Stop message record(Y:yes, N:no)

OR2:Notification of completion required(Y:yes, N:no)
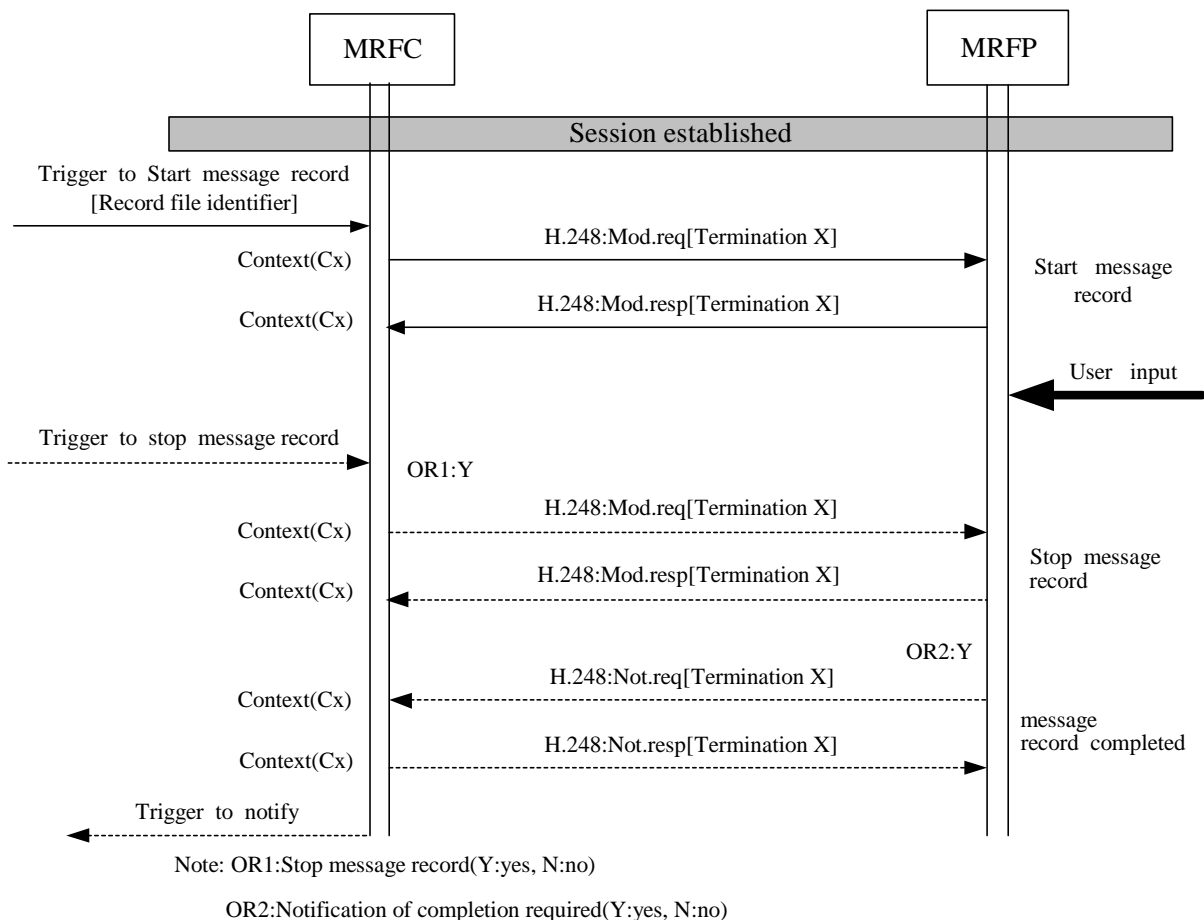
Figure 6.2.8.10.1 Message record (message sequence chart)

6.2.9 Audio Conference Procedure

6.2.9.1 Context Model

A conference consists of one context with terminations representing each user. The MRFP shall consider the context to represent an ad-hoc conference when three or more terminations have been through-connected.

6.2.9.2 Ad-hoc Conferences

6.2.9.2.1 General

An ad-hoc conference starts without any prior booking or reservation when a user initiates the conference, for further definition of ad-hoc conference, see 3GPP TS 24.147 [4]. Further participants can then be added to the conference without any prior reservation of resources, through either a method of "dial-out" where the conference calls the participant, or by a "dial-in" scenario where the end user calls the conference.

6.2.9.2.2 Create Ad-hoc Audio Conference Procedure

The MRFC receives a trigger to create an ad-hoc conference. The MRFC then initiates the "Reserve and Configure IMS Resources" procedure as specified in subclause 8.20.

The MRFC:

   Requests a new context and a new bearer termination including the Remote Connection Address.

The MRFP:

   Creates a new context

   Adds a new termination to the context and returns the Local Connection Address.

The MRFC:

   Notifies the new user about the Local Connection Address.

Figure 6.2.9.1 shows the message sequence chart example for creating conference procedure.
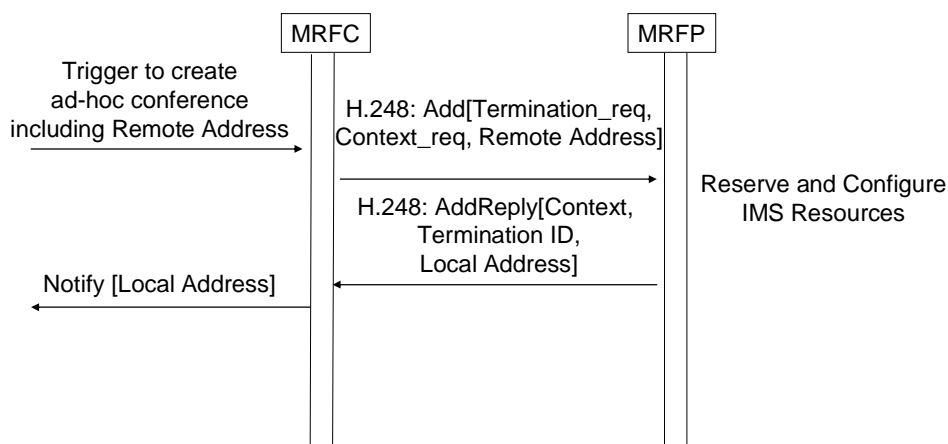
Figure 6.2.9.1 Create Ad-hoc conference

6.2.9.2.3 Closure of Audio Conference Procedure

The MRFP will in accordance with the general rules of H.248.1 delete the context when the last termination has been subtracted from the context.

6.2.9.2.4 Add Subsequent User to Conference; Dial-out

The MRFC receives a trigger to add a new bearer termination. The trigger does not contain connection address nor resources that the new participant can use. The MRFC adds a new bearer termination by initiating the "Reserve IMS Resources" procedure as specified in subclause 8.21.

The MRFC:

   Requests a bearer termination to be added to the existing context.

The MRFP:

   Adds a bearer termination to the existing context and notifies the MRFC about its reserved resources and connection address.

The MRFC:

   Sends a notification to the new user about the MRFP"s resources and connection address.

The MRFC will then receive a trigger containing the new user"s address and resources. The MRFC initiates the "Configure IMS resources" procedure as specified in subclause 8.22.

The MRFC:

   Requests that remote address and resources be configured to the termination

The MRFP:

   Modifies the termination using the received data and confirms the action

The MRFC:

   Notifies the new participant about the result

Figure 6.2.9.2 shows the message sequence chart example for dial-out procedure.
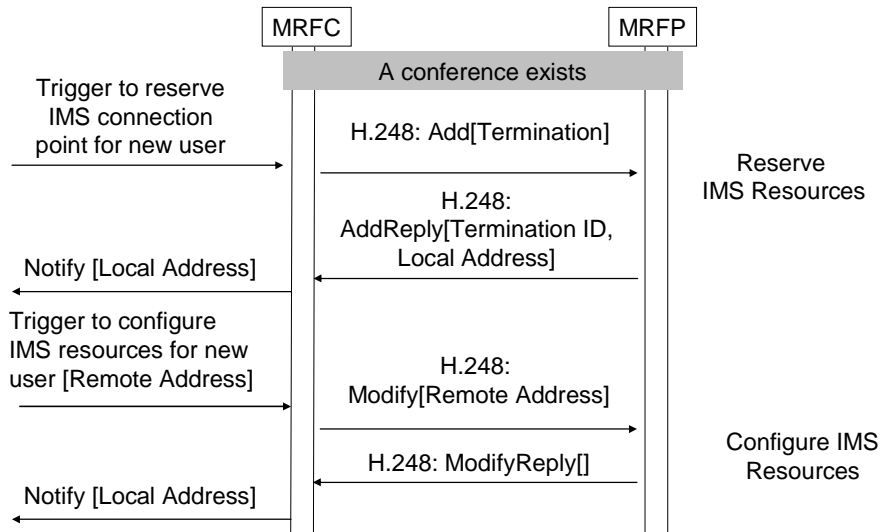
Figure 6.2.9.2 Procedure to add user in Dial-out scenario

6.2.9.2.5 Add subsequent user to conference; Dial-in

Precondition is that a conference exists. The MRFC receives a trigger to add a new user including Remote Connection Address. The MRFC then initiates the "Reserve and Configure IMS Resources" procedure as specified in subclause 8.20.

The MRFC:

Requests a new bearer termination, including the Remote Connection Address, to be added to the existing context.

The MRFP:

Adds a new termination to the existing context and returns the Local Connection Address.

The MRFC notifies the new user about the Local Connection Address.

Figure 6.2.9.3 shows the message sequence chart example for dial-in procedure.
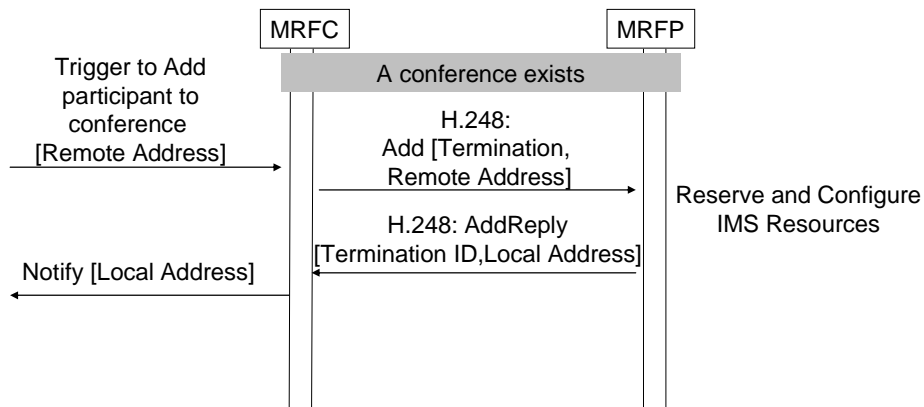
Figure 6.2.9.3 Procedure to add user in Dial-in scenario

6.2.9.2.6 Remove Conference Participant Procedure

When the MRFC receives a trigger that a user has left the conference, it initiates the "Release IMS termination" procedure as specified in subclause 8.23.

The MRFC:

Requests that the termination is released.

The MRFP:

Releases the termination and informs the MRFC about the result.

Figure 6.2.9.4 shows the message sequence chart example for removing conference participant procedure.
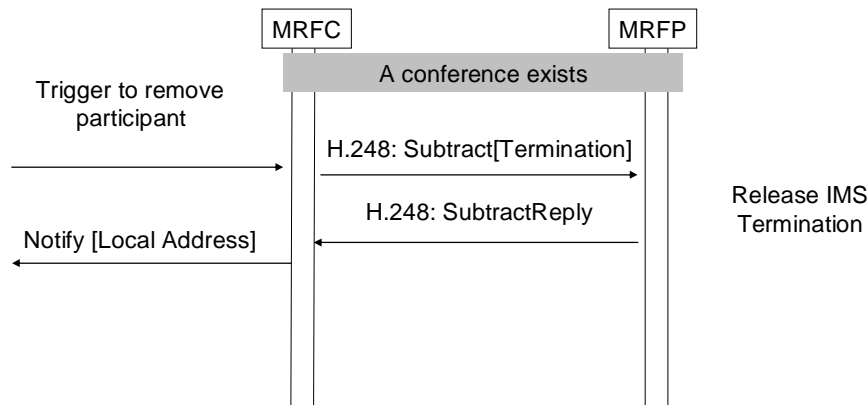
Figure 6.2.9.4 Procedure to remove conference participant

6.2.10 Multimedia Conference Procedures

6.2.10.1 Context Model

A conference consists of one context with terminations representing connections to the participants. Each termination shall support up to three streams, one for audio, one for messaging and one for video. The MRFP shall consider the context to represent an ad-hoc conference when three or more terminations have been through-connected.

It is possible for a user supporting only one media, represented by one stream, to join a conference. The user will then only participate in the part of the conference that is using the supported stream.

6.2.10.2 Ad-hoc Conferences

6.2.10.2.1 General

An ad-hoc conference starts without any prior booking or reservation when a user initiates the conference, for further definition of ad-hoc conference, see 3GPP TS 24.147 [4]. Further participants can then be added to the conference without any prior reservation of resources, through either a method of "dial-out" where the conference calls the participant, or by a "dial-in" scenario where the end user calls the conference.

6.2.10.2.2 Create Ad-hoc Multimedia Conference Procedure

The MRFC receives a trigger to create an ad-hoc conference. The MRFC then initiates the "Reserve and Configure IMS Resources" procedure as specified in subclause 8.20, where the connection address and resources shall have multiple values for speech, messaging and video.

The MRFC:

   Requests a new context and a new bearer termination including the Remote Connection Addresses.

The MRFP:

   Creates a new context

   Adds a new termination to the context and returns the Local Connection Address.

The MRFC:

> Notifies the new user about the Local Connection Address.

Figure 6.2.10.1 shows the message sequence chart example for creating multimedia conference procedure.
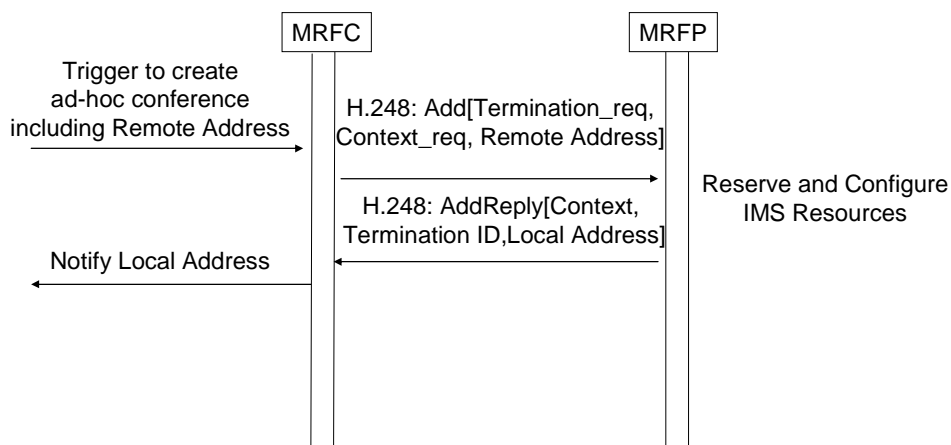
Figure 6.2.10.1 Create Ad-hoc conference

6.2.10.2.3 Closure of Multimedia Conference Procedure

The MRFP will in accordance with the general rules of H.248.1 delete the context when the last termination has been subtracted from the context..

6.2.10.2.4 Add Subsequent User to Conference; Dial-out

Precondition for this procedure is that a conference exists. The MRFC receives a trigger to add a new bearer termination. The trigger does not contain connection address nor resources that the new participant can use. The MRFC adds a new bearer termination by initiating the "Reserve IMS Resources" procedure as specified in subclause 8.21 where the connection address and resources may have multiple values for speech, messaging and video.

The MRFC:

> Requests a bearer termination to be added to the existing context.

The MRFP:

> Adds a bearer termination to the existing context and notifies the MRFC about its reserved resources and connection address.

The MRFC:

> Sends a notification to the new user about the MRFP"s resources and connection address.

The MRFC will then receive a trigger containing the new user"s address and resources. The MRFC initiates the "Configure IMS resources" procedure as specified in subclause 8.22 where the connection address and resources may have multiple values for speech, messaging and video.

The MRFC:

Requests that remote address and resources be configured to the termination

The MRFP:

Modifies the termination using the received data and confirms the action

The MRFC:

Notifies the new participant about the result

Figure 6.2.10.2 shows the message sequence chart example for dial-out procedure of multimedia conference.
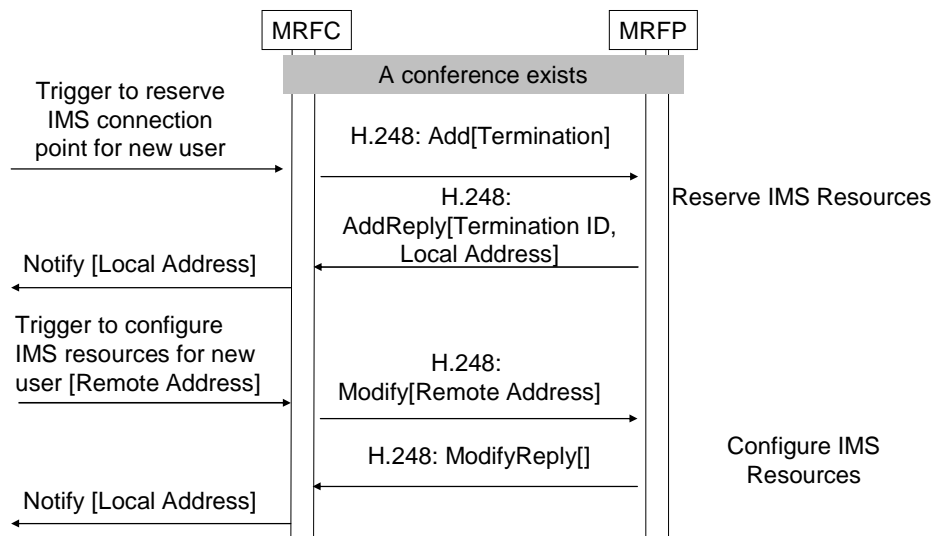
Figure 6.2.10.2 Procedure to add user in Dial-out scenario

6.2.10.2.5 Add subsequent user to conference; Dial-in

Precondition is that a conference exists. The MRFC receives a trigger to add a new user including Remote Connection Address. The MRFC then initiates the "Reserve and Configure IMS Resources" procedure as specified in subclause 8.20 where the connection address and resources may have multiple values for speech, messaging and video.

The MRFC:

Requests a new bearer termination, including the Remote Connection Address, to be added to the existing context.

The MRFP:

Adds a new termination to the existing context and returns the Local Connection Address.

The MRFC notifies the new user about the Local Connection Address.

Figure 6.2.10.3 shows the message sequence chart example for dial-in procedure of multimedia conference.
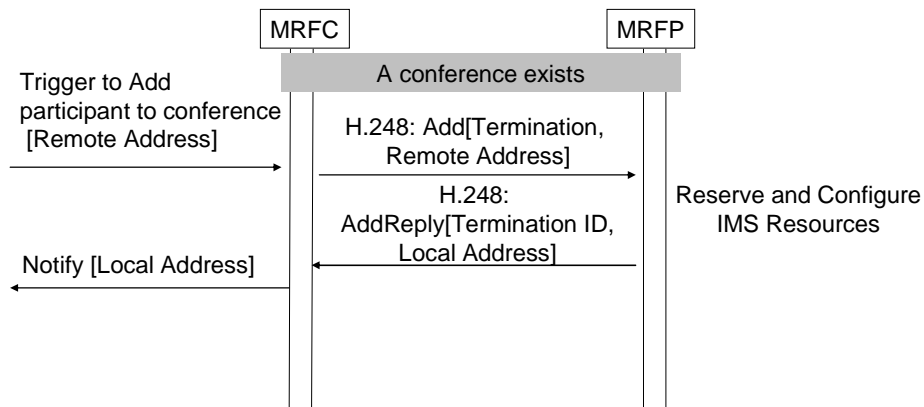
Figure 6.2.10.3 Procedure to add user in Dial-in scenario

6.2.10.2.6 Remove Conference Participant Procedure

When the MRFC receives a trigger that a user has left the conference, it initiates the "Release IMS termination" procedure as specified in subclause 8.23.

The MRFC:

Requests that the termination is released.

The MRFP:

Releases the termination and informs the MRFC about the result.

Figure 6.2.10.4 shows the message sequence chart example for removing multimedia conference participant procedure.
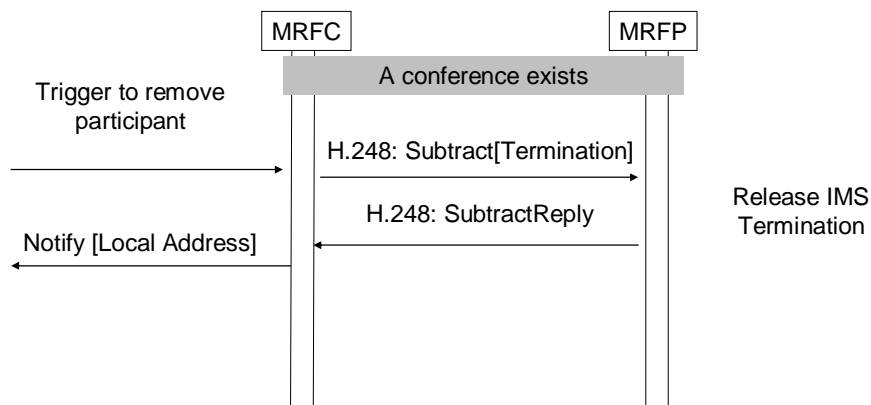
Figure 6.2.10.4 Procedure to remove conference participant

6.2.10.3   Message Conferencing

The procedures specified in clauses 6.2.10.1- 6.2.10.6 for "General Multimedia Conferencing" shall be followed. The following clauses describe the additional requirements for the message conferencing.

6.2.10.3.1   General

For message conferencing, the Message Session Relay Protocol (MSRP) (see IETF RFC 4975 [18]) shall be used to transport messages. The message content may carry different media including text, image, video and audio. The Media types shall be MIME encoded. The TCP connection that the MSRP runs over shall be established when adding a new participant into the conference by including the SDP attribute for MSRP/TCP. In order to manage the message conferencing, the following features may be supported:

   - Message statistics.

   - Message filtering.

6.2.10.3.2   Messages Statistics

The MRFP may report the statistics for the number of messages sent and/or received in two ways described as following.

   1. The MRFC indicates quotas granted to the MRFP. The granted quotas indicate the units specifying the number of messages or volume of messages allowed to be received or sent by users. The MRFC may also indicate to the MRFP a valid time together with the granted quotas. The valid time indicates the time until the specific unit may be measured, after which the quota shall be reported, whether or not it has reached its granted quota. The MRFC initiates this via the "Configure Granted Quota" procedure as specified in subclause 8.50. The quotas granted by MRFC may include any of the following:

   - Quota for number of messages sent

   - Quota for number of messages received

   - Quota for volume (size) of messages sent

   - Quota for volume (size) of messages received

When the quota granted is reached or the valid time elapses the MRFP shall report statistics information of messages according to the indication by the MRFC. The MRFP uses the "Report Message Statistics" procedure as specified in subclause 8.51 to report the statistics of messages. The statstistics of messages sent and/or received may include any of the following:

- number of messages sent

- number of messages received

- volume (size) of messages sent

- volume (size) of messages received

- reason for report i.e. quota reached or granted time elapsed

- 2. The MRFC requests the MRFP to report the statistics information of messages sent and/or received at the end of the session or during the session. In this case, the quotas or the valid time is not required, and the MRFP should report the statistics of message as requested by the MRFC. The statstistics of messages are the same as described above.

Figure 6.2.10.3.2.1 shows the message sequence chart example for reporting message statistics.
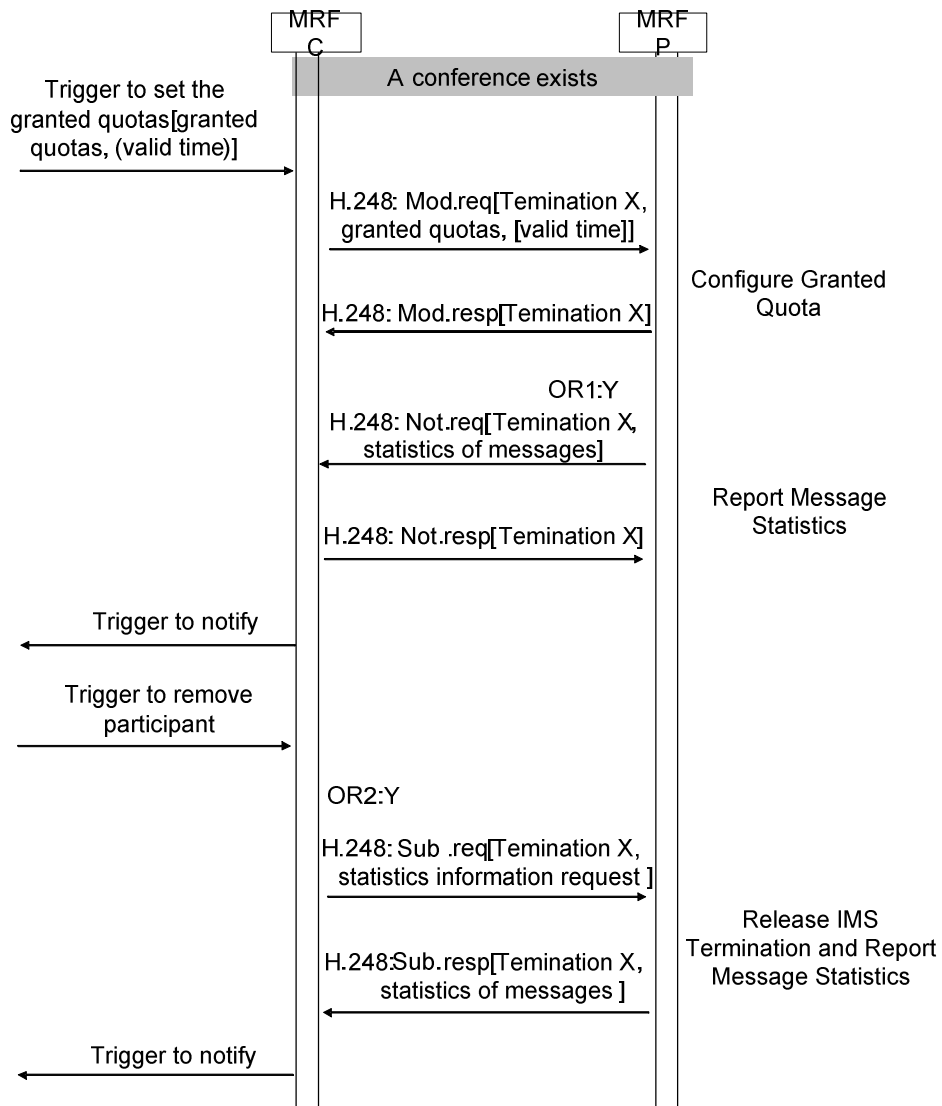
Note: OR1: granted quotas reached or valid time elapses. (Y:yes, N:no)
OR2: remove the subscriber. (Y:yes, N:no)

Figure 6.2.10.3.2.1 Message statistics according to the granted quota

6.2.10.3.3 Message Filtering

When the MRFC receives the trigger to config the filtering rules, the MRFC may initiate the "Configure Filtering Rules" procedure as specified in subclause 8.52 to set filtering rules in the MRFP. The filtering rule is composed of two parts: the criteria and the treatment of the filtered message. The MRFP should handle messages according to the filtering rules.

The MRFC may indicate to the MRFP the following criterias:

Sender address

Message size

Message content type (e.g. video, audio)

Message content format(e.g. mpeg, jpeg)

Message subject

The MRFC may indicate to the MRFP the following message treatments:

Block the delivery of the message content

Store the message content

Redirect the message to another address

The MRFC may indicate to the MRFP the "store url" when messages storage is needed, or the MRFC may indicate the MRFP to allocate the "store url" and return the generated "store url" to the MRFC.

The MRFC may indicate to the MRFP the "redirect url" when messages redirection is needed.

Figure 6.2.10.3.3.1 shows the message sequence chart example to config the filtering rules.
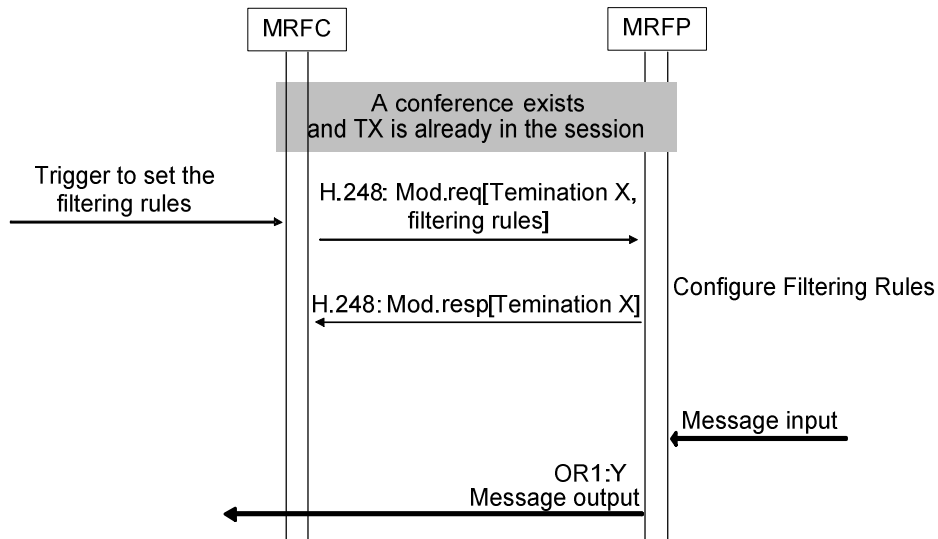
Note: OR1: The message is not filtered according to the filtering rules. (Y:yes, N:no)

Figure 6.2.10.3.3.1 Configure the filtering rules

6.2.11   Audio Transcoding Procedure

As transcoding is considered a basic feature of a MRFP, the MRFC does not explicitly request transcoding.   It is expected that the MRFP determines when transcoding is applied, for example, when the MRFC specifies the audio codec to be applied for a given stream in a context, if there are any other audio terminations in the context and the stream modes permit data flow between these terminations and where the source encodings are not compatible then the MRFP transcodes the stream between these terminations.

6.2.12   Video Transcoding Procedure

As transcoding is considered a basic feature of an MRFP the MRFC does not explicitly request transcoding. It is expected that the MRFP determines when transcoding is applied, for example, when the MRFC specifies the video codec to be applied for a given stream in a context, if there are any other terminations supporting video in the context and the stream modes permit data flow between these terminations and where the source encodings are not compatible then the MRFP transcodes the stream between these terminations.

6.2.13   Floor Control

6.2.13.1   General

Floor control offers control of shared conference resources at the MRFP(s). Floor control protocol (BFCP) is used to convey the Floor control messages between the Floor Chair of the conference, the Floor Control Server, and the Floor Participants of the conference. All Floor control messages go via the Floor Control Server. Processing (granting or

rejecting) Floor control requests is done by the one or more Floor chairs or by the FCS itself, depending on the Floor Control Policy.

The location of the Floor Control Server may be in either the MRFC or the MRFP depending on the complexity/distribution of the conference. However when located in the MRFP, the MRFP shall forward the Floor request decision to the MRFC in order to execute the changes to the Floor Participant's granted permissions.

6.2.13.2 Floor Control within the MRFP

6.2.13.2.1 Floor Control Connection Establishment

The set of data to establish a BFCP connection shall be exchanged in accordance with IETF RFC 4583 [21]. A Floor control connection, which requires a BFCP/TCP protocol termination property, shall be established between the UE and the Floor Control Server, located in the MRFP. The MRFC shall initiate the "Configure BFCP Termination" procedure as specified in clause 8.44 to indicate to the MRFP the remote Floor control Client connection address and request the local Floor control Client connection address. The MRFP shall return the local Floor control Client connection address to the MRFC. The Floor control connection may be initiated by the UE or the MRFP (FCS).

- It is a prerequisite that the conference is configured using "Configure Conference for Floor Control" procedure as described in clause 6.2.13.2.2, which is used to set the common data of the conference for Floor control.

The combined sequence is shown in Figure 6.2.13.2.1.1
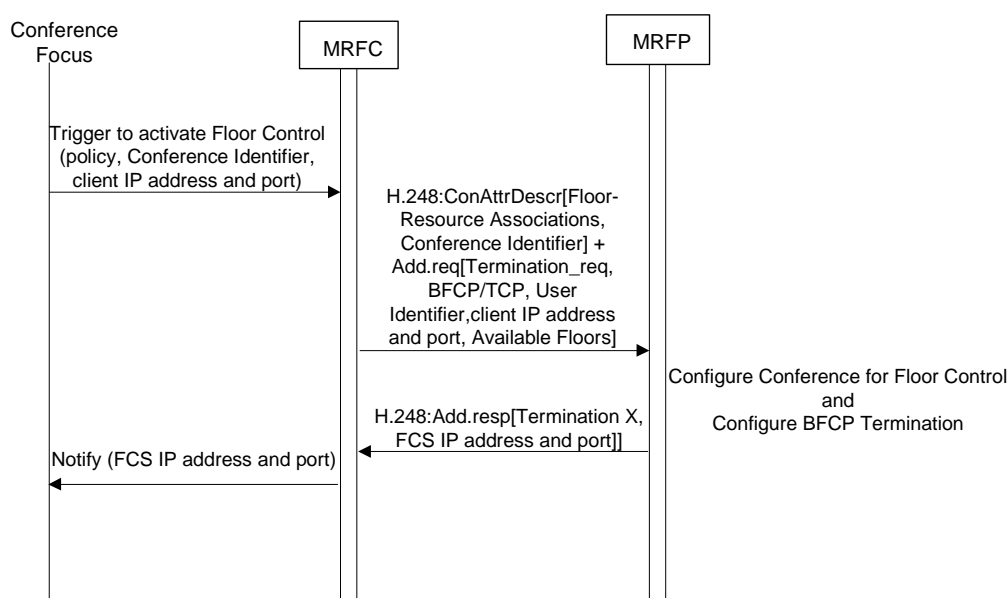
Figure 6.2.13.2.1.1: Combined procedures to Configure Conference and add a Floor Control Termination

6.2.13.2.2 Configure Conference and Floor Control Policy Indication

The "Configure Conference For Floor Control" procedure, specified in Clause 8.45 shall be used to set up a conference and to modify FCS properties such as the Floor Control Policy. The procedure defines common data for all BFCP users, these properties are defined on Context level.

The common data include:

- Floor-Resource Associations, which indicates the correlation between Floor ID and media properties for the MRFP to identify the Floor(s) when receiving BFCP requests and notifying the MRFC of decisions to change the floor permissions for a given user (termination).

- Conference Identifier, which indicates the Conference Identifier for the BFCP client to identify the conference when sending BFCP requests.

Floor Control Policy. This consists of:

- The Floor control algorithm to be used in granting the Floor, either:

    - The FCFS algorithm or

    - The chair-controlled algorithm.

    - The maximum number of users who can hold the Floor at the same time.

Figure 6.2.13.2.2.1 shows the message sequence chart example for configuring a conference for Floor control.
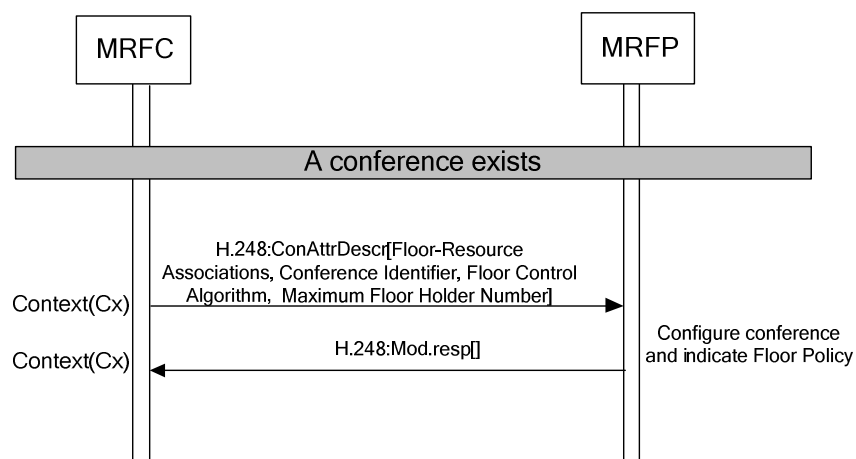
Figure 6.2.13.2.2.1 Procedure to Configure Conference for Floor Control

6.2.13.2.3 Floor Chair Designation

If the Floor Control Policy indicates that the conference is Chair-controlled, the MRFC shall indicate to the MRFP which termination represents the Floor Chair and which Floor(s) the Floor Chair controls using the "Designate Floor Chair" procedure as specified in clause 8.46.

The MRFC may also change the Floor Chair as needed using the "Designate Floor Chair" procedure as specified in clause 8.46.

   NOTE: There may be one or more Floor Chairs in a conference. But one media stream can be controlled by only one chair.

It is a prerequisite that the conference is configured and the termination configured for BFCP using "Configure Conference for Floor Control" and "Configure BFCP Termination" procedures respectively.

   NOTE: These procedures may be requested at same time.

Figure 6.2.13.2.3.1 shows the message sequence chart example for designating Floor Chair.
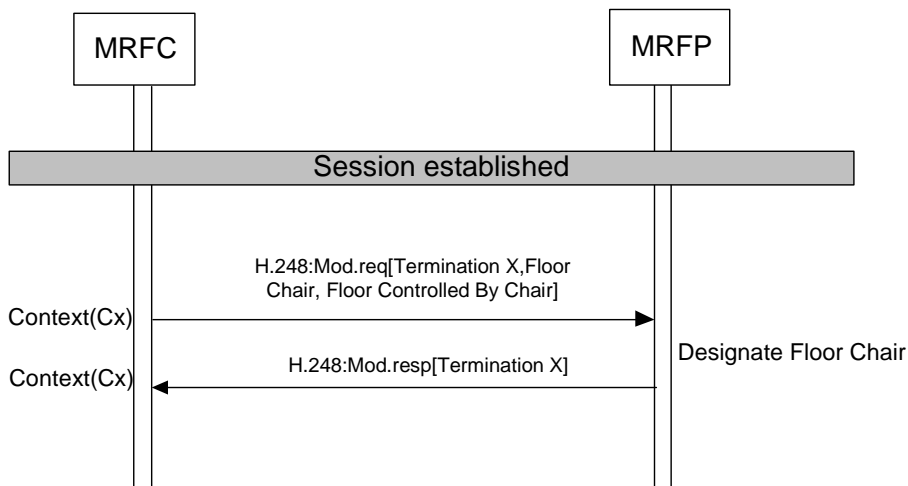
Figure 6.2.13.2.3.1 Procedure to designate Floor Chair

6.2.13.2.4 Floor Request Decision

The MRFC shall request the MRFP to notify the decision of Floor request using the "Floor Decision Request" procedure as specified in clause 8.47. The MRFP shall then notify the MRFC the outcome of the Floor Request, when the FCS has made the decision to change the status to "Granted", " Released " or " Revoked " (The status is defined as REQUEST-STATUS in IETF RFC 4582[20]), using the "Report Floor Status Decision" procedure as specified in clause 8.48.

The Floor Request Decision information is used by the MRFC to decide how to set the media properties of the associated Termination/Stream on the MRFP.

The MRFP shall indicate the Floor Identity or Identities to which the Floor decision is associated. The MRFP sends one notification per Floor decision for a given termination and only one notification per termination shall be outstanding at any time.

Figure 6.2.13.2.4.1 shows the message sequence chart example for requesting and reporting Floor Request decisions.
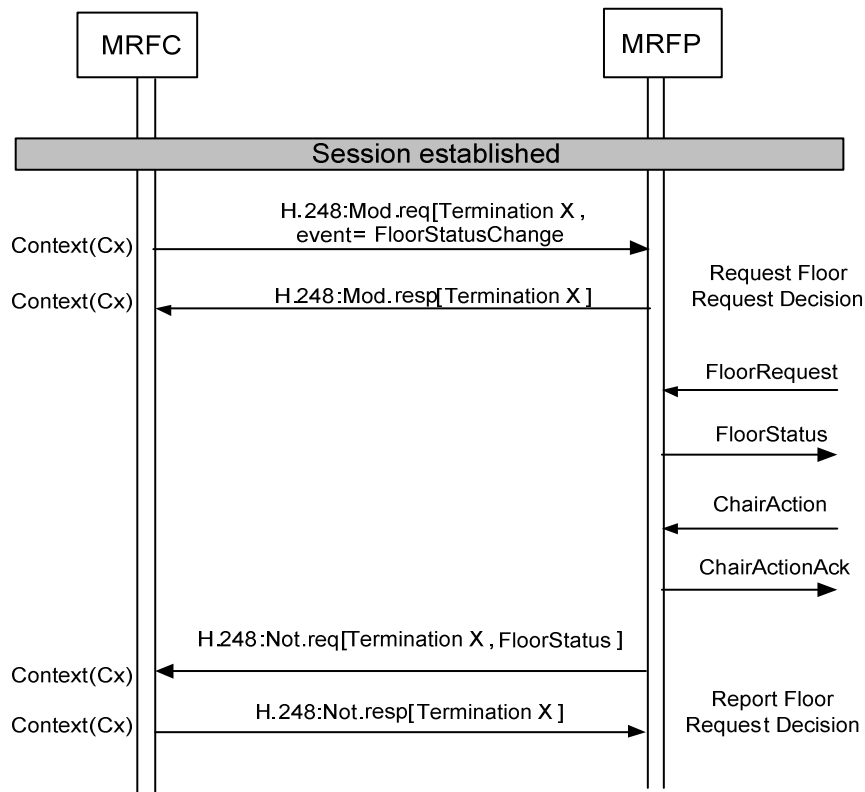
Figure 6.2.13.2.4.1 Procedure to request and report Floor Request decisions

6.2.13.2.5 Media Update and Confirmation

The MRFC modifies media properties associated with the Floor Request Decision received from the MRFP using the "Modify Media" procedure defined in Clause 8.59; this will be either adding permissions if the "status" was granted or removing the permissions if the "status" was revoked or released. The MRFC shall indicate to the MRFP when it has successfully modified the media properties based on the provided Floor Request Decisions notification using the "Confirm Media Update " procedure as specified in clause 8.49. The MRFP shall then modify the Floor status of the associated Client.

Figure 6.2.13.2.5.1 shows the message sequence chart example for modifying the media and confirming media update based on Floor Request status.
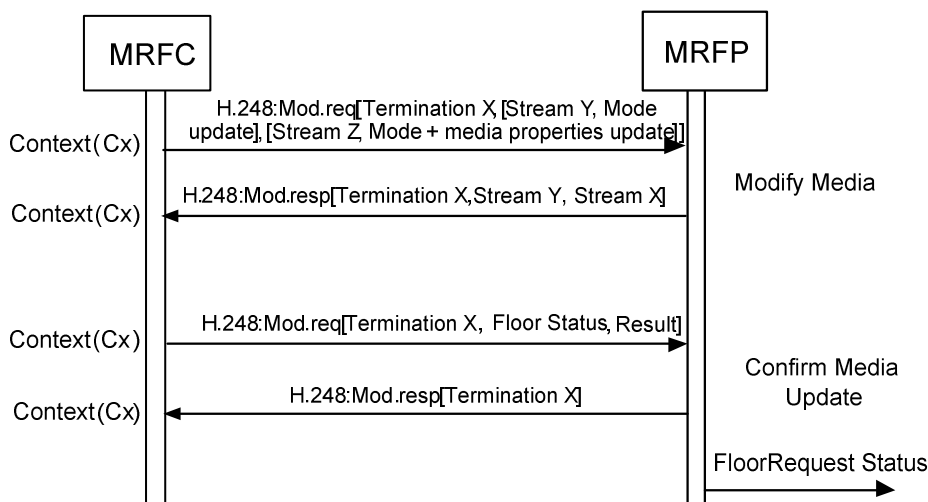
Figure 6.2.13.2.5.1 Procedures to modify the media and confirm media update

6.2.13.2.6 Floor Control Procedure

A Floor Participant may request one or more Floors by sending a BFCP request message to the MRFP (FCS).

The MRFP (FCS) informs the Floor Chair, if present, about a Floor Participant's Floor request via BFCP.

The Floor Chair sends to the MRFP (FCS) the decision to the Floor Participant's Floor requests. If the Floor is not Chair-controlled, the FCS located in the MRFP shall make the decision itself according to the Floor Control Algorithm.

The MRFP shall notify the MRFC the Floor change request decision via the "Report Floor Request Decision" procedure described in Clause 6.2.13.2.4.

The MRFC requests the MRFP to modify the media properties associated with the Floor Request decision as described in Clause 6.2.13.2.5.

The MRFC informs the MRFP that the requested media changes to satisfy the new Floor permissions have been completed using the "Confirm Media Update" procedure, see Clause 8.49.

The MRFC may request the MRFP to play tones or announcements for indicating when a user gains or loses Floor permissions.

6.2.13.2.7 Floor Control Connection Release

When the MRFC receives an indication that the Floor control connection is to be closed, the MRFC shall command the MRFP to release the Floor control connections.

The Floor control connection shall also be released by the MRFP when the termination for that connection is removed.

The Floor related BFCP signalling resources are released by the MRFP when the Floor control connection is released.

If a Floor Participant owns a Floor when releasing the Floor control connection, the MRFP(FCS) shall revoke the Floor permission.

6.2.13.2.8 Example Message sequence chart

Figure 6.2.13.1 shows the message sequence chart example for Floor control on a termination which is not the Floor Chair.

```
        MRFC                                      MRFP

┌──────────────────────────────────────────────────────────────┐
│                    Conference created                          │
└──────────────────────────────────────────────────────────────┘

                H.248:ConAttrDescr [Floor-Resource
                Associations , Conference Identifier  , Floor
                Control Algorithm  , Maximum Floor Holder
                Number] + Add .req [Termination _req , BFCP/
                TCP, User Identifier ,client IP address and port ,
                          Available Floors ]
Context (Cx)    ─────────────────────────────────────────►        Configure Conference for
                  H.248:Add.resp [Termination X , FCS IP               Floor Control and
Context (Cx)    ◄───────── address and port ]]                    Configure BFCP Termination


                  H.248 :Mod .req [Termination X ,Floor
                   Chair , Floor Controlled By Chair   ]
Context(Cx)     ─────────────────────────────────────────►
                                                                   Designate Floor
                    H.248 :Mod.resp[Termination X ]                      Chair
Context(Cx)     ◄─────────────────────────────────────────


                   H.248:Mod .req[Termination X ,
                     event= FloorStatusChange
Context (Cx)    ─────────────────────────────────────────►
                                                                   Request Floor
                   H.248:Mod .resp [Termination X ]               Request  Decision
Context (Cx)    ◄─────────────────────────────────────────


                                                        FloorRequest
                                            ◄─────────────────────────

                                                         FloorStatus
                                            ─────────────────────────►

                                                        ChairAction
                                            ◄─────────────────────────

                                                       ChairActionAck
                                            ─────────────────────────►


                  H .248:Not.req[Termination X  , FloorStatus ]
Context (Cx)    ◄─────────────────────────────────────────
                                                                   Report Floor
                    H.248:Not .resp[Termination X  ]              Request  Decision
Context (Cx)    ─────────────────────────────────────────►


                H.248:Mod .req [Termination X ,Stream Y , Mode + media
                          properties update ]
Context(Cx)     ─────────────────────────────────────────►
                                                                   Modify Media
                  H.248:Mod.resp[Termination X ,Stream Y]
Context( Cx)    ◄─────────────────────────────────────────


                H.248:Mod.req[Termination X  ,  FloorStatus , Result]
Context(Cx)     ─────────────────────────────────────────►
                                                                 Confirm Media Update
                    H.248:Mod .resp [Termination X ]
Context(Cx)     ◄─────────────────────────────────────────
                                                                  FloorRequest Status
```

ETSI

Figure 6.2.13.1 Floor control (message sequence chart)

6.2.14   Explicit Congestion Notification Support

6.2.14.1   General

If the MRFC receives a SDP Offer containing ECN negotiation, see IETF draft-ietf-avtcore-ecn-for-rtp [25], and the MRFC and MRFP support ECN and at least some of the initialisation methods offered within the "a=ecn-capable-rtp" attribute,

 NOTE: Only the "leap" initialisation method is supported over the Mp interface in this release.

the MRFC shall

- act as an end point for ECN;

- return a SDP Answer according to 3GPP TS 26.114 [23] and the capabilities of the MRFP, containing the "a=ecn-capable-rtp" attribute; and

- indicate to the MRFP that it shall apply the ECN procedures (according to 3GPP TS 26.114 [23]) and act as an ECT endpoint.

 NOTE: ECN XR summary reports and RTCP AVPF ECN feedback message are not supported in this release.

When creating the SDP Offer the MRFC may initiate ECN negotiation (in accordance with 3GPP TS 26.114 [23]), indicating the capabilities of the MRFP.

If the MRFC receives the SDP Answer also containing ECN attributes (indicating successful ECN negotiation) then it shall indicate to the MRFP that it shall apply the ECN procedures (according to 3GPP TS 26.114 [23]) and act as an ECT endpoint.

The following ECN parameters are preconfigured in the MRFP:

- Initialisation = "leap";

- Mode = "setread";

- ECT Marking   = ECT-0;

- Feedback is via Application Specific Adaptation Requests (i.e. Receiver Driven Congestion Control).

The MRFP should not send RTCP XR ECN summary reports.

The procedure to configure the MRFP for ECN may be combined with any other procedure requesting media resource from the MRFP.

6.2.14.2   Message sequence chart, Request ECN

Figure 6.2.14.2.1 shows the message sequence chart example for requesting Explicit Congestion Notification.
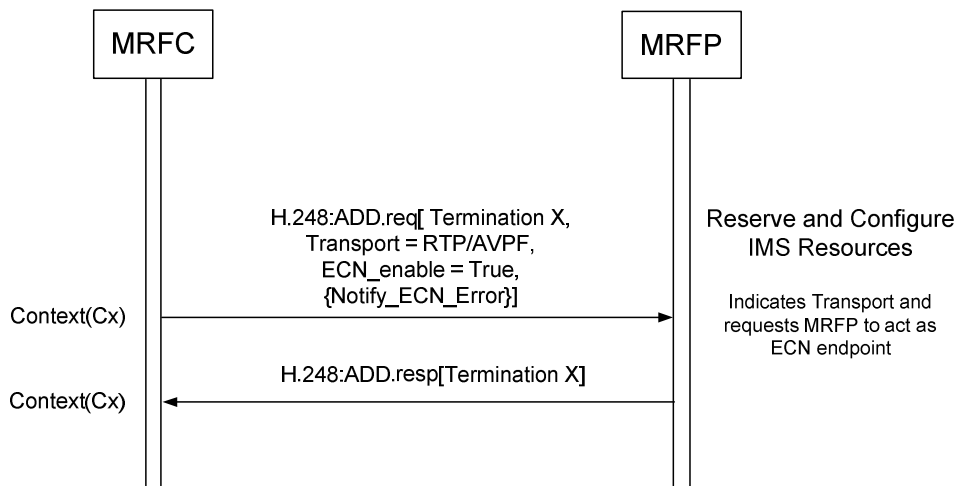
Figure 6.2.14.2.1: Procedure to Request ECN

Upon receipt of a request to apply Explicit Congestion Notification the MRFP shall set the ECN field of the IP header in accordance with 3GPP TS 26.114 [23] when sending any data packets.

Upon receipt of any IP headers indicating Congestion Experienced (ECN-CE) the MRFP shall trigger rate adaptation in accordance with 3GPP TS 26.114 [23].

6.2.14.3 Message sequence chart, Report ECN Failure Event

Figure 6.2.14.3.1 shows the message sequence chart example for ECN Failure Event.
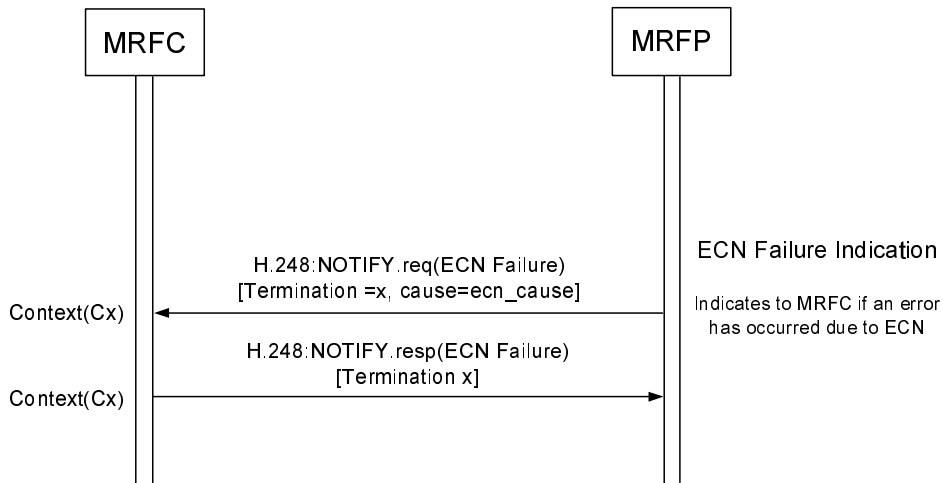
Figure 6.2.14.3.1: Procedure to Report ECN Failure

When the MRFC receives a Notification indicating that an error has occurred it may trigger a new SDP offer to remove ECN.

7 Charging

The charging is specified in 3GPP TS 32.260[14]; no requirements are identified for the Mp interface.

8 Messages/Procedures and contents

8.1 General

This clause describes logical signalling procedures between the MRFC and MRFP. The procedures within this clause are intended to be implemented using the standard H.248 procedure as defined in ITU recommendation H.248.1 [3] with appropriate parameter combinations.

8.2 Send tone

This procedure is used to send a tone.

Table 8.2.1: Procedures between MRFC and MRFP: Send Tone

Procedure	Initiated	Information element name	Information element required	Information element description
Send Tone MRFC		Context	M	This information element indicates the context for the bearer termination.
		Bearer Termination/Bearer Termination Request	M	This information element indicates the existing bearer termination or requests a new bearer termination where the tone is sent.
		Tone	M	This information element indicates the tone to be generated.
		Notify Tone Completion	O	This information element requests a notification of a completed tone.
		Tone Direction	O	This information element indicates the tone direction in the bearer termination.
		Tone Timing	O	This information element indicates the time for the tone.
		DTMF trigger	O	This information element indicates the MRFP to detect the DTMF and the MRFP should stop the tone when a DTMF digit is detected.
		Notify termination heartbeat	C	This information element requests termination heartbeat indications. This information element shall be included when requesting a new bearer termination.
Send Tone Ack	MRFP	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the bearer termination where the command was executed.

NOTE   This procedure may be combined with other procedures such as to ADD bearer connections.

8.3 Stop tone

This procedure is used to stop the tone.

Table 8.3.1: Procedures between MRFC and MRFP: Stop Tone

Procedure	Initiated	Information element name	Information element required	Information element description
Stop Tone	MRFC	Context	M	This information element indicates the context for the bearer termination.
		Bearer Termination	M	This information element indicates the bearer termination where the tone is stopped.
		Stop Tone	M	This information element requests that tone generation is stopped.
Stop Tone Ack	MRFP	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the bearer termination where the command was executed.

8.4 Tone completed

This procedure is used to notify the completed tone.

Table 8.4.1: Procedures between MRFC and MRFP: Tone Completed

Procedure	Initiated	Information element name	Information element required	Information element description
Tone Completed	MRFP	Context	M	This information element indicates the context for the bearer termination.
		Bearer Termination	M	This information element indicates the bearer termination where the tone was completed.
		Tone Completed	M	This information element indicates completion of the tone.
		Cause	M	This information element indicates the cause of tone completion.
Tone Completed Ack	MRFC	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the Bearer Termination where the command was executed.

8.5 Start announcement

This procedure is used to request to start announcement.

Table 8.5.1: Procedures between MRFC and MRFP: Start announcement

Procedure	Initiated	Information element name	Information element required	Information element description
Start announcement	MRFC	Context	M	This information element indicates the context for the bearer termination.
		Bearer Termination/Bearer Termination Request	M	This information element indicates the existing bearer termination or requests a new bearer termination where the announcement is sent.

		Announcement identifier	M	This information element indicates the announcement or announcement list to be played.
		Audio file format	O	This information element indicates the audio file type, such as the 3GPP file type.
		Direction	O	This information element indicates the announcement direction in the bearer termination.
		Iterations	O	This information element indicates the number of times the announcement shall be played
		Variable List	O	This information element indicates the variable or variable list to be played.
		Notify Announcement Completed	O	This information element requests a notification of a completed announcement.
		DTMF stop announcement	O	This information element indicates whether the MRFP should stop the announcement when a DTMF digit is detected.
		Notify termination heartbeat	C	This information element requests termination heartbeat indications. This information element shall be included when requesting a new bearer termination.
Start announcement Ack	MRFP	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the bearer termination where the command was executed.

NOTE   This procedure may be combined with other procedures such as to ADD bearer connections.

8.6   Stop Announcement

This procedure is used to stop the announcement.

Table 8.6.1: Procedures between MRFC and MRFP: Stop Announcement

Procedure	Initiated	Information element name	Information element required	Information element description
Stop Announcement	MRFC	Context	M	This information element indicates the context for the bearer termination.
		Bearer Termination	M	This information element indicates the bearer termination where the announcement is stopped.
		Stop Announcement	M	This information element requests that announcement playing is stopped.
Stop Announcement Ack	MRFP	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the bearer termination where the command was executed.

8.7   Announcement Completed

This procedure is used to notify the completed announcement.

Table 8.7.1: Procedures between MRFC and MRFP Announcement Completed

Procedure	Initiated	Information element name	Information element required	Information element description
Announcement Completed	MRFP	Context	M	This information element indicates the context for the bearer termination.
		Bearer Termination	M	This information element indicates the bearer termination where the announcement was completed.
		Announcement Completed	M	This information element indicates completion of the announcement.
		Cause	M	This information element indicates the cause of announcement completion.
Announcement Completed Ack	MRFC	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the Bearer Termination where the command was executed.

8.8   Start audio record

This procedure is used to start the audio record.

Table 8.8.1: Procedures between MRFC and MRFP: Start audio record

Procedure	Initiated	Information element name	Information element required	Information element description
Start audio record MRFC		Context	M	This information element indicates the context for the bearer termination.
		Bearer Termination/Bearer Termination Request	M	This information element indicates the existing bearer termination or requests a new bearer termination where the audio is recorded.
		Record file Identifier	M	This information element indicates the record file Identifier or a request to the MRFP to create the record file Identifier.
		Record file Format	O	This information element indicates the audio record file format.
		Maximum Record Timer	O	This information element indicates the maximum allowable length of the recording
		Notify audio record Completed	O	This information element requests a notification of a completed audio record.
		Notify termination heartbeat	C	This information element requests termination heartbeat indications. This information element shall be included when requesting a new bearer termination.
Start audio record Ack	MRFP	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the bearer termination where the command was executed.
		Record File identifier	O	This information element indicates the file identifier created by the MRFP if the MRFC request to create a file URI.

NOTE   This procedure may be combined with other procedures such as to ADD bearer connections.

8.9 Stop audio record

This procedure is used to stop the audio record.

Table 8.9.1: Procedures between MRFC and MRFP: Stop audio record

Procedure	Initiated	Information element name	Information element required	Information element description
Stop audio record	MRFC	Context	M	This information element indicates the context for the bearer termination.
		Bearer Termination	M	This information element indicates the bearer termination where the audio record is stopped.
		Stop audio record	M	This information element requests that audio record is stopped.
Stop audio record Ack	MRFP	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the bearer termination where the command was executed.

8.10 Audio record completed

This procedure is used to report the audio record completed.

Table 8.10.1: Procedures between MRFC and MRFP: Report audio record completed

Procedure	Initiated	Information element name	Information element required	Information element description
Audio Record Completed	MRFP	Context	M	This information element indicates the context for the bearer termination.
		Bearer Termination	M	This information element indicates the bearer termination where the audio record was completed.
		audio record Completed	M	This information element indicates the audio record completed.
		Cause	M	This information element indicates the return code of audio record.
Audio record Completed Ack	MRFC	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the Bearer Termination where the command was executed.

8.11 Detect DTMF

This procedure is used to request detection of a DTMF digit.

Table 8.11.1: Procedures between MRFC and MRFP: Detect DTMF

Procedure	Initiated	Information element name	Information element required	Information element description
Detect DTMF	MRFC	Context	M	This information element indicates the context for the bearer termination.
		Bearer Termination/Bearer Termination Request	M	This information element indicates the existing bearer termination or requests a new bearer termination where the DTMF digit detection is requested.
		Start_DTMF_Detection	M	This information element requests MRFP to detect a DTMF digit.

Detect DTMF Ack	MRFP	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the bearer termination where the command was executed.

NOTE   This procedure may be combined with other procedures such as to ADD bearer connections.

8.12 Stop DTMF Detection

This procedure is used to stop detection of the DTMF digit.

Table 8.12.1: Procedures between MRFC and MRFP: Stop DTMF Detection

Procedure	Initiated	Information element name	Information element required	Information element description
Stop DTMF Detection	MRFC	Context	M	This information element indicates the context for the bearer termination.
		Bearer Termination	M	This information element indicates the bearer termination where the DTMF digit detection is stopped.
		Stop DTMF Detection	M	This information element requests that DTMF digit detection is stopped.
Stop DTMF Detection Ack	MRFP	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the bearer termination where the command was executed.

8.13 Report DTMF

This procedure is used to report a detected DTMF digit.

Table 8.13.1: Procedures between MRFP and MRFC: Report DTMF

Procedure	Initiated	Information element name	Information element required	Information element description
Report DTMF	MRFP	Context	M	This information element indicates the context for the bearer termination.
		Bearer Termination	M	This information element indicates the bearer termination where the DTMF digit was detected.
		Digit	M	This information element reports the detected DTMF digit.
Report DTMF Ack	MRFC	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the Bearer Termination where the command was executed.

8.14 Start playing multimedia

This procedure is used to start playing multimedia.

Table 8.14.1: Procedures between MRFC and MRFP: start playing multimedia

Procedure	Initiated	Information element name	Information element required	Information element description

Start playing multimedia MRFC		Context	M	This information element indicates the context for the bearer termination.
		Bearer Termination/Bearer Termination Request	M	This information element indicates the existing bearer termination or requests a new bearer termination where the multimedia is sent.
		Multimedia identifier	M	This information element indicates the multimedia or list of multimedia to be played. This may be a single identifier or one identifier per media type.
		Multimedia file format	O	This information element indicates the multimedia file type, such as the 3GP file type.
		Iterations	O	This information element indicates the number of times the multimedia shall be played
		Direction	O	This information element indicates the direction of the multimedia to be sent.
		Notify multimedia completed	O	This information element requests a notification when the playing multimedia is completed.
		DTMF stop multimedia	O	This information element indicates the MRFP to detect the DTMF digits and stop the playing multimedia when a pre-defined DTMF digit is detected.
		Notify termination heartbeat	C	This information element requests termination heartbeat indications. This information element shall be included when requesting a new bearer termination.
Start playing multimedia Ack	MRFP	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the bearer termination where the command was executed.

NOTE   This procedure may be combined with other procedures such as to ADD bearer connections.

8.15   Stop playing multimedia

This procedure is used to stop playing multimedia.

Table 8.15.1: Procedures between MRFC and MRFP: Stop playing multimedia

Procedure	Initiated	Information element name	Information element required	Information element description
Stop playing multimedia	MRFC	Context	M	This information element indicates the context for the bearer termination.
		Bearer Termination	M	This information element indicates the existing bearer termination.
		Stop playing multimedia	M	This information element requests that multimedia playing is stopped.
stop playing multimedia Ack	MRFP	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the bearer termination where the command was executed.

8.16   Playing multimedia completed

This procedure is used to report the playing multimedia completed.

Table 8.16.1: Procedures between MRFC and MRFP: Report playing multimedia completed

Procedure	Initiated	Information element name	Information element required	Information element description

Report playing multimedia completed	MRFP	Context	M	This information element indicates the context for the bearer termination.
		Bearer Termination	M	This information element indicates the existing bearer termination.
		Playing Completed	M	This information element indicates completed of the multimedia play.
		Cause	M	This information element indicates the return code of playing multimedia.
Report playing multimedia completed ACK	MRFC	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the bearer termination where the command was executed.

8.17 Start multimedia record

This procedure is used to start the multimedia record.

Table 8.17.1: Procedures between MRFC and MRFP: Start multimedia record

Procedure	Initiated	Information element name	Information element required	Information element description
Start multimedia	Record MRFC	Context	M	This information element indicates the context for the bearer termination.
		Bearer Termination/Bearer Termination Request	M	This information element indicates the existing bearer termination or requests a new bearer termination where the multimedia is recorded.
		Multimedia file identifier	M	This information element indicates the multimedia record file identification or a request to the MRFP to create a file identifier.
		Multimedia file Format	O	This information element indicates the multimedia record file format.
		Maximum Record Timer	O	This information element indicates the maximum allowable length of the recording
		Notify multimedia record Completed	O	This information element requests a notification of a completed multimedia record.
		Notify termination heartbeat	C	This information element requests termination heartbeat indications. This information element shall be included when requesting a new bearer termination.
Start multimedia record Ack	MRFP	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the bearer termination where the command was executed.
		File identifier	O	This information element indicates the file identification created by the MRFP if the MRFC request to create a file identifier.

NOTE This procedure may be combined with other procedures such as to ADD bearer connections.

8.18 Stop multimedia record

This procedure is used to stop the multimedia record.

Table 8.18.1: Procedures between MRFC and MRFP: Stop multimedia record

Procedure	Initiated	Information element name	Information element required	Information element description
Stop Multimedia Record	MRFC	Context	M	This information element indicates the context for the bearer termination.
		Bearer Termination	M	This information element indicates the existing bearer termination.
		Stop multimedia record	M	This information element requests that multimedia record is stopped.
Stop Multimedia record Ack	MRFP	Context	M	This information element indicates the context where the command is executed.
		Bearer Termination	M	This information element indicates the bearer termination where the command is executed.

8.19 Multimedia record completed

This procedure is used to report the multimedia record completed.

Table 8.19.1: Procedures between MRFC and MRFP: Report multimedia record completed

Procedure	Initiated	Information element name	Information element required	Information element description
Report multimedia record completed	MRFP	Context	M	This information element indicates the context for the bearer termination.
		Bearer Termination	M	This information element indicates the existing bearer termination.
		Multimedia record Completed	M	This information element indicates the multimedia record completed.
		Cause	M	This information element indicates the return code of multimedia record.
Report multimedia record completed ACK	MRFC	Context	M	This information element indicates the context where the command is executed.
		Bearer Termination	M	This information element indicates the bearer termination where the command is executed.

8.20 Reserve and Configure IMS Resources

This procedure is used to reserve multimedia-processing resources for an Mp interface connection; it is based on the procedure of the same name defined in 3GPP TS 29.163 [9].

Table 8.20.1: Procedures between MRFC and MRFP: Reserve and Configure IMS Resources

Procedure	Initiated	Information element name	Information element required	Information element description
Reserve and Configure IMS Resources	MRFC	Context/Context Request	M	This information element indicates the existing context or requests a new context for the bearer termination.
		IMSTermination Request	M	This information element indicates the existing bearer termination or requests a new IMS termination for the bearer to be established.
		Local IMS Resources	M	This information element indicates the resource(s) (i.e. codecs) for which the MRFP shall be prepared to receive user data. For terminations supporting any combination of video, audio and messaging this IE shall contain separate resources per stream.
		ReserveValue	O	This information element indicates if multiple local IMS resources are to be reserved
		Remote IMS Resources	M	This information element indicates the resource(s) (i.e. codecs) for which the MRFP shall send data. For terminations supporting any combination of video, audio and messaging this IE shall contain separate resources per stream.
		Local Connection Address Request	M	This information element requests an IP address and port number(s) on the MRFP that the remote end can send user plane data to. For terminations supporting any combination of video, audio and messaging this may contain multiple addresses.
		Remote Connection Address	M	This information element indicates the remote IP address and port number(s) that the MRFP can send user plane data to. For terminations supporting any combination of video, audio and messaging this may contain multiple addresses.
		Notify Released Bearer	O	This information element requests a notification of a released bearer.
		Notify termination heartbeat	C	This information element requests termination heartbeat indications. This information element shall be included when requesting a new bearer termination. Otherwise the information element is optional.
		ECN Enable	O	This information element requests the MRFP to apply ECN.

		ECN Initiation Method	C	This information element specifies the ECN Initiation method and requests the MRFP to perform IP header settings as an ECN endpoint. It may be included only if ECN is enabled.
		Notify ECN Failure Event	C	This information element requests a notification if an ECN related error occurs It may be included only if ECN is enabled..
Reserve and Configure IMS Resources Ack	MRFP	Context	M	This information element indicates the context where the command was executed.
		IMSTermination	M	This information element indicates the Bearer Termination where the command was executed.
		Local IMS Resources	M	This information element indicates the resource(s) (i.e. codecs) for which the MRFP shall be prepared to receive user data.\n\nFor terminations supporting any combination of video, audio and messaging this IE shall contain separate resources per stream.
		Remote IMS Resources	M	This information element indicates the resource(s) (i.e. codecs) for which the MRFP shall send data.\n\nFor terminations supporting any combination of video, audio and messaging this IE shall contain separate resources per stream.
		Local Connection Address	M	This information element indicates the IP address and port number(s) the MRFP shall receive user plane data from IMS.\n\nFor terminations supporting any combination of video, audio and messaging this may contain multiple addresses.
		Remote Connection Address	M	This information element indicates the remote IP address and port number(s) that the MRFP can send user plane data to.\n\nFor terminations supporting any combination of video, audio and messaging this may contain multiple addresses.

8.21   Reserve IMS Resources Procedure

This procedure is used to reserve local connection addresses and local resources in MRFP; it is based on the procedure of the same name defined in 3GPP TS 29.163 [9].

Table 8.21.1: Procedures between MRFC and MRFP: Reserve IMS Resources

Procedure	Initiated	Information element name	Information element required	Information element description
Reserve IMS Resources	MRFC	Context /Context Request	M	This information element indicates the existing context or requests a new context for the bearer termination.
		IMS Termination Request	M	This information element requests a new bearer termination
		Local IMS Resources	M	This information element indicates the resource(s) (i.e. codecs) for which the MRFP shall be prepared to receive user data.

For terminations supporting any combination of video, audio and messaging this IE shall contain separate resources per stream. |
| | | ReserveValue | O | This information element indicates if multiple local IMS resources are to be reserved. |
| | | Local Connection Address Request | M | This information element requests an IP address and port number(s) on the MRFP that the remote end can send user plane data to.

For terminations supporting any combination of video, audio and messaging this may contain multiple addresses. |
		Notify Released Bearer	O	This information element requests a notification of a released bearer.
		Notify termination heartbeat	M	This information element requests termination heartbeat indications.
		ECN Enable	O	This information element requests the MRFP to apply ECN.
		ECN Initiation Method	C	This information element specifies the ECN Initiation method and requests the MRFP to perform IP header settings as an ECN endpoint. It may be included only if ECN is enabled.
		Notify ECN Failure Event	C	This information element requests a notification if an ECN related error occurs. It may be included only if ECN is enabled.
Reserve IMS Resources Ack	MRFP	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the Bearer Termination where the command was executed.
		Local IMS Resources	M	This information element indicates the resource(s) (i.e. codecs) for which the MRFP shall be prepared to receive user data

For terminations supporting any combination of video, audio and messaging this IE shall contain separate resources per stream. |

		Local Connection Address	M	This information element indicates the IP address and port number(s) the MRFP shall receive user plane data from IMS. For terminations supporting any combination of video, audio and messaging this may contain multiple addresses.

8.22 Configure IMS Resources Procedure

This procedure is used to select multimedia-processing resources for an Mp interface connection; it is based on the procedure of the same name defined in 3GPP TS 29.163 [9].

Table 8.22.1: Procedures between MRFC and MRFP: Configure IMS Resources Procedure

Procedure	Initiated	Information element name	Information element required	Information element description
Configure IMS Resources	MRFC	Context	M	This information element indicates the context for the bearer termination.
		IMS Termination	M	This information element indicates the existing bearer termination.
		Local IMS Resources	O	This information element indicates the resource(s) (i.e. codecs) for which the MRFP shall be prepared to receive user data. For terminations supporting any combination of video, audio and messaging this IE shall contain separate resources per stream.
		Remote IMS Resources	M	This information element indicates the resource(s) (i.e. codecs) for which the MRFP shall send data. For terminations supporting any combination of video, audio and messaging this IE shall contain separate resources per stream.
		Local Connection Address	O	This information element indicates the IP address and port number(s) on the MRFP that the IMS user can send user plane data to. For terminations supporting video any combination of video, audio and messaging may contain multiple addresses.
		Remote Connection Address	M	This information element indicates the remote IP address and port number(s) that the MRFP can send user plane data to. For terminations supporting any combination of video, audio and messaging this may contain multiple addresses.
		Notify termination heartbeat	O	This information element requests termination heartbeat indications.
		ECN Enable	O	This information element requests the MRFP to apply ECN procedures.
		ECN Initiation Method	C	This information element specifies the ECN Initiation method and requests the MRFP to perform IP header settings as an ECN endpoint. It may be included if ECN is enabled.
		Notify ECN Failure Event	C	This information element requests a notification if an ECN related error occurs. It may be included if ECN is enabled.
Configure IMS Resources Ack	MRFP	Context	M	This information element indicates the context where the command was executed.

		IMS Termination	M	This information element indicates the Bearer Termination where the command was executed.
		Local IMS Resources	O	This information element indicates the resource(s) (i.e. codecs) for which the MRFP shall be prepared to receive user data For terminations supporting any combination of video, audio and messaging this IE shall contain separate resources per stream.
		Remote IMS Resources	M	This information element indicates the resource(s) (i.e. codecs) for which the MRFP shall send data. For terminations supporting any combination of video, audio and messaging this IE shall contain separate resources per stream.
		Local Connection Address	O	This information element indicates the IP address and port number(s) on the MRFP that the IMS user can send user plane data to. For terminations supporting any combination of video, audio and messaging this may contain multiple addresses.
		Remote Connection Address	M	This information element indicates the remote IP address and port number(s) that the MRFP can send user plane data to. For terminations supporting any combination of video, audio and messaging this may contain multiple addresses.

8.23 Release IMS Termination

This procedure is used to release a termination towards the IMS and free all related resources; it is based on the procedure of the same name defined in 3GPP TS 29.163 [9].

Table 8.23.1: Procedures between MRFC and MRFP: Release IMS Termination

Procedure	Initiated	Information element name	Information element required	Information element description
Release IMS Termination	MRFC	Context	M	This information element indicates the existing context for the bearer termination.
		Bearer Termination	M	This information element indicates the bearer termination to be released.
Release IMS Termination Ack	MRFP	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the Bearer Termination where the command was executed.

8.24   Start TTS

This procedure is used to request to start TTS.

Table 8.24.1: Procedures between MRFC and MRFP: Start TTS

Procedure	Initiated	Information element name	Information element required	Information element description
Start TTS	MRFC	Context	M	This information element indicates the context for the bearer termination.
		Bearer Termination/Bearer Termination Request	M	This information element indicates the existing bearer termination or requests a new bearer termination where the TTS is sent.
		Direction	O	This information element indicates the direction of the TTS to be sent.
		Notify TTS Completed	O	This information element requests a notification of a completed TTS.
		DTMF stop TTS	O	This information element indicates the MRFP to detect the DTMF digits and stop the TTS when a pre-defined DTMF digit is detected.
		SSML	M	This information element indicates the text to be spoken as SSML script.
		Iterations	O	This information element indicates the number of times the TTS shall be played.
		Notify termination heartbeat	C	This information element requests termination heartbeat indications. This information element shall be included when requesting a new bearer termination.
Start TTS Ack	MRFP	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the bearer termination where the command was executed.

NOTE   This procedure may be combined with other procedures such as to ADD bearer connections.

8.25   Stop TTS

This procedure is used to stop TTS.

Table 8.25.1: Procedures between MRFC and MRFP: Stop TTS

Procedure	Initiated	Information element name	Information element required	Information element description
Stop TTS	MRFC	Context	M	This information element indicates the context for the bearer termination.
		Bearer Termination	M	This information element indicates the bearer termination where the TTS is stopped.
		Stop TTS	M	This information element requests that TTS is stopped.
Stop TTS Ack	MRFP	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the bearer termination where the command was executed.

8.26   TTS Completed

This procedure is used to report the TTS result.

Table 8.26.1: Procedures between MRFC and MRFP: TTS Completed

Procedure	Initiated	Information	Information	Information element description

		element name	element required	
TTS Completed	MRFP	Context	M	This information element indicates the context for the bearer termination.
		Bearer Termination	M	This information element indicates the bearer termination where the TTS is requested.
		TTS Completed	M	This information element indicates completed of the TTS.
		Cause	M	This information element indicates the return code of TTS.
TTS Completed Ack	MRFC	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the Bearer Termination where the command was executed.

8.27   Start ASR

This procedure is used to request to start ASR.

Table 8.27.1: Procedures between MRFC and MRFP: Start ASR

Procedure	Initiated	Information element name	Information element required	Information element description
Start ASR	MRFC	Context	M	This information element indicates the context for the bearer termination.
		Bearer Termination/Bearer Termination Request	M	This information element indicates the existing bearer termination or requests a new bearer termination where the ASR is requested.
		Recognition Mode	O	This information element indicates the recognition mode: Normal Recognition Mode, Hotword Recognition Mode.
		Notify ASR completion	O	This information element requests a notification of a completed ASR.
		DTMF stop ASR	O	This information element indicates the MRFP to detect the DTMF digits and stop the ASR when a pre-defined DTMF digit is detected.
		SRGS Grammar	M	This information element indicates the SRGS format grammar as script or URI.
		Notify termination heartbeat	C	This information element requests termination heartbeat indications. This information element shall be included when requesting a new bearer termination.
Start ASR Ack	MRFP	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the bearer termination where the command was executed.

NOTE   This procedure may be combined with other procedures such as to ADD bearer connections.

8.28   Stop ASR

This procedure is used to stop ASR.

Table 8.28.1: Procedures between MRFC and MRFP: Stop ASR

Procedure	Initiated	Information element name	Information element required	Information element description
Stop ASR	MRFC	Context	M	This information element indicates the context for the bearer termination.
		Bearer Termination	M	This information element indicates the bearer termination where the ASR is stopped.
		Stop ASR	M	This information element requests that ASR is stopped.

Stop ASR Ack	MRFP	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the bearer termination where the command was executed.

8.29   ASR completed

This procedure is used to report the ASR result.

Table 8.29.1: Procedures between MRFC and MRFP: ASR completed

Procedure	Initiated	Information element name	Information element required	Information element description
ASR completed	MRFP	Context	M	This information element indicates the context for the bearer termination.
		Bearer Termination	M	This information element indicates the bearer termination where the ASR is requested.
		ASR Completed	M	This information element indicates completed of the ASR.
		Cause	M	This information element indicates the return code of ASR.
		Recognition Result	O	This information element reports the ASR result.
		Text Token	O	This information element indicates a text token correspond to tokens as defined by the SRGS grammar. The ASR may return multiple results.
		Result Interpretation	O	This information element indicates interpretation of application specific for each result.
		Confidence Score	O	This information indicates the quality of the input for each result. The confidence score is a number in the range from 0.0 to 1.0 inclusive.
		Input Time	O	This information indicates the time of the speech input for each result.
ASR completed Ack	MRFC	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the Bearer Termination where the command was executed.

8.30   MRFP Out-of-Service or Maintenance Locked

This procedure is used to indicate that the MRFP will go out of service or is maintenance locked.

Table 8.30.1: Procedures between MRFC and MRFP: MRFP Out-of-Service

Procedure	Initiated	Information element name	Information element required	Information element description
MRFP Out-of-Service	MRFP	Context	M	This information element indicates the context for the command.
		Root Termination	M	This information element indicates the root termination for the command.
		Reason	M	This information element indicates the reason for service change.
		Method	M	This information element indicates the method for service change.
MRFP Out-of-Service Ack	MRFC	Context	M	This information element indicates the context where the command was executed.
		Root Termination	M	This information element indicates the root termination where the command was executed.

8.31 MRFP Communication Up

This procedure is used to indicate that the MRFP is back in service.

Table 8.31.1: Procedures between MRFC and MRFP: MRFP Communication Up

Procedure	Initiated	Information element name	Information element required	Information element description
MRFP Communication Up	MRFP	Context	M	This information element indicates the context for the command.
		Root Termination	M	This information element indicates the root termination for the command.
		Reason	M	This information element indicates the reason for service change.
		Method	M	This information element indicates the method for service change.
MRFP Communication Up Ack	MRFC	Context	M	This information element indicates the context where the command was executed.
		Root Termination	M	This information element indicates the root termination where the command was executed.

8.32 MRFP Restoration

This procedure is used to indicate the MRFP failure or recovery.

Table 8.32.1: Procedures between MRFC and MRFP: MRFP Restoration

Procedure	Initiated	Information element name	Information element required	Information element description
MRFP Restoration	MRFP	Context	M	This information element indicates the context for the command.
		Root Termination	M	This information element indicates the root termination for the command.
		Reason	M	This information element indicates the reason for the service change.
		Method	M	This information element indicates the method for service change.
MRFP Restoration Ack	MRFC	Context	M	This information element indicates the context where the command was executed.
		Root Termination	M	This information element indicates the root termination where the command was executed.

8.33 MRFC Restoration

This procedure is used to indicate the MRFC failure or recovery.

Table 8.33.1: Procedures between MRFC and MRFP: MRFC Restoration

Procedure	Initiated	Information element name	Information element required	Information element description
MRFC Restoration	MRFC	Context	M	This information element indicates the context for the command.
		Root Termination	M	This information element indicates the root termination for the command.
		Reason	M	This information element indicates the reason for the service change.
		Method	M	This information element indicates the method for service change.
MRFC Restoration Ack	MRFP	Context	M	This information element indicates the context where the command was executed.
		Root Termination	M	This information element indicates the root termination where the command was executed.

8.34 MRFP Re-register

This procedure is used to re-register the MRFP.

Table 8.34.1: Procedures between MRFC and MRFP: MRFP Re-register

Procedure	Initiated	Information element name	Information element required	Information element description
MRFP Re-register	MRFP	Context	M	This information element indicates the context for the command.
		Root Termination	M	This information element indicates the root termination for the command.
		Reason	M	This information element indicates the reason for the service change.
		Method	M	This information element indicates the method for service change.
		Protocol Version	M	This information element indicates the protocol version for Mp interface requested by the MRFP.
		Service Change Profile	M	This information element indicates the profile for the Mp interface requested by the MRFP.
MRFP Re-register Ack	MRFC	Context	M	This information element indicates the context where the command was executed.
		Root Termination	M	This information element indicates the root termination where the command was executed.
		Protocol Version	O	This information element indicates the protocol version for Mp interface supported by the MRFC.
		Service Change Profile	O	This information element indicates the profile for the Mp interface supported by the MRFC.

8.35 MRFC Re-registration Ordered by MRFC

This procedure is used by the MRFC to request the MRFP to register itself.

Table 8.35.1: Procedures between MRFC and MRFP: MRFC Ordered Re-register

Procedure	Initiated	Information element name	Information element required	Information element description
MRFC Ordered Re-register	MRFC	Context	M	This information element indicates the context for the command.
		Root Termination	M	This information element indicates the root termination for the command.
		Reason	M	This information element indicates the reason for the service change.
		MRFC Address	O	This information element indicates the MRFC signalling address.
MRFC Ordered Re-register Ack	MRFP	Context	M	This information element indicates the context where the command was executed.
		Root Termination	M	This information element indicates the root termination where the command was executed.

8.36 Audit Value

This procedure is used to audit values of different object(s).

Table 8.36.1: Procedures between MRFC and MRFP: Audit Value

Procedure	Initiated	Information element name	Information element required	Information element description
Audit Value	MRFC	Context	M	This information element indicates the context for the command.
		Bearer Termination	M	This information element indicates the bearer termination(s) for the command.
		Object(s)	M	This information element indicates the object(s) to be audited.
Audit Value Ack	MRFP	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the bearer termination where the command was executed.
		Value(s)	M	This information element indicates the value(s) of the object(s).

8.37 Audit Capability

This procedure is used to audit capabilities of different object(s).

Table 8.37.1: Procedures between MRFC and MRFP: Audit Capability

Procedure	Initiated	Information element name	Information element required	Information element description
Audit Capability	MRFC	Context	M	This information element indicates the context for the command.
		Bearer Termination	M	This information element indicates the bearer termination(s) for the command.
		Object(s)	M	This information element indicates the object(s) which capability is requested.
Audit Capability Ack	MRFP	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the bearer termination where the command was executed.
		Capabilities(s)	M	This information element indicates the capabilities of the object(s).

8.38 Capability Update

This procedure is used to indicate update of an object capability.

Table 8.38.1: Procedures between MRFC and MRFP: Capability Update

Procedure	Initiated	Information element name	Information element required	Information element description
Capability Update	MRFP	Context	M	This information element indicates the context for the command.
		Bearer Termination	M	This information element indicates the bearer termination(s) for the command.
		Reason	M	This information element indicates the reason for service change.
		Method	M	This information element indicates the method for service change.
Capability Update Ack	MRFC	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the bearer termination where the command was executed.

8.39   MRFC Out of Service

This procedure is used to indicate that MRFC has gone out of service.

Table 8.39.1: Procedures between MRFC and MRFP: MRFC Out of Service

Procedure	Initiated	Information element name	Information element required	Information element description
MRFC Out of Service	MRFC	Context	M	This information element indicates the context for the command.
		Root Termination	M	This information element indicates the root termination for the command.
		Reason	M	This information element indicates the reason for the service change.
		Method	M	This information element indicates the method for service change.
MRFC Out of Service Ack	MRFP	Context	M	This information element indicates the context where the command was executed.
		Root Termination	M	This information element indicates the root termination where the command was executed.

8.40   MRFP Resource Congestion Handling - Activate

This procedure is used to activate the congestion handling mechanism.

Table 8.40.1: Procedures between MRFC and MRFP: MRFP Resource Congestion Handling - Activate

Procedure	Initiated	Information element name	Information element required	Information element description
MRFP Resource Congestion Handling – Activate	MRFC	Context	M	This information element indicates that all context are applicable for the root termination.
		Root Termination	M	This information element indicates that root termination is where the congestion mechanism is activated.
		Congestion Activate	M	This information element requests to activate the congestion mechanism.
MRFP Resource Congestion Handling - Activate Ack	MRFP	Context	M	This information element indicates that all context are where the command was executed.
		Root Termination	M	This information element indicates that root termination is where the command was executed.

8.41 MRFP Resource Congestion Handling - Indication

This procedure is used to inform the MRFC that traffic restriction is advised.

Table 8.41.1: Procedures between MRFC and MRFP: MRFP Resource Congestion Handling - Indication

Procedure	Initiated	Information element name	Information element required	Information element description
MRFP Resource Congestion Handling - Indication	MRFP	Context	M	This information element indicates all context are applicable for the root termination.
		Root Termination	M	This information element indicates that root termination is where the congestion mechanism was activated.
		Reduction	M	This information element indicates the load percentage to be reduced.
MRFP Resource Congestion Handling - Indication Ack	MRFC	Context	M	This information element indicates all context are where the command was executed.
		Root Termination	M	This information element indicates that root termination is where the command was executed.

8.42 Command Reject

This command is used to reject the received command request. It may be used as response to any of the procedures.

Table 8.42.1: Procedures between (G)MSC server and MGW: Command Reject

Procedure	Initiated	Information element name	Information element required	Information element description
Command Reject	Both	Context	M	This information element indicates the context where the command was rejected.
		Bearer Termination	M	This information element indicates the bearer termination where the command was rejected.
		Error	M	This information element indicates the error that caused command rejection.

8.43 Termination heartbeat indication

This procedure is used to report indication of hanging termination.

Table 8.43.1: Procedures between MRFC and MRFP: Hanging termination indication

Procedure	Initiated	Information element name	Information element required	Information element description
Termination heartbeat indication	MRFP	Context	M	This information element indicates the context for the bearer termination.
		Bearer Termination	M	This information element indicates the bearer termination for which the termination heartbeat is reported.
		Termination heartbeat	M	Hanging Termination event, as defined in 3GPP TS 29.333 [16].
Termination heartbeat indication Ack	MRFC	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the Bearer Termination where the command was executed.

8.44 Configure BFCP Termination

This procedure is used to configure a termination to support BFCP protocol

Table 8.44.1: Procedures between MRFC and MRFP: Configure BFCP Termination

Procedure	Initiated	Information element name	Information element required	Information element description
Configure BFCP Termination	MRFC	Context	M	This information element indicates the context for the bearer termination.
		Bearer Termination	M	This information element indicates the existing bearer termination or requests a new bearer termination.
		Local BFCP Connection Address Request	M	This information element requests an IP address and port number(s) on the MRFP to serve BFCP/TCP protocol
		Remote BFCP Connection Address	M	This information element indicates the remote IP address and port number(s) that the MRFP can send BFCP/TCP to.
		User Identifier	M	This information element indicates the user Identifier to identify the BFCP client when receiving BFCP requests.
		Available Floors	M	This information Element defines the list of Floor Ids that may be requested (via BFCP) to be used by the client represented by this termination.
Configure BFCP Termination Ack	MRFP	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the Bearer Termination where the command was executed.
NOTE: The above procedure may be combined with other procedures in ADD or MOD commands.				

8.45 Configure Conference For Floor Control

This procedure is used to configure or modify a conference for floor control and indicate the Floor policy for a conference.

Table 8.45.1: Procedures between MRFC and MRFP: Configure Conference For Floor Control

Procedure	Initiated	Information element name	Information element required	Information element description
Indicate Floor Policy	MRFC	Context	M	This information element indicates the context for the bearer termination.
		Conference Identifier	M	This information element indicates the Identifier for the conference for BFCP purposes.
		Floor-Resource Associations	M	This information element indicates the resource associated with specific Floor Ids for the MRFP to identify the Floor(s) when receiving BFCP requests.
		Floor Control Algorithm	M	This information element indicates for a specific floor, the algorithm to be used in granting the Floor.
		Maximum Floor Holder Number	M	This information element indicates for a specific floor, the maximum number of users who can hold the same Floor at the same time.
Indicate Floor Policy Ack	MRFP	Context	M	This information element indicates the context where the command was executed.
NOTE: The above procedure applies to a context instead of a termination. The H.248v3 shall be supported. The procedure may be combined with other procedures in ADD or MOD commands.				

8.46 Designate Floor Chair

This procedure is used to designate a Floor Chair to a conference.

Table 8.46.1: Procedures between MRFC and MRFP: Designate Floor Chair

Procedure	Initiated	Information element name	Information element required	Information element description
Designate Floor Chair	MRFC	Context	M	This information element indicates the context for the bearer termination.
		Bearer Termination/Bearer Termination Request	M	This information element indicates the existing bearer termination.
		Floor Chair	M	This information element indicates that the termination represents a Floor Chair in accordance with BFCP [20].
		Floor Controlled By Chair	O	This information element indicates the Floor(s) the Floor Chair controls.
Designate Floor Chair Ack	MRFP	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the bearer termination where the command was executed.

8.47 Floor Request Decision

This procedure is used to request the MRFP to report the Floor request decision.

Table 8.47.1: Procedures between MRFC and MRFP: Floor Request Decision

Procedure	Initiated	Information element name	Information element required	Information element description
Floor Request Decision	MRFC	Context	M	This information element indicates the context for the bearer termination.
		Bearer Termination/Bearer Termination Request	M	This information element indicates the existing bearer termination.
		Notify Floor Request Decision	M	This information element requests MRFP to notify the decision of the FCS to Floor requests.
Floor Request Decision Ack	MRFP	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the bearer termination where the command was executed.

8.48 Report Floor Request Decision

This procedure is used to report the Floor request status .

Table 8.48.1: Procedures between MRFP and MRFC: Report Floor Request Decision

Procedure	Initiated	Information element name	Information element required	Information element description
Report Floor Request Decision	MRFP	Context	M	This information element indicates the context for the bearer termination.
		Bearer Termination	M	This information element indicates the bearer termination to which the Floor request is associated.
		Floor Request Status	M	This information element reports the Floor Id or Floor Ids to which the Floor Request is associated and the Floor request status of specific Floor or Floors..
Report Floor Request Decision Ack	MRFC	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the Bearer Termination where the command was executed.

8.49 Confirm Media Update

This procedure is used to indicate whether the media properties associated with a Floor Request have been modified successfully or not..

Table 8.49.1: Procedures between MRFC and MRFP: Confirm Media Update

Procedure	Initiated	Information element name	Information element required	Information element description
Confirm Media Update	MRFC	Context	M	This information element indicates the context for the bearer termination.
		Bearer Termination	M	This information element indicates the existing bearer termination to which the floor request is associated.
		Floor Request Status	M	This information element indicates the Floor Id or Ids and requested status to which the Confirm Media Result applies..
		Result	M	This information element indicates whether the media properties associated with a Floor Request have been modified successfully or not.
Confirm Media Update Ack	MRFP	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the bearer termination where the command was executed.

8.50 Configure Granted Quota

This procedure is used to configure the granted quota.

Table 8.50.1: Procedures between MRFC and MRFP: Configure Granted Quota

Procedure	Initiated	Information element name	Information element required	Information element description
Configure Granted Quota	MRFC	Context	M	This information element indicates the context for the bearer termination.
		Bearer Termination	M	This information element indicates the bearer termination to configure the granted quotas.
		Quota for number of messages sent	O	This information element indicates the quota for the number of messages sent.
		Quota for number of messages received	O	This information element indicates the quota for the number of messages received.
		Quota for volume of messages sent	O	This information element indicates the quota for the volume of messages sent.
		Quota for volume of messages received	O	This information element indicates the quota for the volume of messages received.
		Valid Time	O	This information element indicates the valid time for collecting message statistics, upon expiry the MRFP shall report the current message statistics.
Configure Granted Quota Ack	MRFP	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the Bearer Termination where the command was executed.

8.51 Report Message Statistics

This procedure is used to report statistics for the sent and received messages.

Table 8.51.1: Procedures between MRFP and MRFC: Report Message Statistics

Procedure	Initiated	Information element name	Information element required	Information element description
Report Message Statistics	MRFP	Context	M	This information element indicates the context for the bearer termination.
		Bearer Termination	M	This information element indicates the bearer termination to report statistics.
		Number of messages sent	O	This information element indicates the number of messages sent.
		Number of messages received	O	This information element indicates the number of messages received.
		Volume of messages sent	O	This information element indicates the volume of messages sent.
		Volume of messages received	O	This information element indicates the volume of messages received.
		Reason For Report	M	Indicates reason for the report (e.g. expiry of time, granted quotas reached)
Report Message Statistics Ack	MRFC	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the Bearer Termination where the command was executed.

8.52 Configure Filtering Rules

This procedure is used to configure the filtering rules.

Table 8.52.1: Procedures between MRFC and MRFP: Configure Filtering Rules

Procedure	Initiated	Information element name	Information element required	Information element description
Configure Filtering Rules	MRFC	Context	M	This information element indicates the context for the bearer termination.
		Bearer Termination	M	This information element indicates the bearer termination to config the filtering rules.
		Sender address	O	This information element indicates the filtering criteria of sender address.
		Message size	O	This information element indicates the filtering criteria of message size.
		Message content type	O	This information element indicates the filtering criteria of message content type.

		Message content format	O	This information element indicates the filtering criteria of message content format.
		Message subject	O	This information element indicates the filtering criteria of message subject.
		Message treatment	O	This information element indicates to the MRFP the message treatment when the filtering criteria is reached. The message treatment can be: Block the delivery of the message content. Store the message content Redirect the message to another address.
		Store URL	O	This information element indicates the store URL.
		Redirect URL	O	This information element indicates the redirect URL.
Configure Filtering Rules Ack	MRFP	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the Bearer Termination where the command was executed.
		Store URL	O	This information element indicates the store URL.

8.53 Start message record

This procedure is used to start the message record.

Table 8.53.1: Procedures between MRFC and MRFP: Start message record

Procedure	Initiated	Information element name	Information element required	Information element description
Start message Record	MRFC	Context	M	This information element indicates the context for the bearer termination.
		Bearer Termination/Bearer Termination Request	M	This information element indicates the existing bearer termination or requests a new bearer termination where the message is recorded.
		Message file identifier	M	This information element indicates the message record file identification. The MRFC may also request the MRFP to create file identifier.
		Maximum Record Timer	O	This information element indicates the maximum allowable length of time of the recording
		Notify message record Completed	O	This information element requests a notification of a completed message record.
Start message record Ack	MRFP	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the bearer termination where the command was executed.
		File identifier	O	This information element indicates the file identification created by the MRFP if the MRFC request to create a file identifier.

NOTE   This procedure may be combined with other procedures such as to ADD bearer connections.

8.54 Stop message record

This procedure is used to stop the message record.

Table 8.54.1: Procedures between MRFC and MRFP: Stop message record

Procedure	Initiated	Information element name	Information element required	Information element description
Stop Message Record	MRFC	Context	M	This information element indicates the context for the bearer termination.
		Bearer Termination	M	This information element indicates the existing bearer termination.
		Stop message record	M	This information element requests that message record is stopped.
Stop Message record Ack	MRFP	Context	M	This information element indicates the context where the command is executed.
		Bearer Termination	M	This information element indicates the bearer termination where the command is executed.

8.55 Message record completed

This procedure is used to report the message record completed.

Table 8.55.1: Procedures between MRFC and MRFP: Report message record completed

Procedure	Initiated	Information element name	Information element required	Information element description
Report message record completed	MRFP	Context	M	This information element indicates the context for the bearer termination.
		Bearer Termination	M	This information element indicates the existing bearer termination.
		Message record Completed	M	This information element indicates the message record completed.
		Cause	M	This information element indicates the return code of message record.
Report message record completed ACK	MRFC	Context	M	This information element indicates the context where the command is executed.
		Bearer Termination	M	This information element indicates the bearer termination where the command is executed.

8.56 Start playing message

This procedure is used to start playing message.

Table 8.56.1: Procedures between MRFC and MRFP: start playing message

Procedure	Initiated	Information element name	Information element required	Information element description
Start playing message	MRFC	Context	M	This information element indicates the context for the bearer termination.
		Bearer Termination/Bearer Termination Request	M	This information element indicates the existing bearer termination or requests a new bearer termination where the message is sent.
		Message identifier	M	This information element indicates the message or list of message to be played. This may be a single identifier or one identifier per media type.
		Direction	O	This information element indicates the direction of the message to be sent.

		Notify message completed	O	This information element requests a notification when the playing message is completed.
		Notify termination heartbeat	C	This information element requests termination heartbeat indications. This information element shall be included when requesting a new bearer termination.
Start playing message Ack	MRFP	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the bearer termination where the command was executed.

NOTE   This procedure may be combined with other procedures such as to ADD bearer connections.

8.57   Stop playing message

This procedure is used to stop playing message.

Table 8.57.1: Procedures between MRFC and MRFP: Stop playing message

Procedure	Initiated	Information element name	Information element required	Information element description
Stop playing message	MRFC	Context	M	This information element indicates the context for the bearer termination.
		Bearer Termination	M	This information element indicates the existing bearer termination.
		Stop playing message	M	This information element requests that message playing is stopped.
Stop playing message Ack	MRFP	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the bearer termination where the command was executed.

8.58   Playing message completed

This procedure is used to report the playing message completed.

Table 8.58.1: Procedures between MRFC and MRFP: Report playing message completed

Procedure	Initiated	Information element name	Information element required	Information element description
Report playing message completed	MRFP	Context	M	This information element indicates the context for the bearer termination.
		Bearer Termination	M	This information element indicates the existing bearer termination.
		Playing Completed	M	This information element indicates completed of the message play.
		Cause	M	This information element indicates the return code of playing message.
Report playing message completed ACK	MRFC	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the bearer termination where the command was executed.

8.59   Modify Media

This procedure is used to modify the media and stream properties for a given Floor Request (as indicated by the Report Floor Request Decision, Clause 8.48).

Table 8.59.1: Procedures between MRFC and MRFP: Modify Media

Procedure	Initiated	Information element name	Information element required	Information element description
Modify Media	MRFC	Context	M	This information element indicates the existing context for the bearer termination or requests a new context for the bearer termination.
		Bearer Termination	M	This information element indicates the existing bearer termination to which the floor request is associated.
		Stream	M	This information element indicates the existing stream to which the floor request is associated
		Stream Mode	M	Stream mode properties associated to the floor request.
		Media Properties	M	Media properties associated to the floor request
Modify Media Ack	MRFP	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the bearer termination where the command was executed.

8.60 ECN Failure Indication

This procedure is used to indicate an ECN related Error.

Table 8.60.1: Procedures between MRFC and MRFP: ECN Failure indication

Procedure	Initiated	Information element name	Information element required	Information element description
ECN Failure Indication	MRFP	Context	M	This information element indicates the context for the bearer termination.
		Bearer Termination	M	This information element indicates the existing bearer termination.
		ECN Failure Indication	M	This information element indicates an ECN failure event.
ECN Failure Indication ACK	MRFC	Context	M	This information element indicates the context where the command is executed.
		Bearer Termination	M	This information element indicates the bearer termination where the command is executed.

Annex A (informative): Change history

					Change history		
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**
2006-05	CT4#31				Draft Skeleton	0.0.0	0.1.0
2006-07	CT4#31				Approval of the ad-hoc meeting TDs: C4-060934, C4-060935, C4-060938, C4-060939, C4-060940, C4-060963, C4-060964, C4-060965, C4-060966, C4-060967, C4-060968.	0.1.0	0.2.0
2006-09	CT4#32				Approval of the meeting TDs: C4-061324,C4-061474,C4-601475,C4-061476, C4-061477,C4-061478	0.2.0	0.3.0
2006-11	CT4#33				Approval of the meeting TDs: C4-061797, C4-061798, C4-061799, C4-061801, C4-061802, C4-061804, C4-061805, C4-061806, C4-061594,C4-061646	0.3.0	0.4.0
2006-11					Sent to CT#34 information	0.4.0	1.0.0
2007-02	CT4#34				Approval of the meeting TDs: C4-070282, C4-070285, C4-070357, C4-070246, C4-070290, C4-070056, C4-070291, C4070358	1.0.0	1.1.0
2007-03	CT#35	CP-070037			Sent to CT#35 for approval	1.1.0	2.0.0
2007-03	CT#35	CP-070261			Chapter numbering corrected	2.0.0	2.1.0
2007-03	CT#35				Approved as v7.0.0	2.1.0	7.0.0
2007-06	CT#36	CP-070472	0002	1	Clarify the TTS requirement	7.0.0	7.1.0
		CP-070472	0003	3	Alignment of procedures and normative text		
		CP-070472	0005	5	Clarify ASR function requirement		
		CP-070324	0004	1	Correction to DTMF handling		
		CP-070324	0007	1	Multimedia Play		
		CP-070324	0010	1	Remove editor notes		
		CP-070324	0011	1	Correction of Play Announcement		
		CP-070324	0012	1	Addition of Non-call Related procedures to chapter 8		
2007-09	CT#37	CP-070539	0013	1	Remove option to signal max number of participants in conference	7.1.0	7.2.0
		CP-070539	0014	2	Removal of floor control functions		
		CP-070539	0015	2	Correction of stop audio and multimedia record procedures		
		CP-070539	0017	2	Clarify recording requirement and procedure		
2007-12	CT#38	CP-070745	0020		Maximum Number of Participants in a conference	7.2.0	7.3.0
		CP-070745	0021		Clarification of Topology Handling During a Recording		
		CP-070745	0022		Amend iterations parameter in start TTS procedure		
		CP-070745	0023		Clarification of record file storage		
		CP-070745	0024	1	Clean-up of hanging contexts and terminations		
		CP-070745	0025		Eliminate the duplicate definitions on the ASR completion scenario		
		CP-070745	0027	1	Implementation of multiple signals played simultaneously		
		CP-070745	0028	1	Clarification of the connection address and port		
2008-03	CT#39	CP-080021	0030	1	Introduction of support for Messaging on Mp Interface	7.3.0	8.0.0
		CP-080017	0031	1	Alignment of IMS resources procedures" title		
		CP-080021	0032		Mandatory use termination heartbeat		
		CP-080021	0034	2	Clarify floor control requirement		
2008-03	CT#39				Corrupted table structure fixed in tables: 8.17.1, 8.20.1, 8.21.1, 8.22.1, 8.24.1, 8.27.1 by MCC	8.0.0	8.0.1
2008-06	CT#40	CP-080263	0035	1	Clarify messaging conference requirements	8.0.1	8.1.0
		CP-080263	0038	1	Clarify floor control requirements and procedures		
		CP-080263	0039	1	Introduction of procedure for Messaging Conference		
2008-09	CT#41	CP-080465	0041	2	Clarification of message storage requirement and procedure	8.1.0	8.2.0
		CP-080465	0042	2	Clarification of playing messaging requirement and procedure		
		CP-080465	0044	1	Improvement of Floor control procedures		
2008-12	CT#42	CP-080694	0045		Remove Editor's Note on Message File Format	8.2.0	8.3.0
2009-12	-	-	-	-	Update to Rel-9 version (MCC)	8.3.0	9.0.0
2010-12	CT#50	CP-100685	0048	3	Support of ECN	9.0.0	10.0.0
2011-03	CT#51	CP-110058	0049	2	ECN Support in Mp Interface	10.0.0	10.1.0
2011-06	CT#52	CP-110368	0050	1	Adding ECN IEs to Connection Point procedures	10.1.0	10.2.0
2011-12	CT#54	CP-110789	0051	1	ECN Improvements	10.2.0	10.3.0

History

Document history		
V10.1.0	April 2011	Publication
V10.2.0	June 2011	Publication
V10.3.0	January 2012	Publication