INTERNATIONAL TELECOMMUNICATION UNION

ITU-T

H.248 Sub-series Implementors' Guide

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

(6 July 2007)

SERIES H: AUDIOVISUAL AND MULTIMEDIA SYSTEMS

Infrastructure of audiovisual services – Communication procedures

Implementors' Guide for the H.248 Sub-series of Recommendations ("Media Gateway Control Protocol")

Summary

This document is a compilation of reported defects identified in the ITU-T H.248 sub-series of Recommendations currently in force. It must be read in conjunction with the Recommendations to serve as an additional authoritative source of information for implementors. The changes, clarifications and corrections defined herein are expected to be included in future versions of affected H.248 sub-series Recommendations.

This revision contains all updates submitted up to and including those at Study Group 16 meeting in Geneva, 26 June – 6 July 2007.

This Implementors' Guide was approved by ITU-T Study Group 16 on 6 July 2007 (TD 398/Plen) and it obsoletes the earlier version of this Implementors' Guide approved on 24 November 2006.

NOTE: the Implementors' Guides for H.248.1 Version 1 and Version 2 are published as *separate* documents.

Change Log

(All changes that were included in corrigenda, amendments or revisions to the recommendations in the H.248 subseries are omitted here.)

V19 (Melbourne, February 2005)

Added new section for H.248.20, renumbering other sections as appropriate.

New:

6.12	Annex C and SDP parameters
6.13	Case Sensitivity of Profile Names
6.14	Profile Negotiation
6.15	Conflict between H.248.1 Version 2 Corrigendum 1 and H.248.8
7.1	Clarification of "At-Most-Once" Functionality
9.1	Media Values

V20 (Geneva, August 2005)

New:

6.16	AuditCapability of Signals
6.17	Media Type Mismatch
6.18	Notify Avalanche
6.19	Topology Reply
6.20	Statistics and Sub-lists
7.1	Probe Order Typo
9.2	New Error Code – Too many transactions
12.1	Alerting Confusion
13.1	Metering Pulses at Signal Replacement

V21 (Geneva, November 2005)

Removed items pertaining to H.248.1 Version 2, as they are incorporated into the new H.248.1 Version 2 IG. Added new section for H.248.1 Version 3. Removed existing items pertaining to H.248.8, as they are incorporated in the H.248.8 (09/2005) revision. Added new section for H.248.9. Renumbered existing sections.

New:

6.1	Clarification of ASN.1 definition of topologyDirectionExtension
6.2	Correction of ASN.1
6.3	Correction of Annex E.14.6 Procedures
6.4	Clarification of statistic reset capability
6.5	Clarification of delay calculation
6.6	Protocol version negotiation
9.1	Error text for error code 449

6.28   Clarification of use of ServiceChangeAddress

6.29   Correction of typographical error in Appendix III clause 5.7.4

6.30   Clarification of length encoding in ASN.1 syntax

6.31   Clarification for context attribute values when omitted from actions

6.32   Clarification of the use of ServiceChange Disconnected when re-establishing comms

6.33   Clarification of use of unsigned integer

9.4   Clarification of the use of error text

12.1   Correction of Typographical error in Clause 8.3.1.2/H.248.17

V24 (Geneva, November 2006)

Added new section for H.248.23. Removed existing items pertaining to H.248.2, as they are incorporated in the H.248.2 (01/2005) Amendment 1 (01/2007). Removed existing items pertaining to H.248.30, as they are incorporated in the H.248.30 (01/2007) revision. Renumbered existing sections.

Modified:

6.15   Clarification of encoding for packet loss statistic in Annex E.12

New:

6.34   Correction to SDP examples in Appendix I

6.35   Clarification of SDP requirements for the MG

6.36   Correction for Segmentation Error handling

6.37   Clarification of the Octets Sent and Octets Received Statistics in the nt and rtp packages

14.1   Clarification of default pattern ID

14.2   Clarification of solutions to possible race condition in dwa signal

V25 (Shenzhen, March 2007)

Added new section for H.248.30. Added new section for H.248.32. Added new section for H.248.36.

New:

6.38   Correction of package name in Signals Descriptor text

6.39   Clarification of construction of Annex C types

6.40   Clarification of use of ServiceChangeMgcID

6.41   Correction of typeset error in Media Descriptor text

6.42   Transformation of statistics by receiving entities

6.43   Clarification of ServiceChange Graceful handling by terminations in the NULL Context

8.5   Clarification of use of Error Code 500 for MGC

8.6   Correction of incorrect abbreviation for Media Gateway

8.7   New error code 543

15.1   Correction of title of clause 8

16.1   Correction of Extension Resource names

17.1   Clarification of cleanup of hanging terminations

V26 (Geneva, June 2007) Interim draft at meeting to record accepted changes before introduction into H.248.1v3 Amendment 1.

Added new section for H.248.34.

Modified:

6.42   Corrected description

6.43   Corrected description

New:

6.44   Clarification on the Move command

6.45   Clarification on signal direction

6.46   Clarification on maximum number of Contexts

6.47   Service Change extension parameter ABNF

6.48   Clarification on ABNF comment update for indAudterminationStateParm

6.49   Clarification on compatibility

6.50   Clarification for command responses

6.51   Clarification for ServiceChange at failure of an MGC

17.1   Inconsistent parameter value naming (Note: this has caused the renumbering of subsequent sections.

V27 (Geneva, July 2007)

Removed items from clause 6. These items are incorporated into H.248.1v3 Amendment 1 (2007)

Removed items from clause 8. These items are incorporated into revised H.248.8 (2007)

Removed items from clause 9. These items are incorporated into Amendment 1 (2007) to H.248.9

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Table of Contents

Implementors' Guide for the H.248 Sub-series of Recommendations

1 Scope

This guide resolves defects in the following categories:

– editorial errors

– technical errors, such as omissions and inconsistencies

– ambiguities

In addition, the Implementors' Guide may include explanatory text found necessary as a result of interpretation difficulties apparent from the defect reports.

This Guide will not address proposed additions, deletions, or modifications to the Recommendations that are not strictly related to implementation difficulties in the above categories. Proposals for new features should be made through contributions to the ITU-T.

2 Introduction

The H.248 Implementors' Guide is a compilation of reported defects for all versions of the H.248.x sub-series of Recommendations, except H.248.1 Version 1 (03/2002) and H.248.1 Version 2 (05/2002) Corrigendum 1 (03/2004). *For the defects in Version 1, see the H.248.1 Version 1 Implementors' Guide. For the defects in Version 2, see the H.248.1 Version 2 Implementors' Guide.*

In this edition of the Guide, reported defects identified as of 07/2007 are given for:

– H.248.5 (11/2000)

– H.248.14 (03/2002)

– H.248.17 (11/2002) Corrigendum 1 (03/2004)

– H.248.20 (11/2002)

– H.248.22 (07/2003)

– H.248.23 (01/2005) Corrigendum 1 (05/2006)

– H.248.30 (01/2007)

– H.248.32 (01/2005)

– H.248.34 (01/2005)

– H.248.36 (01/2005)

The Guide must be read in conjunction with the H.248.x sub-series of Recommendations to serve as an additional source of information for implementors. The changes, clarifications and corrections defined herein are expected to be included in future versions of affected H.248.x Recommendations.

3 Defect Resolution Procedure

Upon discovering technical defects with any components of the H.248.x Sub-series Recommendations, please provide a written description directly to the editors of the affected Recommendations with a copy to the Q.3/16 Rapporteur. The template for a defect report is located

at the end of the Guide. Contact information for these parties is included at the front of the document. Return contact information should also be supplied so a dialogue can be established to resolve the matter and an appropriate reply to the defect report can be conveyed. This defect resolution process is open to any interested party. Formal membership in the ITU is not required to participate in this process.

4   References

This document refers to the following H.248.x sub-series Recommendations:

- ITU-T Recommendation H.248.1 Version 3 (09/2005), *Gateway Control Protocol: Version 3*

- ITU-T Recommendation H.248.5 (11/2000), *Gateway Control Protocol: Transport over ATM*

- ITU-T Recommendation H.248.8 (09/2005), *Gateway Control Protocol: Error code and service change reason description*

- ITU-T Recommendation H.248.9 (01/2005), *Gateway control protocol: Advanced media server packages*

- ITU-T Recommendation H.248.14 (03/2002), *Gateway control protocol: Inactivity timer package*

- ITU-T Recommendation H.248.17 (11/2002), Corrigendum 1 (03/2004), *Gateway control protocol: Line test packages*

- ITU-T Recommendation H.248.20 (11/2002), *Gateway Control Protocol: The use of local and remote descriptors with H.221 and H.223 multiplexing*

- ITU-T Recommendation H.248.22 (07/2003), *Gateway Control Protocol: Shared Risk Group Package*

- ITU-T Recommendation H.248.23 (01/2005), Corrigendum 1 (05/2006), *Gateway Control Protocol: Enhanced alerting packages*

- ITU-T Recommendation H.248.30 (01/2007), *Gateway Control Protocol: RTCP extended performance metrics packages*

- ITU-T Recommendation H.248.32 (01/2005), *Gateway Control Protocol: Detailed congestion reporting package*

- ITU-T Recommendation H.248.34 (01/2005), *Gateway Control Protocol: Gateway control protocol: Stimulus analogue lines package*

- ITU-T Recommendation H.248.36 (09/2005), *Gateway Control Protocol: Hanging Termination Detection package*

5   Nomenclature

In addition to traditional revision marks, the following marks and symbols are used to indicate to the reader how changes to the text of a Recommendation should be applied:

Symbol	Description
[Begin Correction]	Identifies the start of revision marked text based on extractions from the published Recommendations affected by the correction being described.
[End Correction]	Identifies the end of revision marked text based on extractions from the published Recommendations affected by the correction being described.
...	Indicates that the portion of the Recommendation between the text appearing before and after this symbol has remained unaffected by the correction being described and has been omitted for brevity.
--- SPECIAL INSTRUCTIONS --- {instructions}	Indicates a set of special editing instructions to be followed.

6   Technical and Editorial Corrections to H.248.1 (09/2005)

All corrections have been incorporated into Amendment 1 (2007) to H.248.1 (09/2005).

7   Technical and Editorial Corrections to H.248.5 (2000)

7.1   Clarification of "At-Most-Once" Functionality

Description:	At the January 2004 Geneva SG16 meeting D376 introduced a clarification to H.248.4 on the issue of providing the at most once functionality. It described the issue as: *"In section 3 "Providing the at most once functionality" the procedure recommends that the procedures of H.248 Annex D.1.1 be followed apart from the use of LONG TIMER and TransactionResponseAck.* *When referencing a potential confusion exists in that the procedure to compare and remove duplicate transaction identities uses the LONG TIMER. Readers may assume that as LONG TIMER is not used then the procedure of comparing and identifying duplicate transaction identities is also not supported. This is an incorrect assumption. It is proposed to clarify that procedures to identify duplicate transaction ID are needed."* H.248.5 has the same text with regards to providing at most once functionality. Thus it is proposed that a clarification is added that the MTP backward sequence number is added to H.248.5.
Reference:	AVD-2663

2.   References

–   Recommendation ITU-T Q.703 (07/1996), *Specifications of Signalling System No. 7 – Message transfer part.*

…

4.1   Providing At-Most-Once functionality

Messages, being carried over MTP3b, may be subject to losses. In the absence of a timely response, commands are repeated. Most commands are not idempotent. The state of the MG would become unpredictable if, for example, Add commands were executed several times. The transmission procedures shall thus provide an "At-Most-Once" functionality.

The procedures in D.1.1/H.248.1 shall be followed with two exceptions:

–   The LONG-TIMER shall not be used to remove a Transaction Identity from the list of responses. The MTP Backward Sequence Number (as defined in Q.703 § 5.2) or a response to the requested command shall be used.;

–   The TransactionResponseAck parameter shall not be used.

…

8   Technical and Editorial Corrections to H.248.8 (2005)

All corrections have been incorporated into revised H.248.8 (2007).

9   Technical and Editorial Corrections to H.248.9 (2005)

All corrections have been incorporated into Amendment 1 (2007) to H.248.9 (2005).

10 Technical and Editorial Corrections to H.248.14 (2002)

10.1 Provisioning of the Inactivity Timeout Event

Description:	The development of H.248.14 was controversial in that people did not see the necessity for it for high traffic gateways. However it was agreed that the MGC shouldn't be burdened with having to do large amount of extra signalling or processing in order to get this inactivity timer functionality. AVD-2119 shows the original rationale behind the proposal. Given the history of H.248.14 the contributors believe the following statements can be made: 1. In the original discussions in mid-2001 people favoured a mechanism that did not cause extra burden on the MGC. 2. H.248.14 was seen to be used for residential gateways where the signalling load was insufficient for a keep-alive mechanism. 3. There could be tens of thousands of residential gateways per MGC. 4. If the MGC had to set the "timeout" event on each gateway at restart this would cause a significant signalling load on the MGC. Therefore in keeping with one of the original aims of H.248.14 and given its nature of use with large numbers of MGs it is proposed to recommend that the inactivity timeout event should be provisioned. Furthermore this recommendation is extended to other events which may be provisioned at start up. Another benefit of the provisioning is that the MG may detect if the MGC fails immediately after restart and can take corrective action.
Reference:	D-274

[Begin Correction]

5.5 Procedures

…

If the MGC has failed, the event will not receive a reply. If no reply is received, the MG will consider the MGC to have failed and will follow the procedures of 11.5/H.248.1.

<u>NOTE – To minimize signalling load at MGC restarts in networks where there are large numbers of MGs that implement the Inactivity Timer Package, the Inactivity Timeout Event may be provisioned in both the MGC and MG. This also enhances the ability of the MG to detect MGC failures immediately after the MGC restarts.</u>

…

[End Correction]

11 Technical and Editorial Corrections to H.248.17 (2002) Corr. 1 (2004)

11.1 Correction of Typographical error in Clause 8.3.1.2/H.248.17

Description:	In clause 8.3.1.2/H.248.17 there is a reference to the "bcg/bdtq" (A.8/Q.1950) signal. This should be "bcg/bdt".
Reference:	AVD-2843

[Begin Correction]

8.3.1.2 Auto Answering Trunk (AAT)

Auto Answering Trunk with forced disconnection

To perform the line test described in JJ-90-10 Appendix A.4.1 over an MGC/MG interface, the MGC shall request the MG, via the signal "bgc/brt"(A.8/Q.1950, "Basic Call Progress Tones Generator with Directionality") in an AMM command, to initiate a ringing tone. After 6 seconds the MGC shall then request the MG, via the signal "bcg/bdtq" (A.8/Q.1950), to initiate a dial tone. After reception of Modify acknowledgement, the MGC having timed the Dial Tone for a period of 10 seconds will request MG to stop Dial Tone by sending a MOD command.

…

[End Correction]

12 Technical and Editorial Corrections to H.248.20 (2002)

12.1 Media values

Description:	H.248.20 defines the following for the use of the Media field in the SDP m= line:
	5.1.2 "m=line" Line for H.221 and H.223 MUX termination
	The syntax of the media field:
	media-field = "m=" media SP port ["/" integer] SP proto 1*(SP fmt) CRLF
	The possible media values for media are "audio", "video", "data" and "control", depending on the media type within the specific H.248.1 Stream. "Control" is used if a Stream is

	defined for the demultiplexed H.245 messages.
	Currently the IETF are working on updating the SDP RFC (see: http://www.ietf.org/internet-drafts/draft-ietf-mmusic-sdp-new-23.txt). In this text the IETF have removed the value "control" from the allowed list of media types. Thus it will soon be invalid to use value "control". It is therefore proposed to allow the use of "application" for a de-multiplexed H.245 message.
	The draft defines the users of the media type "application" as:
	"Voice over IP, video teleconferencing, streaming media, instant messaging, etc. See also section 3 of RFC XXXX."
	From this definition it is seen that type "application" would be appropriate for use for H.248.20.
Reference:	AVD-2663

[Begin Correction]

5.1.2   "m=line" Line for H.221 and H.223 MUX termination

The syntax of the media field:

media-field = "m=" media SP port ["/" integer] SP proto 1*(SP fmt) CRLF

The possible media values for media are "audio", "video", "data" and "application~~control~~", depending on the media type within the specific H.248.1 Stream. "application~~Control~~" is used if a Stream is defined for the demultiplexed H.245 messages.

Note: Some older applications may use the value "control". To aid interoperability MGs should be able to recognize "control".

…

[End Correction]
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13 Technical and Editorial Corrections to H.248.22 (2003)

13.1 Correction of typographical errors

Description:	H.248.22 contains typographical errors in that the property "shrisk/srgi" is referenced however the correct property reference is "shrisk/srgir".
	H.248.1 defines the "Include shared risk group" property with the values "on/off". Eg.
	5.1.1 Property Name: Include shared risk group
	PropertyID: incl, 0x0001
	Description:
	The value of this property indicates if the shared risk group specified is requested to be used or to not be used (see 5.5.1.1 for further details).
	Type: Sublist of type Boolean
	Possible Values:
	"on" (TRUE) Use resources from the specified SRGI only [Default]
	"off" (FALSE) Use resources from any but the specified SRGI

	However the procedures use yes/no instead of on/off in one place. The procedures should be corrected to align with 5.1.1.
Reference:	AVD-2467 and COM 16 D-44

[Begin Correction]

5.5.1.1 Usage of the "Include shared risk group" property

The "Include shared risk group" property shall be used to indicate to the MG if resources from the specified shared risk group identity (*shrisk/srgir*) must be used for the termination (*shrisk/incl = ~~yes~~on*) or if resources from the specified risk group identity must not be used for the termination (*shrisk/incl = ~~no~~off*). If the MGC is not concerned with which shared risk groups are used then it should not include the *shrisk/incl* nor *shrisk/srgir* properties. The *shrisk/incl* and *shrisk/srgir* properties are valid only for the command that they are contained in. They cannot be read/audited after the execution of the command. Wildcarding values with CHOOSE ($) or ALL (*) shall not be used with *shrisk/incl* and/or *shrisk/srgir*. For example: in the case of a semi-permanent connection and a protective secondary link, by specifying (*shrisk/incl = on, shrisk/srgir = 1*) for the primary link and (*shrisk/incl = off, shrisk/srgir = 1*) for the secondary, the MGC is assured that the primary and secondary links are not sharing the same groups of resources.

…

[End Correction]

14 Technical and Editorial Corrections to H.248.23 (2005) Corr. 1 (2006)

14.1 Clarification of default pattern ID

Description:	The Corrigendum deleted a sentence that was in direct conflict with the defined default value for the pattern parameter of the dwa signal. Some confusion as to how the pattern is applied when not included in the signal has ensued. As with any other signal, the default is applied when the parameter is absent. A notation indicating that data to be sent without alerting should use the data signal would help ease the confusion.
Reference:	COM16 C-110

[Begin Correction]

6.3.1.1.2   Pattern

…

Description: The pattern is an abstract indication of the distinctive alerting pattern that will be applied to the line. If data is to be applied without alerting, the data signal should be used.

…

[End Correction]

14.2 Clarification of solutions to possible race condition in dwa signal

Description:	A possible, but rare, race condition for the dwa signal has been raised in a number of contributions to SG16. There is a solution that utilizes the base protocol constructs that needs documentation in the package.

Reference:	Discussions arising from COM16 C-70

[Begin Correction]

6.5   Procedures

…

For ADSI, there are constraints similar to the off-hook data with alerting around ACK digits and softkey/digit responses. Any responses that the MGC wishes to be made aware of should be requested in the Events descriptor. Digitmaps may be used for this application.

There is a possible race condition where an MGC might apply the dwa signal intending power ringing and data to be applied, but before the signal reaches the MG, the termination undergoes a transition to offhook. The result is that the signal would apply a call waiting tone in the interim while the MG reports the offhook and the MGC responds with updated Events and Signals Descriptors. It may be desirable to prevent any possibility of this race condition occurring. To achieve this, implementations may embed the andisp/dwa signal on the onhook event with its strict parameter set to "state". This will enforce that the dwa signal is only applied if the termination is still onhook when the command arrives at the MG.

Binary encoding SHALL carry the binary data. Text encoding SHALL carry the data as a hex string encoded as big-endian hex data.

…

[End Correction]

15 Technical and Editorial Corrections to H.248.30 (2007)

15.1 Correction of title of clause 8

Description:	The title of clause 8 is incorrect due to a cut/paste error.
Reference:	AVD-2972a

[Begin Correction]

8   Received RTCP XR Burst Metrics Package

…

[End Correction]

16 Technical and Editorial Corrections to H.248.32 (2005)

16.1 Correction of Resource Extension names

Description:	Currently H.248.32 defines that the Extension Resource being 1 to 20, with the text names ext1, ext2 .. ext20 and the binary ids 0x0021 to 0x0040. However this leads to a potential mismatch in values as it is not clear whether the text name is decimal or hexadecimal. The text name is decimal so the values should be updated to reflect this.
Reference:	Subject: [Megaco] Number of Extension Resources in Detailed Congestion Reporting

	Package Date: 07.03.2007 12:56 From: "Arvind Charanyan"<arvind.charanyan@ccpu.com> To: <megaco@ietf.org>

[Begin Correction]

5.1.1 Resources Definitions

…

Table 1/H.248.32 – Resource Names

Resource Name:	PropertyID/EnumerationValue	
	Text Identifier	Binary Identifier
General Resources	gen	0x0001
DSP Resources	dsp	0x0002
IP Resources	ip	0x0003
ATM Resources	atm	0x0004
Reserved		0x0005 – 0x0020
Extension Resource 1	ext1	0x0021
Extension Resource 2	ext2	0x0022
	…	
Extension Resource ~~20~~32	~~ext20~~ext32	0x0040

…

[End Correction]

17 Technical and Editorial Corrections to H.248.34 (2005)

17.1 Correction of inconsistent parameter value naming

Description:	The use of the parameter value name "reversePolarity" is inconsistent between Table 1 and Table 6. Table 6 uses the name "reversedPolarity". As Table 1 first defines the value name Table 6 should be updated to align.
Reference:	C.277

[Begin Correction]

**Table 6/H.248.34 – Detailed mapping of V5 PSTN
Protocol Information Elements**

…

Steady Signal	In the MGC to MG direction, the V5 information element is mapped to the signal "steady signal" defined in this package with the V5 parameters mapped as follows:

In the MGC to MG direction, the V5 information element is mapped to the signal "steady signal" defined in this package with the V5 parameters mapped as follows:

- Steady Signal type – Directly mapped to the parameter "Signal" as specified below.

V5		H.248	
Steady signal	**Value**	**Text encoding**	**Binary encoding**
Normal polarity	0	"normalPolarity"	(0x0000)
Reversed polarity	1	"reversedPolarity"	(0x0001)
Battery on c-wire	2	"batteryOnC-wire"	(0x0002)

…

[End Correction]

18 Technical and Editorial Corrections to H.248.36 (2005)

18.1 Clarification of cleanup of hanging terminations

Description:	Some wording about the cleanup of hanging terminations in H.248.36 is confusing in regard to which entity has responsibility for cleaning up these terminations. This needs to be clarified.
Reference:	Discussions at March 2007 Shenzhen meeting related to AVD-3089

[Begin Correction]

5.6.1   Detection of hanging terminations

…

In the case the MGC is unable to detect these terminations, the MG needs to be able to detect and clean up terminations that are hanging by sending Notify Commands to the MGC identifying the hanging terminations. The MG can detect hanging terminations by error responses to commands. Typically, during a stable speech call state, very few H.248.1 messages are generated by the MG, thus a mechanism is needed to trigger a periodic message from the MG. The MG may issue a periodic Notify command on the concerned termination and check the response to determine if the MGC has a record of the termination or not. The time period for this Notify may be parameter driven.

…

[End Correction]

Annex: Defect Report Form for H.248 Sub-series

DATE:	
CONTACT INFORMATION **NAME:** **COMPANY:** **ADDRESS:** **TEL:** **FAX:** **EMAIL:**	
AFFECTED RECOMMENDATIONS:	
DESCRIPTION OF PROBLEM:	
SUGGESTIONS FOR RESOLUTION:	

NOTE - Attach additional pages if more space is required than is provided above.

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