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SERIES H: AUDIOVISUAL AND MULTIMEDIA SYSTEMS
Infrastructure of audiovisual services – Communication
procedures

Implementors' Guide for Recommendation H.248.1 Version 1 (03/2002) ("Media Gateway Control Protocol")

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Summary

This document is a compilation of reported defects identified in ITU-T Recommendation H.248.1 Version 1 (03/2002). It must be read in conjunction with the Recommendation to serve as an additional authoritative source of information for implementors.

This revision contains all updates submitted up to and including those at Study Group 16 meeting in January 2004.

This document was approved by ITU-T Study Group 16 on 30 January 2004.

NOTE: Changes relative to H.248.1 Version 2 (05/2002) and onwards are found in another document.

Change Log

(All changes that were included in H.248.1 v1 (03/2002) are omitted here.)

V10 (Bruges, June 2002)

Changed references to H.248 Amendment 1 to H.248.1.

New:

- 6.1 Specify types for rtp/jit and rtp/delay in Annex E.12.4
- 6.2 Define the '#' symbol in INEQUAL in text encoding
- 6.3 Empty Descriptor Syntax
- 6.4 Define the symbol for NULL Context in text encoding
- 6.5 Corrections to Appendix A example statistics
- 6.6 Corrections to Package Guidelines for Statistics in 12.1.5
- 6.7 Specification of the meaning of automatic in E.13 tdm package

V11 (Geneva, October 2002)

Modification:

- 6.7 Added additional changes to gain

New:

- 6.8 Protocol Version Negotiation
- 6.9 Statistics and Move
- 6.10 Additional Codepoint for Annex C
- 6.11 Wildcarding Principles

V12 (San Jose, February 2003)

New:

- 6.12 Wildcarding in the Topology Descriptor
- 6.13 Binary Value for Packetization Time (Annex C)

V13 (Geneva, May 2003)

New:

- 6.14 Modification of Terminations by MGCs
- 6.15 Optional Command in an Action
- 6.16 Ordering of Transactions
- 6.17 Replies to Actions with no Commands

V14 (Paris, September 2003)

Made several editorial changes to the text.

Modification:

- 6.3 Ambiguous Audit and Individual Audit Return (Changed title and description – no technical change)

New:

- 6.18 Network Package can apply to TDM

V15 (Geneva, January 2004) [TD 55R1/PLEN]

Modified:

- 6.17 This item is deprecated in favor of 6.23

New:

- 6.19 Precedence of LocalControl Mode property versus SDP mode
- 6.20 Digit processing clarification
- 6.21 Usage of DigitMap timer symbols with range notation
- 6.22 Clarification of the use of StreamID = 0
- 6.23 Correction of Context Audit Return
- 6.24 Clarification of return value for AuditCapabilities of strings

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Implementors' Guide for Recommendation H.248.1 Version 1 (03/2002)

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 Recommendation 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.248.1 Version 1 Implementors' Guide is a compilation of reported defects for version 1 of Recommendation H.248.1 (03/2002). This edition of the Guide contains reported defects identified as of 01/2004.

The Guide must be read in conjunction with Recommendation H.248.1 version 1 to serve as an additional source of information for implementors. For changes to other versions of H.248.1 or for other Recommendations in the H.248.x sub-series, please reference the H.248 Sub-series Implementors' Guide.

3 Defect Resolution Procedure

Upon discovering technical defects with Recommendation H.248.1 Version 1, please provide a written description directly to the editor 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 Recommendation:

- ITU-T Recommendation H.248.1 Version 1 (03/2002), *Media Gateway Control Protocol*

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
<u>[Begin Correction]</u>	Identifies the start of revision marked text based on extractions from the published Recommendations affected by the correction being described.
<u>[End Correction]</u>	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

--- SPECIAL INSTRUCTIONS --- {instructions}

has been omitted for brevity.
Indicates a set of special editing instructions to be followed.

6 Technical and Editorial Corrections to H.248.1 Version 1 (03/2002)

6.1 Specify types for rtp/jit and rtp/delay in Annex E.12.4

Description:	In Regard to rtp/jit and rtp/delay: These package elements do not have types (Integer, Double, etc.) in the 6/00 doc, the IG, or the corrigendum.
Reference:	From: Troy Cauble <troy@bell-labs.com> Date: 6/18/2002 7:22 PM Subject: [Megaco] rtp/jit, rtp/delay

E.12.4 Statistics

[Begin Correction]

Jitter

StatisticID: jit (0x0007)

Requests the current value of the interarrival jitter on an RTP stream as defined in IETF RFC 1889. Jitter measures the variation in interarrival time for RTP data packets.

Type: double

Possible Values: any 64 bit integer

Delay

StatisticID:delay (0x0008)

Requests the current value of packet propagation delay expressed in timestamp units. Same as average latency.

Type: double

Possible Values: any 64 bit integer

[End Correction]

6.2 Define the '#' symbol in INEQUAL in text encoding

Description:	INEQUAL = LWSP (">" / "<" / "#") LWSP The symbol "#" is not explained. From the ASN.1, it appears that it means "not equal". I found a comment in the archives describing it as "quantity of" (??) Which is correct?
Reference:	From: Raphael Tryster Raphael@tdsoft.com Date: 6/2/2002 4:21 AM Subject: [Megaco] INEQUAL, parmValue

B.2 ABNF Specification

[Begin Correction]

INEQUAL = LWSP (">" / "<" / "#") LWSP; “#” means ‘not equal’

[End Correction]

6.3 Ambiguous Audit and Individual Audit Return

Description:	<p>The use of the audititem information element in the <i>auditreturnparameter</i> structure leads to ambiguities in audit and individual audit replies. With the current ABNF formulation a reply could be for example:</p> <ul style="list-style-type: none">- an empty eventsDescriptor or an auditItem- an individual audit response or a descriptor audit response. <p>This ambiguity was introduced because <i>auditreturnparameter</i> is used in both command requests and returns. It was not intended that <i>audititem</i> be used in command replies</p>
Reference:	<p>From: Aleksandr Ryabin <kengr@winphoria.com> Date: 5/30/2002 1:08 PM Subject: RE: [Megaco] Descriptor grammar issue</p>

B.2 ABNF Specification

[Begin Correction]

signalsDescriptor = SignalsToken [LBRKT † signalParm
* (COMMA signalParm) † RBRKT]

[End Correction]

[Begin Correction]

auditReturnParameter = (mediaDescriptor / modemDescriptor /
muxDescriptor / eventsDescriptor /
signalsDescriptor / digitMapDescriptor /
observedEventsDescriptor /
eventBufferDescriptor /
statisticsDescriptor / packagesDescriptor /
errorDescriptor / auditReturnItem)

auditReturnItem = (MuxToken / ModemToken / MediaToken /
DigitMapToken / StatsToken /
ObservedEventsToken / PackagesToken)

[End Correction]

[Begin Correction]

```
;at-most-once, and DigitMapToken and PackagesToken are not allowed
;in AuditCapabilities command
auditItem          = ( auditReturnItem / SignalsToken /
                        EventBufferToken / EventsToken )

auditItem          = ( MuxToken / ModemToken / MediaToken /
                        SignalsToken / EventBufferToken /
                        DigitMapToken / StatsToken / EventsToken /
                        ObservedEventsToken / PackagesToken )
```

[End Correction]

6.4 Define the symbol for NULL context in text encoding

Description:

In answering a recent question on the list, I was surprised to not be able to find where we define NULL as being encoded as '-' in text encoding. We define "*" and "\$" in B.1. "ROOT" appears in the syntax for TerminationID. Similarly '-' appears in the syntax for ContextID but nothing states that it stands for NULL. It seems obvious "ROOT" stands for ROOT but less so for '-'. Am I missing something or should be add something to B.2 to state this?

B.2 ABNF Specification

[Begin Correction]

```
;The values 0x0, 0xFFFFFFFFE and 0xFFFFFFFFF are reserved,
; "-" is used for NULL context.
ContextID          = (UINT32 / "*" / "-" / "$")
```

[End Correction]

6.5 Corrections to Appendix A example statistics

Description:

The statistics returned in step 22 of the example in Appendix A.1.1 omits some of the statistics in the packages implemented on the terminations and indicates the wrong units for nt/dur. While this example is not normative, errors are confusing to readers.

Reference:

Private discussion during Jun 2002 meeting in Bruges.

Appendix A.1.1 step 22

[Begin Correction]

From MG2 to MGC:

```

MEGACO/1 [125.125.125.111]:55555
Reply = 50009 {
  Context = 5000 {
    Subtract = A5555 {
      Statistics {
        nt/os=45123, ; Octets Sent
        nt/or=45123, ; Octets SentReceived
        nt/dur=40000 ; in milliseconds
      }
    },
    Subtract = A5556 {
      Statistics {
        rtp/ps=1245, ; packets sent
        nt/os=62345, ; octets sent
        rtp/pr=780, ; packets received
        nt/or=45123, ; octets received
        rtp/pl=10, ; % packets lost
        rtp/jit=27,
        rtp/delay=48 ; average latency
        nt/dur=38000 ; in millisec
      }
    }
  }
}

```

[End Correction]

6.6 Corrections to Package Guidelines for Statistics in 12.1.5

Description:	The guidelines for defining statistics for packages only suggests indicating the units of the statistic but not its type or range. The packages in Annex E that define statistics uses sections similar to those for package parameters which include type and possible values. It would seem preferable to change the guidelines to recommend this format.
Reference:	Private discussion during Jun 2002 meeting in Bruges.

12.1.5 Statistics

[Begin Correction]

Statistics defined by the package, specifying:

Statistic name: only descriptive.

StatisticID: Is an identifier

StatisticID is used in a StatisticsDescriptor

Description

Units: unit of measure, e.g. milliseconds, packets

Type: One of:

Boolean

String: UTF-8 string

Octet String: A number of octets. See Annex A and Annex B.3 for encoding

Integer: 4 byte signed integer

Double: 8 byte signed integer

Character: Unicode UTF-8 encoding of a single letter.

Could be more than one octet.

Enumeration: One of a list of possible unique values (See 12.3)

Sub-list: A list of several values from a list. The type of sub-list SHALL also be specified. The type shall be chosen from the types specified in this section (with the exception of sub-list). For example,

Type: sub-list of enumeration. The encoding of sub-lists is specified in Annexes A and B.3.

Boolean

Possible Values:

A package must indicate the unit of measure, e.g. milliseconds, packets, either here or along with the type above, as well as indicating any restriction on the range.

[End Correction]

6.7 Specification of the meaning of automatic in E.13 tdm package

Description:	<p>The meaning of “automatic” in the gain parameter of E.13 tdm package is not well defined. and</p> <p>There have been several issues raised over the last month or so about gain in the TDM package (Annex E.13) as well as in Annex C. I will summarize the issues and propose changes to address them.</p> <p>1. tdm/gain is defined as integer which in 12.1.2 is clearly signed but the description and choice of value for "automatic" seem to have assumed that the value was unsigned. [consensus was that gain should be signed, negative values have useful meaning and that the reserved value for automatic should be changed. Note this last issue is definitely not backward compatible but no objections were raised.]</p> <p>2. tdm/gain does not specify if it applies to outbound signal level, inbound or both. [consensus was that it should be for outbound signal level.]</p> <p>3. Nigel Williams suggested that the value in text encoding be restricted to decimal (non-hex) representation for easier parsing. [there was no discussion on this, but since the comment the in B.2 specifies that either decimal and hexadecimal can be used for positive values of any integer property, I think we should NOT make this a special case. Note that the specification does require decimal for negative values.]</p> <p>4. There is also a Gain in C.1 (100C) for binary encoding. It is not clear what it applies to and it is defined as unsigned integer and 0..65535 (evidently 2 bytes). [Consensus was that this should be deprecated similar to what we did for echo control.]</p>
Reference:	<p>AVD-2191 a liaison from SG15 received at the Jun 2002, Bruges meeting and further changes from:</p> <p>Subject: [Megaco] Gain in TDM package and in Annex C</p> <p>From: Terry L Anderson tla@lucent.com</p> <p>Date: 8/1/2002 12:24 PM</p> <p>To: Megaco Mailing List <megaco@ietf.org></p>

C.1 General media attributes

[Begin Correction]

Gain	100C	Unsigned integer	Gain in dB: 0..65535 Not Used. See H.248.1 Annex E.13 for an available gain property.
------	------	------------------	---

[End Correction]

E.13.1 Properties

[Begin Correction]

Gain Control

PropertyID: gain (0x000a)

Gain control, or usage of ~~of~~ signal level adaptation and noise level reduction is used to adapt the level of the outbound signal. However, it is necessary, for example for modem calls, to turn off this function. When the value is set to "automatic", the termination serves as an automatic level control (ALC) with a target level provisioned on the MG and the direction being outward.

Type: integer

Possible values:

The gain control specifies the gain in decibels (positive or negative), with the maximum positive integer, 214748646 (0x7fffffff), reserved to represent "automatic". ~~parameter may either be specified as "automatic" (0xffffffff), or as an explicit number of decibels of gain (any other integer value).~~ The default value is provisioned in the MG.

Defined in: LocalControlDescriptor

Characteristics: read/write

[End Correction]

6.8 Protocol Version Negotiation

Description:	<p>Section 11.3 on protocol negotiation, describes the behavior of MGC specifying explicitly that it return version in the response for two cases:</p> <ol style="list-style-type: none">1) MGC supports only a lower version than that proposed by MG2) MGC supports a higher version but can support the version proposed by MG. <p>It does not explicitly state behavior for the case:</p> <ol style="list-style-type: none">3) MGC supports ONLY the same version proposed by MG but this is not actually stated. MG of course could not know the difference between #2 and #3. I suppose that an MG receiving a response with no version should assume that the version proposed is being accepted but of course this would have worked for #2 as well. The question is, is omission equivalent to returning the equal value. <p>Description should be changed to cover this case and to indicate that return of version is optional if MG's choice is used.</p>
Reference:	<p>Subject: [Megaco] Protocol version negotiation From: Terry L Anderson tla@lucent.com Date: 7/23/2002 10:27 PM To: Megaco Mailing List <megaco@ietf.org></p>

11.3 Negotiation of protocol version

[Begin Correction]

A ServiceChange command from a MG that registers with an MGC shall contain the version number of the protocol supported by the MG in the ServiceChangeVersion parameter. Regardless of the version placed in the ServiceChangeVersion parameter the message containing the command shall be encoded as a version 1 message. Upon receiving such a message, if the MGC supports only a lower version, then the MGC shall send a ServiceChangeReply with the lower version and thereafter all the messages between MG and MGC shall conform to the lower version of the protocol. If the MG is unable to comply and it has established a transport connection to the MGC, it should close that connection. In any event, it should reject all subsequent requests from the MGC with Error 406 – Version Not Supported.

If the MGC only supports higher version(s) than the MG, it shall reject the association with Error 406 Version Not Supported.

If the MGC supports the version indicated by the MG, it shall conform to that version in all subsequent messages. In this case it is optional for the MGC to return a version in the ServiceChangeReply.

~~If the MGC supports a higher version than the MG but is able to support the lower version proposed by the MG, it shall send a ServiceChangeReply with the lower version and thereafter all the messages between MG and MGC shall conform to the lower version of the protocol. If the MGC is unable to comply, it shall reject the association, with Error 406 – Version Not Supported.~~

[End Correction]

6.9 Statistics and Move

Description:	<p>Statistics on a termination are defined in two ways:</p> <ol style="list-style-type: none">6.2 says: "Statistics are reported...when the termination is taken out of the call it is in."7.1.15 says: "The Statistics parameter provides information describing the status and usage of a Termination during its existence with a specific Context." <p>I don't think a "call" is a well defined concept in H.248, but perhaps these two statements are consistent if we associate a "call" with a context. The issue is, if a termination is Moved to a different termination, is it in the same call (one party is probably the same but the other may not be)? Or, more specifically are its statistics zeroed.</p> <p>Subtract clearly zeros them since ephemerals disappear and physicals get default values when returned to NULL context, and we state this as the last sentence in 7.1.15. The issue is for a Move. We never clearly state this for Move, but from the current language defining what statistics mean, I assume that they ARE zeroed. It would help if that last sentence in 7.1.15 included Move (or if they are NOT cleared, we state that).</p> <p>We report statistics, by default, on a Subtract, but NOT on a Move. So if statistics are zeroed by the move, then one must remember to add a Statistics Descriptor to Move to get them where this is not needed for a Subtract. It would seem to be consistent we would have reported statistics by default on all commands that zero them rather than only on Subtract.</p>
Reference:	<p>Subject: [Megaco] Statistics and Move From: Terry L Anderson tla@lucent.com Date: 3/7/2002 4:23 PM To: Megaco Mailing List <megaco@ietf.org></p>

6.2 Terminations [H.248.1v1 (03/02)]

[Begin Correction]

Terminations may have signals applied to them (see 7.1.11). Terminations may be programmed to detect Events, the occurrence of which can trigger notification messages to the MGC, or action by the MG. Statistics may be accumulated on a Termination. Statistics are reported to the MGC upon request (by means of the AuditValue command, see 7.2.5) and when the Termination ceases to exist or is returned to the null context due to a Subtract command~~is subtracted from a context~~.

[End Correction]

7.1.15 Statistics descriptor

[Begin Correction]

The Statistics Descriptor provides information describing the status and usage of a Termination during its existence (ephemeral) or while it is outside the null context (physical)~~within a specific Context~~. There is a set of standard statistics kept for each Termination where appropriate (number of octets sent and received for example). The particular statistical properties that are reported for a given Termination are determined by the Packages realized by the Termination. By default, statistics are reported when the Termination ceases to exist or is returned to the null context due to a Subtract command~~is Subtracted from the Context~~. This behaviour can be overridden by including an empty AuditDescriptor in the Subtract command. Statistics may also be returned from the AuditValue command, or any Add/Move/Modify command using the Audit descriptor.

Statistics are cumulative; reporting Statistics does not reset them. Statistics are reset when a ceases to exist or is returned to the null context due to a Subtract command~~Termination is Subtracted from a Context~~.

[End Correction]

E.11.4 Statistics

[Begin Correction]

Duration

StatisticsID: dur (0x0001)

Description: provides duration of time the termination has existed or been out of the null context~~been in the Context~~.

Type: double, in milliseconds

[End Correction]

6.10 Additional Codepoint for Annex C

Description:	H.248.20 needs an additional code point in Annex C and should be available in both v1 and v2 of H.248.1
Reference:	D-280 from Geneva 10/2002

[Begin Correction]

PropertyID	Property tag	Type	Value
OLC	C001	Octet string	The value of H.245 OpenLogicalChannel structure. Ref.: ITU-T H.245
OLCack	C002	Octet string	The value of H.245 OpenLogicalChannelAck structure. Ref.: ITU-T H.245
OLCcnf	C003	Octet string	The value of H.245 OpenLogicalChannelConfirm structure. Ref.: ITU-T H.245
OLCrej	C004	Octet string	The value of H.245 OpenLogicalChannelReject structure. Ref.: ITU-T H.245
CLC	C005	Octet string	The value of H.245 CloseLogicalChannel structure. Ref.: ITU-T H.245
CLCack	C006	Octet string	The value of H.245 CloseLogicalChannelAck structure. Ref.: ITU-T H.245
<u>LCN</u>	<u>C007</u>	<u>Integer</u>	<u>The value of H.245 Local Channel Number</u> <u>0 - 65535.</u> <u>Ref.: ITU-T H.245</u>

[End Correction]

6.11 Wild Carding Principles

Description:	<p>Over the last several months on the IETF Megaco list the issue of wild carded context command handling has been raised several times. There has been a significant amount of discussion surrounding this topic and it is apparent that the H.248.1 recommendation is unclear with regards to the handling of wildcarded commands.</p> <p>From the discussions on the list the main issues that need to be clarified are:</p> <ul style="list-style-type: none"> • All commands should have the same behavior with respect to wildcarding • Context=ALL does NOT cover the NULL context. • The reply to commands using a wildcarded Context=ALL and partial Termination ID should not contain an error if at least one of the Full TerminationIDs referenced by the partial TerminationID appear in a context. <p>The intent is to clarify the use of wildcard not change the specification, but since the current text has many ambiguities the clarification will not match all current implementation.</p>
---------------------	--

Reference:

D-283 to the Geneva 10/2002 meeting and discussions at the meeting.

[Begin Correction]

6.2.2 TerminationIDs

Terminations are referenced by a TerminationID, which is an arbitrary schema chosen by the MG.

TerminationIDs of physical Terminations are provisioned in the Media Gateway. The TerminationIDs may be chosen to have structure. For instance, a TerminationID may consist of trunk group and a trunk within the group.

A wildcarding mechanism using two types of wildcards can be used with TerminationIDs. The two wildcards are ALL and CHOOSE. The former is used to address multiple Terminations at once, while the latter is used to indicate to a media gateway that it must select a Termination satisfying the partially specified TerminationID. This allows, for instance, that a MGC instructs a MG to choose a circuit within a trunk group.

~~When ALL is used in the TerminationID of a command, the effect is identical to repeating the command with each of the matching TerminationIDs. The use of ALL does not address the ROOT termination. Since each of these commands may generate a response, the size of the entire response may be large. If individual responses are not required, a wildcard response may be requested. In such a case, a single response is generated, which contains the UNION of all of the individual responses which otherwise would have been generated, with duplicate values suppressed. For instance, given a Termination Ta with properties p1=a, p2=b and Termination Tb with properties p2=c, p3=d, a UNION response would consist of a wildcarded TerminationId and the sequence of properties p1=a, p2=b,c and p3=d. Wildcard response may be particularly useful in the Audit commands.~~

The encoding of the wildcarding mechanism is detailed in Annexes A and B.

[End Correction]

[Begin Correction]

6.63 Wildcarding Principles

This clause specifies the behaviour for wildcarding Context and Termination Identities that shall be applied to all commands. In processing these commands two forms of wildcarding must be considered:

1. Context Wildcarding
2. Termination Wildcarding

When executing a transaction that contains wildcarded contexts and optionally terminations, all commands in the transaction are executed in order for a particular instance of ContextID before moving to a subsequent ContextID instance. In the case that there are multiple commands in a transaction, only when the TerminationID (wildcarded or specific) specified in the first command matches a specific instance of a ContextID are subsequent commands in the transaction executed. If a TerminationID (wildcarded or specific) of the subsequent command/s in that transaction does not match the specific ContextID instance then an error code 431 is returned and processing of subsequent instances of the wildcard ContextID are stopped unless the command that generated the error is marked optional.

The execution of particular wildcard combinations is discussed below.

6.36.1 ContextID specific with TerminationID wildcarded

In the case where the ContextID is specific, w~~When ALL is used in the TerminationID of a command, the effect is identical to repeating the command with each of the matching TerminationIDs. The use of ALL does not address the ROOT termination. Since each of these commands may generate a response, the size of the entire response may be large. Thus if the wildcard matches more than one TerminationID in the context, all possible matches are attempted, with results reported for each one. If none of the Terminations referenced by the wildcarded TerminationID are in the specific context then error code 431 is returned. No errors are returned for individual terminations specified by the wildcarded TerminationID that are not in the specified context.~~

For example: Assume that a gateway has 4 terminations: t1/1, t1/2, t2/1 and t2/2. Assume that Context 1 has t1/1 and t2/1 in it and that Context 2 has t1/2 and t2/2 in it.

The command:

Context=1{Command=t1/*{Descriptor/s}}

Returns:

Context=1{Command=t1/1{Descriptor/s}}

6.36.2 ContextID wildcarded (ALL) with TerminationID specific

In the case where the ContextID is wildcarded(i.e. ContextID = ALL) and the TerminationID is fully specified, the effect is identical to a command specifying the non-NULL context that contains the specified termination. Thus a search must be made to find the context and only one instance of the command is executed. No errors are reported for Contexts that do not contain the specified termination. If the termination is not contained in any (non-NULL) context then error 431 is returned. Use of this form of action rather than one specifying the ContextId is discouraged but may be useful, for example in correcting conflicting state between MG and MGC.

For example: Taking the above gateway configuration.The command:

Context=1{Command=t1/1{Descriptor/s}}

Returns:

Context=1{Command=t1/1{Descriptor/s}}

6.36.3 ContextID wildcarded (ALL) with TerminationID wildcarded

In the case where the ContextID is wildcarded (i.e. Context ID = ALL) and the TerminationID is wildcarded, the effect is identical to repeating the command with each of the TerminationIDs matching the wildcard for each non-NULL context that contains one or more of those matching TerminationIDs. Thus if the wildcard matches more than one TerminationID in the specific instance of the wildcarded ContextID, all possible matches are attempted, with results reported for each one. No errors are reported for Contexts that do not contain a termination matching the wildcarded TerminationID. No errors are returned for individual terminations specified in the wildcarded TerminationID that are not in a specific instance of the wildcarded ContextID. If there are no matches to the wildcarded ContextID and TerminationID then error 431 is returned.

For example: Taking the above gateway configuration.

The command:

Context=1{Command=t1/*{Descriptor/s}}

Returns:

Context=1{Command=t1/1{Descriptor/s}}

Context=2 {Command=t1/2{Descriptor/s}}

In the case that that multiple commands are contained in a wildcarded TerminationID and/or wildcarded ContextID request then if the first command does not match the first ContextID and TerminationID instance then the subsequent command in the request will not be executed for that instance.

6.36.4 Wildcarded Responses

If individual responses are not required, a wildcard response may be requested. In such a case, a single response is generated, which contains the UNION of all of the individual responses which otherwise would have been generated, with duplicate values suppressed. For instance, given a Termination Ta with properties p1=a, p2=b and Termination Tb with properties p2=c, p3=d, a UNION response would consist of a wildcarded TerminationId and the sequence of properties p1=a, p2=b,c and p3=d. Wildcard response may be particularly useful in the Audit commands. If a wildcard UNION response is used in conjunction with a wildcarded Context then a single response is sent with the UNION of all the individual termination/s referenced by the TerminationID. The response would contain Context=all, a wildcarded TerminationId and the sequence of properties.

If an error occurs during the execution of a wildcarded request that specifies a wildcarded response special handling is required to provide useful information about the error(s) while still maintaining a modest sized response. When a wildcarded response is requested all instances (as specified above) of the command shall be executed even if one or more result in errors, but later commands in the transaction will not be executed (unless optional was specified). Multiple command responses shall be returned for the command that encountered the error. The first command response shall be the normal wildcard response containing the UNION of responses for those commands that succeeded. If none of them succeeded the UNION shall be empty. Additional command responses for each transactionID that failed shall be returned with the appropriate Error Descriptor.

For example

The command:

Context=[Command=t1/*{Descriptor/s}]*

Response to an error:

Context=[Command=t1/*{Union response descriptors},*

Command=t1/3{Error=errorcode}]

The encoding of the wildcarding mechanism is detailed in Annexes A and B.

6.12 Wildcarding in the Topology Descriptor

Description:	During discussions on the Megaco Mailing list an ambiguity was recognized in the text describing how wildcarding works in the case of a one way topology descriptor. It was thought that a "*" wildcard was not allowed to be used in the topology triple (T1,T2,oneway). This is incorrect as a "*" wildcard may be used in one termination ID but not both.
Reference:	Subject: RE: [Megaco] Question on Section 7.1.18 Megaco V2 Date: Tue, 14 Jan 2003 13:31:54 -0500 From: "Kevin Boyle" <kboyle@nortelnetworks.com>

[Begin Correction]

7.1.18 Topology Descriptor

- (T1, T2, oneway) means that the Terminations that match T2 receive media from the Terminations matching T1, but not vice versa. In this case use of the ALL wildcard such that there are Terminations that match either both T1 and T2 but not both is ~~not~~ allowed.

[End Correction]

6.13 Binary Value for Packetization Time (Annex C)

Description:	During discussion on the Megaco Mailing list it was highlighted that there was no equivalent binary codepoint for the SDP a=ptime. It was felt that a new Annex C property should be defined.
Reference:	Subject: [Megaco] Binary equivalent for SDP ptime attribute Date: Mon, 20 Jan 2003 15:16:25 -0600 From: John_Poplett@3com.com

[Begin Correction]

C.1 General media attribute

RTPpayload	100F	Integer	Payload type in RTP Profile for Audio and Video Conferences with Minimal Control Ref.: RFC 1890
<u>Ptime</u>	<u>1010</u>	<u>Integer</u>	<packet Packetization Time This gives the length of time in milliseconds represented by the media in a packet. Ref.: RFC 2327

[End Correction]

6.14 Modification of Terminations by MGCs

Description:	During discussion on the Megaco Mailing list, it was highlighted that the spec prohibited modification of terms in the NULL context. This clearly was not the intent of the passage, and many implementations allow this very function.
Reference:	Subject: [Megaco] Restriction on Modification Of Terminations Date: Tue, 15 Apr 2003 22:00:09 -0400 From: Christian.Groves@ericsson.com.au

[Begin Correction]

6.2.1 Termination dynamics

The protocol can be used to create new Terminations and to modify property values of existing Terminations. These modifications include the possibility of adding or removing events and/or signals. The Termination properties, and events and signals are described in the ensuing subclauses. An MGC can only release/modify Terminations and the resources that the Termination represents which are in the NULL context or which it has have been previously seized via, e.g. the Add command.

[End Correction]

6.15 Optional Commands in an Action

Description:	There is ambiguity in section 8 on whether or not commands are optional in transaction requests. A command is optional if a context property modification or audit is included.
Reference:	D-347 to the 05/03 Geneva meeting and discussions at the meeting

[Begin Correction]

8.2.1 TransactionRequest

The TransactionRequest is invoked by the sender. There is one Transaction per request invocation. A request contains one or more Actions, each of which specifies its target Context ~~and one or more Commands per Context.~~

...

[End Correction]

6.16 Ordering of Transactions

Description:	Transaction processing order when multiple transactions are contained in a message is not guaranteed. This behavior can generate errors in scenarios where there was successful
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	command execution on the MG. For example: the MGC may receive a message with a transaction reply containing the results of a command ADD(ContextID=?, TerminationID=?) and a transaction request containing a notification from the contextID and TerminationID in the transaction reply. If the MGC chooses to execute the second transaction request first it will generate an error 410 "Incorrect identifier" although the transaction reply contained the ContextID and Termination ID. This error can be avoided if transaction replies are processed before transaction requests.
Reference:	D-347 to the 05/03 Geneva meeting and discussions at the meeting

[Begin Correction]

8 Transactions

Transactions guarantee ordered Command processing. That is, Commands within a Transaction are executed sequentially. Ordering of Transactions is NOT guaranteed – transactions may be executed in any order, or simultaneously however transaction replies should be executed before transaction requests when both are contained in a message.

[End Correction]

6.17 Replies to Actions with no Commands

NOTE – This item has been deprecated in favor item 6.23.

Description:	The ABNF commandReply construct requires replies to actions without commands to include the contextProperties specified in the action. This is different from the ASN.1, which does not require this and different from commands in that commandReplies are not required to return fully-specified descriptors set by the command. This is because the ABNF puts the contextProperties construct in the commandReply construct, rather in the actionReply construct. When H.248.1 V3 is produced, then consideration should be given to moving the contextProperties construct up to the actionReply level.
Reference:	Discussions at the 05/03 meeting

[Begin Correction]

7.2.10 Generic Command Syntax

A complete ABNF of the text encoding of the protocol per IETF RFC 2234 is given in Annex B. SDP is used as the encoding of the Local and Remote descriptors for use with the text encoding as modified in 7.1.8.

Note: The ABNF is different from the ASN.1 in the case of a reply to an action with no commands. The ABNF requires the contextProperties to be included in the reply even when fully specified in the request, while the ASN.1 does not.

[End Correction]

6.18 Network Package can apply to TDM

Description:	There has been some confusion about whether the network package can apply to TDM. The intent is that the package can apply to any network. Some clarifying text to this end is needed.
Reference:	Discussions at the 09/03 meeting

[Begin Correction]

E.11 Network Package

PackageID: nt (0x000b)

Version: 1

Extends: None

This package defines properties of network terminations independent of network type. This includes, but is not limited to, TDM, IP and ATM.

[End Correction]

6.19 Precedence of LocalControl Mode property versus SDP mode

Description:	Discussions on the Megaco mailing list highlighted that there is no text indicating how the LocalControl Mode property interacts with mode as specified in SDP.
Reference:	Subject: Re: [Megaco] SDP mode and Megaco mode question Date: Mon, 08 Dec 2003 15:55:41 +1100 From: Christian Groves <Christian.Groves@ericsson.com>

[Begin Correction]

7.1.7 LocalControl descriptor

...

The allowed values for the mode property are send-only, receive-only, send/receive, inactive and loop-back. "Send" and "receive" are with respect to the exterior of the Context, so that, for example, a stream set to mode = sendOnly does not pass received media into the Context. The default value for the mode property is "Inactive". Signals and Events are not affected by mode. The LocalControl Mode property takes precedence over any mode specified in the Local and Remote descriptors.

[End Correction]

6.20 Digit processing clarification

Description:	Discussion on the Megaco mailing list revealed that the wording in both H.248.1 and H.248.16 regarding "first digit" processing is misleading.
Reference:	Subject: [Megaco] DTMF detection and buffering Date: Wed, 27 Aug 2003 19:18:53 +0200 From: "CHATRAS Bruno FTRD/DAC/ISS" <bruno.chatras@francetelecom.com>

[Begin Correction]

7.1.14.2 DigitMap Timers

The collection of digits according to a DigitMap may be protected by three timers, viz. a start timer (T), short timer (S), and long timer (L).

- 1) The start timer (T) is used prior to any digits being available for processing against the digit map~~having been dialed~~. If the start timer is overridden with the value set to zero (T = 0), then the start timer shall be disabled. This implies that the MG will wait indefinitely for digits.

[End Correction]

6.21 Usage of DigitMap timer symbols with range notation

Description:	Discussion on the Megaco mailing list has concluded that clarification is needed on the usage of timer symbols when building digitmap strings utilizing the range notation.
Reference:	Subject: RE: [Megaco] Digit Maps: Long Duration Modifier(Z), Long Timers (L), & Short Timers (S) Date: Fri, 5 Dec 2003 13:09:11 -0500 From: Steve Cipolli <SCipolli@radvision.com>

[Begin Correction]

7.1.14.3 DigitMap Syntax

...

In addition to these event symbols, the string may contain "S" and "L" inter-event timing specifiers and the "Z" duration modifier. "S" and "L" respectively indicate that the MG should use the short (S) timer or the long (L) timer for subsequent events, overriding the timing rules described above. If an explicit timing specifier is in effect in one alternative event sequence, but none is given in any other candidate alternative, the timer value set by the explicit timing specifier must be used. If all sequences with explicit timing controls are dropped from the candidate set, timing reverts to the default rules given above. If used inside a range notation, the S and L specifiers shall be ignored. Finally, if conflicting timing specifiers are in effect in different alternative sequences, the long timer shall be used.

A "Z" designates a long duration event: placed in front of the symbol(s) designating the event(s) which satisfy a given digit position, it indicates that that position is satisfied only if the duration of the event exceeds the long-duration threshold. The value of this threshold is assumed to be provisioned in the MG. If the Z specifier is not followed by a digit (0-9 or A-K), then the MG shall reject the digitmap as invalid protocol. When used in a range notation, the Z specifier applies solely to the immediately following digit. When used immediately prior to a range, the Z modifier applies to all digits in the range (thereby requiring a match in the range to be long duration).

[End Correction]

6.22 Clarification of the use of StreamID = 0

Description:	The ASN.1 and ABNF version of the H.248.1 syntax allow StreamIDs 0 to 65535. The convention in the procedure section of H.248 is that Stream ID starts with stream 1. This needs to be further clarified.
Reference:	COM 16 D-376

[Begin Correction]

7.1.4 Media descriptor

...

A stream is identified by a StreamID. The StreamID shall be in the range of 1 to 65535. The StreamID is used to link the streams in a Context that belong together. Multiple streams exiting a Termination shall be synchronized with each other. Within the Stream descriptor, there are up to three subsidiary descriptors: LocalControl, Local, and Remote. The relationship between these descriptors is thus:

[End Correction]

6.23 Correction of Context Audit return

Description:	The ABNF commandReply construct requires replies to actions without commands to include the contextProperties specified in the action. This is different from the ASN.1, which does not require this and different from commands in that commandReplies are not required to return fully-specified descriptors set by the command. This is because the
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	ABNF puts the contextProperties construct in the commandReply construct, rather in the actionReply construct.
Reference:	COM 16 D-374
<i>NOTE – This item supersedes item 6.17</i>	

[Begin Correction]

B.2 ABNF specification

```

...
; at-most-once
; EmergencyOffToken to be used in MG to MGC direction only in H.248.1 v1
; either EmergencyToken or EmergencyOffToken, but not both
contextProperty      = (topologyDescriptor / priority / EmergencyToken_ /
                        EmergencyOffToken)
...
EmergencyToken        = ("Emergency"           / "EG")
EmergencyOffToken     = ("EmergencyOff"        / "EGO")
ErrorToken            = ("Error"               / "ER")

```

[End Correction]

6.24 Clarification of return value for AuditCapabilities of strings

Description:	H.248.1 does not specify what should be returned by the MG if the MGC requests an AuditCapabilities of a property that is a string. Since the possibilities are infinite, H.248.1 should specify a value to be returned.
Reference:	Discussions at the 01/2004 Geneva meeting

[Begin Correction]

7.2.6 AuditCapabilities

...
Interpretation of what capabilities are requested for various values of ContextID and TerminationID is the same as in AuditValue.

For property and parameter values of type string, character or octet string, the MG shall return an empty value. For the text encoding, strings and characters return an empty quotedString construct, while octet strings return NUL (0x00). This behavior may be overridden by the package definition.

...

[End Correction]

Annex A: Defect Report Form for Recommendation H.248.1 Version 1 (03/2002)

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.
