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Infrastructure of audiovisual services – Communication procedures

Gateway control protocol: Packages for media server control markup language and ITU-T H.248 interworking

Recommendation ITU-T H.248.73

ITU-T H-SERIES RECOMMENDATIONS

AUDIOVISUAL AND MULTIMEDIA SYSTEMS

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Recommendation ITU-T H.248.73

Gateway control protocol: Packages for media server control markup language and ITU-T H.248 interworking

Summary

Recommendation ITU-T H.248.73 provides guidance on mapping media server control markup language (MSCML) functions to ITU-T H.248 protocol information elements, packages and procedures. It further defines a package to enable gain control (fixed and automatic) on incoming and outgoing media streams.

History

Edition	Recommendation	Approval	Study Group
1.0	ITU-T H.248.73	2010-09-13	16

FOREWORD

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As of the date of approval of this Recommendation, ITU had not received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementers are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database at http://www.itu.int/ITU-T/ipr/.

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1 Scope

The media server control markup language (MSCML) is a markup language used in conjunction with session initiation protocol (SIP) to provide advanced conferencing and interactive voice response (IVR) functions. If used with a decomposed media server, MSCML is terminated at the media gateway controller (MGC) level as it is associated with SIP. Where the decomposed media server uses ITU-T H.248, MSCML requests need to be translated into the applicable ITU-T H.248 functionality. This Recommendation provides guidance on mapping MSCML functions to ITU-T H.248 protocol information elements, packages and procedures.

Furthermore, this Recommendation defines a package to enable gain control (fixed and automatic) on incoming and outgoing streams.

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

[ITU-T G.169]	Recommendation ITU-T G.169 (1999), *Automatic level control devices*.
[ITU-T H.248.1]	Recommendation ITU-T H.248.1 (2005), *Gateway control protocol: Version 3*.
[ITU-T H.248.2]	Recommendation ITU-T H.248.2 (2005), *Gateway control protocol: Facsimile, text conversation and call discrimination packages*.
[ITU-T H.248.9]	Recommendation ITU-T H.248.9 (2009), *Gateway control protocol: Advanced media server packages*.
[ITU-T H.248.19]	Recommendation ITU-T H.248.19 (2004), *Gateway control protocol: Decomposed multipoint control unit, audio, video and data conferencing packages,* plus Amendment 2 (2009), *Floor control enhancements*.
[ITU-T H.248.63]	Recommendation ITU-T H.248.63 (2009), *Gateway control protocol: Resource management packages*.
[ITU-T H.248.68]	Recommendation ITU-T H.248.68 (2009), *Gateway control protocol: Package for removal of digits and tones*.
[IETF RFC 3108]	IETF RFC 3108 (2001), *Conventions for the use of the Session Description Protocol (SDP) for ATM Bearer Connections*.
[IETF RFC 5022]	IETF RFC 5022 (2007), *Media Server Control Markup Language (MSCML) and Protocol*.

3   Definitions

3.1   Terms defined elsewhere

None.

3.2   Terms defined in this Recommendation

None.

4   Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

DTMF   Dual Tone Multi-Frequency

IVR   Interactive Voice Response

MG   Media Gateway

MGC   Media Gateway Controller

MSCML   Media Server Control Markup Language

SIP   Session Initiation Protocol

TDM   Time Division Multiplex

5   Conventions

None.

6   MSCML and ITU-T H.248 interworking

This clause shows how the MSCML functions are mapped to the ITU-T H.248 elements. It contains an analysis of the functions provided by [IETF RFC 5022] and indicates how these are supported by the ITU-T H.248 sub-series of Recommendations.

6.1   Advanced conferencing

6.1.1   Conference model

See clause 5.1 of [IETF RFC 5022] for details.

ITU-T H.248 natively supports conferencing as part of its connection model. Requests for creating, modifying and deleting conference legs are translated to the appropriate ITU-T H.248 commands.

6.1.2   Configure Conference Request <configure_conference>

See clause 5.2 of [IETF RFC 5022] for details.

Reservedtalkers: A MGC may request Terminations for the number of talkers. The "Resource Management Configuration Package" defined in [ITU-T H.248.63] also allows the MGC to indicate the number of speaking and listening Terminations. See Example 3 in clause 8.6.3 of [ITU-T H.248.63].

Reserveconfmedia: A MGC may audit a MG to determine if the MG supports signals/ events/packages for recording and/or playout.

6.1.3   Configure Leg Request <configure_leg>

See clause 5.3 of [IETF RFC 5022] for details.

A MGC may manipulate the configuration of a conference leg by manipulating the appropriate ITU-T H.248 Descriptors on the applicable Termination.

Attributes of <configure_leg>:

Type:	In ITU-T H.248, this is represented by the "Mode" property, see clause 7.1.7 of [ITU-T H.248.1].
Dtmfclamp:	This functionality may be implemented via [ITU-T H.248.68].
Toneclamp:	This functionality may be implemented via [ITU-T H.248.68].
Mixmode:	These mix modes can be achieved via the Topology Descriptor (clause 7.1.18 of [ITU-T H.248.1]). The exception is "preferred". The "Preferred Mix" package in [ITU-T H.248.19] allows the MGC to indicate "mix 10 loudest speakers + this one".
Inputgain, outputgain:	Clause E.13 of [ITU-T H.248.1] defines a gain control parameter. This contains the ability to set the gain to a specific value or to auto for an outbound stream (e.g., via LocalControl). The specification of the gain per direction (incoming/outgoing) and the "startlevel", "targetlevel" and "silencethreshold" is achieved through the use of the "TDM Gain Control" package defined in this Recommendation.
	Clause 5.6.3.4 of [IETF RFC 3108] specifies the "Gain Control" (a=gc) attribute. This allows for directional based gain control as well as automatic gain control. However, it also does not allow the specification of the "startlevel", "targetlevel" and "silencethreshold".
Configure_team:	ITU-T H.248 supports this via its connection model.
Subscribe:	ITU-T H.248 supports this natively via its event mechanism.

6.1.4   Terminating a conference

ITU-T H.248 supports this via the Subtract command.

6.1.5   Conference manipulation

See clause 5.5 of [IETF RFC 5022] for details.

ITU-T H.248 supports this via Add, Modify and Move commands.

6.1.6   Video conferencing

See clause 5.6 of [IETF RFC 5022] for details.

ITU-T H.248 supports this via properties in [ITU-T H.248.19].

6.1.7   Conference events

See clause 5.7 of [IETF RFC 5022] for details.

The "Speaker reporting" package in [ITU-T H.248.19] enables active talker reporting with an interval as well as the reporting of the speakers. As the MG has no concept of the call, the MGC is responsible for mapping the TerminationID to the talker called element.

6.1.8 Conferencing with personalized mixes

See clause 5.8 of [IETF RFC 5022] for details.

Configure_team: This is natively supported through the use of the ITU-T H.248 connection model as well as the Topology Descriptor. As mentioned, the default mix behaviour is that active talkers do not hear themselves. In order for an active talker to hear himself or herself in the mix, the "Include Participant in Mix Package" clause 11.5 of [ITU-T H.248.19] can be used.

6.2 Interactive voice response (IVR)

6.2.1 Specifying prompt content

See clause 6.1 of [IETF RFC 5022] for details.

In general, IVR is supported by functionality in [ITU-T H.248.9].

For the support of the prompt attributes:

Baseurl: See clause 6 of [ITU-T H.248.9] for more information.

Delay: Supported via the "Interval" parameter of the Play signal in the "Advanced audio server base" package in [ITU-T H.248.9].

Duration: Supported via the Signal Type "on/off" or "timeout" (see 7.1.11 of [ITU-T H.248.1]) with an associated time value.

Gain: Supported by the Absolute Volume parameter in the "Advanced audio Server base" package in [ITU-T H.248.9].

Gaindelta: Supported via the "Volume" parameter of the Play signal in the "Advanced audio server base" package in [ITU-T H.248.9].

Rate: Supported via the "Speed" parameter of the Play signal in the "Advanced audio server base" package in [ITU-T H.248.9].

Ratedelta: NOTE – The support via a "Playback Relative Scale Adjustment" package is for further study.

Locale: Supported via the use of variables. See clause 6 of [ITU-T H.248.9].

Offset: Supported by the Play signal in the "Advanced audio server base" package, the Record signal in the "AAS recording" package and the "Multimedia recording" package in [ITU-T H.248.9].

Repeat: Supported via the "Iterations" parameter of the Play signal in the "Advanced audio server base" package in [ITU-T H.248.9].

Stoponerror: The default behaviour is for an MG to generate an error response if there is a problem. The MGC may wish to retry or request further announcements. In this way, it can apply the logic associated with this.

The audio element also has a number of attributes. The above mappings also apply. The variable attributes are achieved through the use of ITU-T H.248.9 variables as described in clause 6 of [ITU-T H.248.9].

6.2.2 Multimedia processing for IVR

See clause 6.2 of [IETF RFC 5022] for details.

See [ITU-T H.248.9] for multimedia support.

6.2.3 Playing announcements <play>

See clause 6.3 of [IETF RFC 5022] for details.

Supported by the "Advanced audio server base" package in [ITU-T H.248.9].

6.2.4 Prompt and collect <playcollect>

See clause 6.4 of [IETF RFC 5022] for details.

Supported by the "AAS Digit Collection" package in [ITU-T H.248.9].

6.2.5 Prompt and record <playrecord>

See clause 6.5 of [IETF RFC 5022] for details.

Supported by the "AAS Recording" package in [ITU-T H.248.9].

6.2.5.1 Prompt phase

The prompt URL is supported by the "InitialPrompt" parameter in [ITU-T H.248.9].

Barge: Digit collection may be achieved through the use of digit maps. The "restart", "Reinput", "Return key" and "Endinputkey" parameters may be used to indicate what effect user input will have on the announcement/recording.

Cleardigits: [ITU-T H.248.1] contains the EventBuffer descriptor that may be used to buffer DTMF collection.

Escapekey: Supported through the use of the [ITU-T H.248.9] "ReturnKey" parameter.

6.2.5.2 Record phase

Recurl: Supported through the use of the "RecordingIdentifier" parameter in [ITU-T H.248.9].

Recencoding: Supported through the use of the "RecordingIdentifier" in [ITU-T H.248.9]. The encoding forms part of the segment identifier.

Mode: Supported through the use of the "Storage Mode" parameter in the "AAS Recording" package and the "Multimedia recording" package in [ITU-T H.248.9].

Beep: Not explicitly supported by [ITU-T H.248.9]; however, the playout of beep tone may form part of the Initial Prompt.

Initsilence: Supported through the use of the "Pre-speech Timer" parameter in [ITU-T H.248.9]. The values "immediate" and "infinite" may be mapped to an appropriately short or long time value.

Endsilence: Supported through the use of the "Post-speech Timer" parameter in [ITU-T H.248.9]. The values "immediate" and "infinite" may be mapped to an appropriately short or long time value.

Recstopmask: Supported through the use of the "EndInputKey" parameter in [ITU-T H.248.9].

6.2.6 Stop request <stop>

See clause 6.6 of [IETF RFC 5022] for details.

The ending of interactive voice response is supported natively in the ITU-T H.248 protocol via the normal signal termination mechanisms.

6.3 Call leg events

6.3.1 Keypress events

See clause 7.1 of [IETF RFC 5022] for details.

This is supported by [ITU-T H.248.1] in the Tone Detection packages, with the exception of an explicit "Interdigit time". The MGC however may determine the interdigit time by examining the timestamp associated with the ObservedEvents reporting the detected DTMF digits.

6.3.2 Signal events

This is supported by [ITU-T H.248.1] in the "Tone Generator" and "Tone Detection" packages.

6.4 Managing content <managecontent>

See clause 8 of [IETF RFC 5022] for details.

See clauses 10 and 11 of [ITU-T H.248.9] which allow a MGC to manage the content on a MG.

6.5 Fax processing

See clause 9 of [IETF RFC 5022] for details.

Whilst fax is supported via [ITU-T H.248.2], there is no support in ITU-T H.248 for the MG to generate or record a fax.

6.6 MSCML response attributes and elements

See clause 10 of [IETF RFC 5022] for details.

See above for an analysis of how base elements are supported.

6.6.1 Response attributes and elements for <configure_leg>

See clause 10.3 of [IETF RFC 5022] for details.

The MGC is responsible for mapping team information to ITU-T H.248 connection model concepts.

6.6.2 Response attributes and elements for <play>

See clause 10.4 of [IETF RFC 5022] for details.

Response attributes are supported in the following ways:

Reason: Supported by the Audio Operation Failure event in [ITU-T H.248.9].

Play duration, Play offset: The [ITU-T H.248.9] "Advanced Audio Server Base Package", "AAS Digit Collection Package", "AAS Recording Package", "Multimedia Play Package" and "Multimedia Recording Package" have parameters that allow the "Play Duration" and "Play Offset" to be returned on signal completion (either successful or on error).

6.6.2.1 Reporting content retrieval errors

See clause 10.4.1 of [IETF RFC 5022] for details.

Only the "code" response attribute is directly supported. The MGC may map the ITU-T H.248 error code to the MSCML code and provide the text.

6.6.3 Response attributes and elements for <playcollect>

See clause 10.5 of [IETF RFC 5022] for details.

Response attributes are supported in the following ways:

Reason: Supported by the "Audio Operation Failure" event in [ITU-T H.248.9].

Play duration: Supported by the "PlayCollect Success" event in clause 9.2.2 of [ITU-T H.248.9].

Play offset: Supported by the "Offset" parameter in the "Playout Completion Event" in the Advanced audio server base package in [ITU-T H.248.9].

Digits: Supported by the "PlayCollect Success" event in clause 9.2.2 of [ITU-T H.248.9].

Name: Not relevant as ITU-T H.248 grammar applies.

6.6.4   Response attributes and elements for <playrecord>

See clause 10.6 of [IETF RFC 5022] for details.

Response attributes are supported in the following ways:

Reason: Supported by the Audio Operation Failure event.

Play duration: Supported by the "PlayRecord Success" event in clause 10.2.2 of [ITU-T H.248.9].

Play offset: Supported by the "Offset" parameter in the "Playout Completion Event" in the "Advanced audio server base" package in [ITU-T H.248.9].

Digits: Supported by the "End Key" parameter in the "PlayRecord Success Event" in the "AAS recording" package in [ITU-T H.248.9].

Reclength: Supported by the "Recording Length" parameter in the "PlayRecord Success Event" in the "AAS recording" package in [ITU-T H.248.9].

Recduration: Supported by the "Recording Duration" parameter in clause 10.2.2.2.5 of [ITU-T H.248.9].

6.6.5   Response attributes and elements for <managecontent>

See clause 10.7 of [IETF RFC 5022] for details.

This is supported by normal ITU-T H.248 error response mechanisms.

6.6.6   Response attributes and elements for <faxplay> and <faxrecord>

See clause 10.8 of [IETF RFC 5022] for details.

Fax play and record are currently not supported by [ITU-T H.248.9].

7   TDM Gain Control Package

Package Name: TDM Gain Control Package

Package ID: tgc (0x00f9)

Description: This package provides the MGC and the MG the enhanced gain control functionalities.

Version: 1

Extends: TDM Circuit Package version 1

7.1   Properties

7.1.1   Incoming Gain Control

Property Name: Incoming Gain Control

Property ID: ingain (0x000b)

Description: As per clause E.13.1.2 of [ITU-T H.248.1], except that it is used to adapt the level of the inbound signal.

Type: Integer

Possible values: As per clause E.13.1.2 of [ITU-T H.248.1]

Default: Provisioned

Defined in: LocalControl Descriptor

Characteristics: Read/Write

7.1.2   Outgoing Automatic Gain Parameters

Property Name: Outgoing Automatic Gain Parameters

Property ID: oagp (0x000c)

Description: This property allows the MGC to provide further information to the MG regarding automatic gain control for an outgoing signal/media.

Type: Sub-list of Integer

Possible values: The sub-list of Integer shall be of length three. The first instance of the sub-list represents the "Start level", the second instance represents the "Target level" and the third instance represents the "Silence Threshold". Each instance contains an integer value representing a level in decibels.

Default: Provisioned

Defined in: LocalControl Descriptor

Characteristics: Read/Write

7.1.3   Incoming Automatic Gain Parameters

Property Name: Incoming Automatic Gain Parameters

Property ID: iagp (0x000d)

Description: This property allows the MGC to provide further information to the MG regarding automatic gain control for an incoming signal/media.

Type: Sub-list of Integer

Possible values: As per clause 7.1.2

Default: Provisioned

Defined in: LocalControl Descriptor

Characteristics: Read/Write

7.2   Events

None.

7.3   Signals

None.

7.4   Statistics

None.

7.5 Error codes

None.

7.6 Procedures

In order to control the gain on an incoming signal/media, the MGC may set the "Incoming Gain Control" (*tgc/ingain*) property. For the outbound signal/media, it may set the "Gain Control" (*tdm/gain*) property. The MGC may set these properties to a fixed value or to indicate automatic gain. Where automatic gain is indicated, further information may be provided to the MG through the use of the "Outgoing Automatic Gain Parameters" (*tgc/oagp*) and/or "Incoming Automatic Gain Parameters" (*tgc/iagp*) properties. These parameters provide extra information to the MG in order to provide a more accurate and timely automatic level control. If set, these properties shall be included in the same command as the one that indicates automatic gain for the particular direction. If set separately, error code 472 "*Required Information Missing*" shall be returned.

[ITU-T G.169] contains information regarding automatic level control devices. Start level (otherwise known as "initial gain"), target level and silence threshold (otherwise known as "threshold level") and how they apply to automatic level control are discussed in that Recommendation.

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