



INTERNATIONAL TELECOMMUNICATION UNION

# **ITU-T                      H.248 Sub-series Implementors' Guide**

TELECOMMUNICATION  
STANDARDIZATION SECTOR  
OF ITU

(2 May 2008)

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

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

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## 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 – 2 May 2008.

This Implementors' Guide was approved by ITU-T Study Group 16 on 2 May 2007 (TD 474/Plen) and it obsoletes the earlier version of this Implementors' Guide approved on 6 July 2007.

**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.)

### V28 (Seoul, January 2008)

Added new section for H.248.12

New:

- 6.1 ALL Wildcard in Topology Descriptor
- 6.2 Octet String usage in Annex B.2
- 6.3 H.248 Data type ServiceChangeMgcID
- 6.4 Text encoding of Octet Strings
- 6.5 Profile definition - Syntactical vs Semantical Profiles
- 6.6 Example Call Flow updates
- 6.7 Multiplexing and Maximum number of terminations per context property
- 6.8 Clarification of the behavior of sub-lists
- 6.9 Orthogonal capabilities “Transcoding” and “Codec Negotiation/Determination”
- 6.10 Signal Type Override
- 6.11 rtp/pltrans event clarification
- 6.12 The use of Ignore with SDP
- 6.13 Base packages and Extended Packages
- 6.14 Connection Endpoint Naming Conventions
- 6.15 Support of Profile Elements

### V29 (Geneva, April 2008)

Added new section for H.248.3

Added new section for H.248.8

Added new section for H.248.9

Added new section for H.248.12

Added new section for H.248.16

Added new section for H.248.18

Added new section for H.248.29

Modified

- 6.13 Base packages and Extended Packages
- 6.15 Support of Profile Elements

New:

- 6.16 Error in Context Audit example

- 6.17 Simple value as allowed as a sub-list of length one
- 6.18 Service Change extension parameter ABNF
- 6.19 Segmentation Example Error
- 6.20 Incorrect RTP Profile ID
- 6.21 Unsuccessful Digit Map match reporting
- 6.22 Empty Statistics Descriptor
- 7.1 Set Indicator Value Discrepancy
- 9.1 Allow the MG to issue error #511
- 10.1 Duplicated Parameter ID
- 13.1 Unsuccessful Digit Map match reporting
- 15.1 Duplicated Error Code 459
- 19.1 Unsuccessful Digit Map match reporting

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# **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 05/2008 are given for:

- H.248.1 Version 3 (09/2005) Amendment 1 (2008)
- H.248.3 (11/2000)
- H.248.5 (11/2000)
- H.248.8 (08/2007)
- H.248.9 (01/2005)
- H.248.12 (01/2005)
- H.248.14 (03/2002)
- H.248.16 (11/2002)
- H.248.17 (11/2002) & Corrigendum 1 (03/2004)
- H.248.18 (11/2002)
- H.248.20 (11/2002)
- H.248.22 (07/2003)
- H.248.23 (01/2005) & Corrigendum 1 (05/2006)
- H.248.29 (01/2005)
- 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.248.1 Version 3 (09/2005) Amendment 1 (2008), *Gateway Control Protocol: Version 3*
- ITU-T Recommendation H.248.3 (11/2000), *Gateway Control Protocol: User interface elements and actions packages*
- 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.248.8 (08/2007), *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.248.12 (01/2005), *Gateway control protocol: H.248.1 packages for H.323 and H.324 interworking*
- ITU-T Recommendation H.248.14 (03/2002), *Gateway control protocol: Inactivity timer package*
- ITU-T Recommendation H.248.16 (11/2002), *Gateway control protocol: Enhanced digit collection packages and procedures*
- ITU-T Recommendation H.248.17 (11/2002), Corrigendum 1 (03/2004), *Gateway control protocol: Line test packages*
- ITU-T Recommendation H.248.18 (11/2002), *Gateway control protocol: Package for support of multiple profiles*
- 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.248.29 (01/2005), Corrigendum 1 (05/2006), *Gateway Control Protocol: International CAS compelled register signalling 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
<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 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) Amendment 1 (07/2008)

### 6.1 ALL Wildcard in Topology Descriptor

<b>Description:</b>	The semantic for ALL is related to TerminationIDs, thus outlined by clause 6.2.2/H.248.1 (“...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
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	<p>partially specified TerminationID.”).</p> <p>The Topology Descriptor is applied on Context level, wildcard “ALL” could basically mean either</p> <p>A. the set of “all” Terminations {Ta, Tb, ... Tn} of the Context, or</p> <p>B. the sub-set of all Terminations without the Termination “T1” and/or “T2”.</p> <p>Only semantic “B” is meaningful with regards to “topology associations” between terminations within a context.</p> <p>The handling of the topology descriptor when adding a termination to a Context is further clarified.</p>
<b>Reference:</b>	AVD-3204 & AVD-3205

[Begin Correction]

## 7.1.18 Topology Descriptor

### 7.1.18.1 General

A Topology Descriptor is used to specify flow directions between terminations in a context. Contrary to the descriptors in previous clauses, the Topology Descriptor applies to a context instead of a termination. The default topology of a context is that each termination's transmission is received by all other terminations. When a Termination is added to a Context its default Topology is “bothway” to the other Terminations in the Context. If another Topology is required this shall be indicated in any updated Topology Descriptor. The Topology Descriptor is optional to implement. An MG that does not support Topology Descriptors, but receives a command containing one, returns Error Code 444 ("Unsupported or unknown descriptor"), and optionally includes a string containing the name of the unsupported descriptor ("Topology") in the error text in the Error Descriptor.

The Topology Descriptor occurs before the commands in an action. It is possible to have an action containing only a Topology Descriptor, provided that the context to which the action applies already exists.

### 7.1.18.2 Structure (syntax) of the Topology Descriptor

A Topology Descriptor consists of a sequence of associated terminations of the form (*T1*, *T2*, *association*[, *StreamID*]). *T1* and *T2* specify terminations within the context, possibly using the ALL or CHOOSE wildcard. If the optional StreamID field is used, the association applies only to the particular stream between *T1* and *T2* labeled by the StreamID. If the StreamID field is omitted, the topology applies to all streams in the termination.

### 7.1.18.3 Descriptor element “association”

The *association* specifies how media flows between these two terminations as follows:

- (*T1*, *T2*, Isolate) means that the terminations matching *T2* do not receive media from the terminations matching *T1*, nor vice versa.
- (*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 *T1* or *T2* *but not both* is allowed.
- (*T1*, *T2*, OnewayExternal) means the terminations that match *T2*, receive media sent externally by terminations matching *T1*, but not vice versa. In this case, use of the ALL wildcard for *T1* is not allowed.

- (*T1*, *T2*, OnewayBoth) means the terminations that match *T2*, receive media sent and received externally by terminations matching *T1*, but not vice versa. In this case, use of the ALL wildcard for *T1* and/or *T2* is not allowed.
- (*T1*, *T2*, Bothway) means that the terminations matching *T2* receive media from the terminations matching *T1*, and vice versa. In this case it is allowed to use wildcards such that there are terminations that match both *T1* and *T2*. However, if there is a termination that matches both, no loopback is introduced.

#### **7.1.18.4 Wildcarding of TerminationID elements**

##### **7.1.18.4.1 Wildcard CHOOSE**

CHOOSE wildcards may be used in *T1* and *T2* as well, under the following restrictions:

- the action (see clause 8) of which the Topology Descriptor is part contains an Add Command in which a CHOOSE wildcard is used;
- if a CHOOSE wildcard occurs in *T1* or *T2*, then a partial name (underspecified Termination ID) shall not be specified.

The CHOOSE wildcard in a Topology Descriptor matches the TerminationID that the MG assigns in the first Add Command that uses a CHOOSE wildcard in the same action. An existing termination that matches *T1* or *T2* in the context to which a termination is added is connected to the newly added termination as specified by the Topology Descriptor. If a termination is not mentioned within a Topology Descriptor, any topology associated with it remains unchanged. If, however, a new termination is added into a context, its association with the other terminations within the context defaults to Bothway, unless a Topology Descriptor is given to change this (e.g., if *T3* is added to a context with *T1* and *T2* with topology (*T3*, *T1*, Oneway) it will be connected Bothway to *T2*).

##### **7.1.18.4.2 Wildcard ALL**

ALL wildcard may be used in *T1* or *T2* as well, under the following restrictions:

- “all” excludes the other termination in the Topology Descriptor (this semantic is in-line with clause 6.2.2);

ALL wildcard may be not used for both *T1* and *T2* in a single descriptor with a one way association.

##### **7.1.18.4.3 Combination of Wildcard ALL and CHOOSE in a single Topology Descriptor**

ALL wildcard may be used in *T1* and CHOOSE wildcard may be used in *T2*, or vice versa. The *chosen* termination is then excluded from the “all” set of the remaining terminations.

##### **7.1.18.5 Topologies on Stream-level**

If the topology is applied to one particular stream (*T1*, *T2*, association, StreamID), the topology of other streams between the terminations does not change.

A Topology Descriptor shall not include a combination of associations between two terminations (*Ti*, *Tj*) with and without the optional StreamID field, to avoid undefined behaviour. For example (*T1*, *T2*, Bothway) and (*T1*, *T2*, Isolate, *S1*) shall not appear in the same descriptor. Upon receipt of such a Topology Descriptor, a MG shall respond with an error response, including Error Code 421 ("Unknown action or illegal combination of actions").

##### **7.1.18.6 Association types**

###### **7.1.18.6.1 “Oneway”**

A oneway connection must be implemented in such a way that the other terminations in the context are not aware of the change in topology.

### 7.1.18.7 Example topologies

Figure 7, the table following it and Figure 8 following it show some examples of the effect of including Topology Descriptors in actions. In these examples it is assumed that the Topology Descriptors are applied in sequence. Figures 9 and 10 are stand-alone examples showing the specific effects of the OnewayExternal and OnewayBoth topology settings.

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*[End Correction]*

## 6.2 Octet String usage in Annex B.2

<b>Description:</b>	<p>H.248 package definitions in terms of Properties, Events and Signals descriptor parameters all based on:</p> <pre>propertyParm      = pkgdName parmValue eventOther        = eventParameterName parmValue sigOther          = sigParameterName parmValue parmValue         = (EQUAL alternativeValue / INEQUAL VALUE) VALUE             = quotedString / 1*(SafeChar / %x80-FF)</pre> <p>However packages specify data types to be used for properties, events and signals descriptor parameters. In some cases parameters are defined as “octet string” as well. In H.248 B.2 “octet string” is currently defined as:</p> <pre>octetString       = *(nonEscapeChar)</pre> <p>and the usage of “octet string” is defined to be related to SDP defined in RFC2327 used within H.248 Local and Remote Descriptors.</p> <p>The distinction between the two needs to be specified.</p>
<b>Reference:</b>	AVD-3206

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*[Begin Correction]*

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## B.2 ABNF specification

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; Boolean: Boolean values are encoded as "on" and "off" and are
; case insensitive. The SafeChar form of VALUE must be used.
; OctetString: Where a package specifies the data type
; "OctetString" the
; hexadecimal form defined in B.3 shall be used. Note: the
; OctetString BNF
; is only for the carriage of SDP in the Local and Remote
; Descriptors.
;
; Future types: Any defined types must fit within
```

; the ABNF specification of VALUE. Specifically, if a type's encoding

...

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[End Correction]

## 6.3 H.248 Data type ServiceChangeMgcID

<b>Description:</b>	The ServiceChangeMgcID is used to identify an “alternate address” for a MGC entity. This implies an interim address resolution step in case that the parameter format is using a <i>name</i> format, i.e. either a domain name or a device name. The current H.248.1 text is not explicit on that aspect and only mentions the <i>address</i> format.
<b>Reference:</b>	AVD-3207

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[Begin Correction]

### 7.2.8.1.3 ServiceChangeAddress and ServiceChangeMgcID

The optional ServiceChangeAddress parameter specifies the address (e.g., IP port number for IP networks) to be used for subsequent communications. It can be specified in the input parameter descriptor or the returned result descriptor.

The optional ServiceChangeMgcID parameter is of type *Message Identifier* (MID, see clause 8.3), the parameter format represents thus either an *address* (IP version 4 or 6 *domain address*, or broadband *MTP3 address*) or a *name* (IP *domain name* or a generic *device name*). In both cases is the parameter used for an unambiguous identification of an MGC entity (i.e. a primary or secondary MGC).

NOTE - There is following difference between name and address format: the network address is routable, thus may be directly inserted as destination address in the signalling transport protocol data unit, whereas names requiring firstly a resolution into a routable address. The name-to-address resolution by the MG requires a local or remote DNS query request in case of the domain format, or a local mapping table in case of the device format.

ServiceChangeAddress and ServiceChangeMgcID parameters must not both be present in the ServiceChange Descriptor or the ServiceChangeResult Descriptor. The ServiceChangeAddress provides an address to be used within the context of the association currently being negotiated, while the ServiceChangeMgcID provides an *alternate address* (NOTE: in case of a name format is firstly a name-to-address resolution implied, see above) where the MG should seek to establish another association. ~~Note that the use of ServiceChangeAddress is not encouraged.~~ MGCs and MGs must be able to cope with the ServiceChangeAddress being either a full address or just a port number in the case of ~~TCP-IP-based~~ transports such as UDP, TCP or SCTP.

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[End Correction]

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[Begin Correction]

## F.5.7 ServiceChangeMgcID

The use of the ServiceChangeMgcID parameter is described in clause 7.2.8, specifically clause 7.2.8.1.3. The MGC may send this parameter in a ServiceChange Command directed toward the Root Termination. Upon receipt during a registration attempt, the MG shall attempt registration with the MGC at the specified address (NOTE: in case of a name format is firstly a name-to-address resolution implied, see clause 7.2.8.1.3). When received in a ServiceChange Handoff Command from the MG's primary MGC, the MG shall utilize the procedures outlined in 11.5.

The MGC should not use the ServiceChangeMgcID pParameter in a ServiceChange Reply when responding to a ServiceChange Forced or Graceful Command with reason 908.

The MGC may use the ServiceChangeMgcID parameter in a ServiceChange Reply when responding to a ServiceChange Disconnected with reason 900 (see also clause 8.4/H.Sup7).

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*[End Correction]*

## 6.4 Text encoding of Octet Strings

<b>Description:</b>	The coding of Octet String in Annex B.3 can be seen as confusing on transmission order versus the bit sending order. The should be further clarified.
<b>Reference:</b>	AVD-3313

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*[Begin Correction]*

### B.3 Hexadecimal octet coding

Hexadecimal octet coding is a means for representing package elements of type Octet String as a string of hexadecimal digits, with two digits representing each octet. This octet encoding should be used when encoding values of type Octet String in the text version of the protocol.

For each octet, the 8-bit sequence is encoded as two hexadecimal digits. Bit 0 is the first transmitted or left-most; bit 7 is the last or right-most.

Note: this means that Bit 0 is the MSB of the original octet and Bit 7 is the LSB of the original octet, according to the common convention used to specify octet values.

Bits 7-4 are encoded as the first hexadecimal digit, with Bit 7 as MSB of the first hexadecimal digit and Bit 4 as LSB of the first hexadecimal digit. Bits 3-0 are encoded as the second hexadecimal digit, with Bit 3 as MSB of the second hexadecimal digit and Bit 0 as LSB of the second hexadecimal digit.

Note: The above encoding results in the reversal of bits from the original octet.

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*[End Correction]*

## 6.5 Profile definition - Syntactical vs Semantical Profiles

<b>Description:</b>	It was not clear what the behaviour of Profile Specification should be with
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	regards to extending and profiling the H.248 core protocol and its associated packages. This needs to be further clarified.
<b>Reference:</b>	AVD-3210

*[Begin Correction]*

---

### 13 Profile definition

Profiles may be specified to further define how the H.248.1 protocol is used and what functionality is supported by a MG. It only describes the capabilities of the MGC/MG H.248 interface. The profile itself specifies what options associated with H.248.1 have been used. For example: transport and packages used for an application.

Any profile definition shall not extend the H.248.1 protocol by e.g. adding new syntactical elements, revision of semantics, or additional procedures (like e.g. cross-package level procedures) in a profile. Possible profile procedures are thus given only by possible core protocol level (1) and package level (2) procedures.

A profile is identified by a name (IANA registered) and a version. A name shall be a case-insensitive string up to 64 characters long. Version shall be 1 to 99.

The profile itself is a document that indicates the options for a particular application. There is no set format for this document. The only mandatory element is that there should be a section indicating the Profile Name and Version and a summary of the profile.

The two points below are the only mandatory sections of a profile:

- Profile Identification: The name and version of the profile that is sent in the ServiceChange Command.
- Summary: A description of what the profile is.

Appendix III contains a template for the definition of profiles. It should be used as the basis of a profile definition.

*[End Correction]*

---

## 6.6 Example Call Flow updates

<b>Description:</b>	Some bracket types in the example call flows or Appendix I are not consistent with the protocol syntax for text encoding.  Also in some cases the Streammode should be set to Inactive when the termination is in the NULL context.
<b>Reference:</b>	AVD-3211 & AVD-3357



## Appendix I

### Example call flows

...

- 3) The MGC programs a termination in the NULL Context. The TerminationID is A4444, the streamID is 1, the requestID in the Events Descriptor is 2222. The MID is the identifier of the sender of this message; in this case, it is the IP address and port [123.123.123.4]:55555. The Mode Property for this stream is set to SendRecvInactive. "al" is the analog line supervision package. The Local and Remote Descriptors are assumed to be provisioned.

```
MGC to MG1:
MEGACO/3 [123.123.123.4]:55555
Transaction = 9999 {
  Context = - {
    Modify = A4444 {
      Media { Stream = 1 {
        LocalControl {
          Mode = SendRecvInactive,
          tdmc/gain=2, ; in dB,
          tdmc/ec=on
        },
      },
    },
    Events = 2222 {al/of {strict=state}}
  }
}
```

...

#### I.1.2 Collecting originator digits and initiating termination

The following builds upon the previously shown conditions. It illustrates the transactions from the Media Gateway Controller and originating Media Gateway (MG1) to get the originating termination (A4444) through the stages of digit collection required to initiate a connection to the terminating Media Gateway (MG2).

- 6) MG1 detects an off-hook event from User 1 and reports it to the Media Gateway Controller via the Notify Command.

```
MG1 to MGC:
MEGACO/3 [124.124.124.222]:55555
Transaction = 10000 {
  Context = - {
    Notify = A4444 {ObservedEvents =2222 {
      19990729T22000000:al/of-{init=OFF}}}}}
  }
}
```

...

- 8) The MGC modifies the termination to play dial tone, to look for digits according to Dialplan0 and to look for the on-hook event now.

MGC to MG1:

```

MEGACO/3 [123.123.123.4]:55555
Transaction = 10001 {
    Context = - {
        Modify = A4444 {
            Events = 2223 {
                al/on{+strict=state}+, dd/ce {DigitMap=Dialplan0}
            },
            Signals {cg/dt},
            DigitMap= Dialplan0{
(0| 00| [1-7]xxx|8xxxxxxx|Fxxxxxxx|Exx|91xxxxxxxxxxx|9011x.)}
            }
        }
    }
}

```

...

- 12) The controller then analyses the digits and determines that a connection needs to be made from MG1 to MG2. Both the TDM termination A4444, and an RTP termination are added to a new context in MG1. Mode is RecvOnly since Remote Descriptor values are not yet specified. Preferred codecs are in the MGC's preferred order of choice.

```

MGC to MG1:
MEGACO/3 [123.123.123.4]:55555
Transaction = 10003 {
    Context = $ {
        Add = A4444{ LocalControl {
            Mode = SendRecv} },
        Add = $ {
            Media {
                Stream = 1 {
                    LocalControl {
                        Mode = RecvOnly,
                        nt/jit=40 ; in ms
                    },
                    Local {
v=0
c=IN IP4 $
m=audio $ RTP/AVP 4
a=ptime:30
v=0
c=IN IP4 $
m=audio $ RTP/AVP 0
                }
            }
        }
    }
}

```

...

- 14) The MGC will now associate A5555 with a new context on MG2, and establish an RTP Stream (i.e., A5556 will be assigned), SendRecv connection through to the originating user, User 1. The MGC also sets ring on A5555.

```

MGC to MG2:
MEGACO/3 [123.123.123.4]:55555
Transaction = 50003 {
    Context = $ {
        Add = A5555 { Media {
            Stream = 1 {
                LocalControl {Mode = SendRecv} }},
        Events=1234{al/of{+strict=state}+},
    }
}

```

```

        Signals {al/ri}
    },
    Add = $ {Media {
        Stream = 1 {
            LocalControl {
                Mode = SendRecv,
                nt/jit=40 ; in ms
            },
            Local {
v=0
c=IN IP4 $
m=audio $ RTP/AVP 4
a=ptime:30
            },
            Remote {
v=0
c=IN IP4 124.124.124.222
m=audio 2222 RTP/AVP 4
a=ptime:30
            } ; RTP profile for G.723.1 is 4
        }
    }
}
}
}
}

```

...

- 17) The two gateways are now connected and User 1 hears the ringback. The MG2 now waits until User2 picks up the receiver and then the two-way call is established.

From MG2 to MGC:

```

MEGACO/3 [125.125.125.111]:55555
Transaction = 50005 {
    Context = 5000 {
        Notify = A5555 {ObservedEvents =1234 {
            19990729T22020002:al/of{+init=off+}}
        }
    }
}

```

From MGC to MG2:

```

MEGACO/3 [123.123.123.4]:55555
Reply = 50005 {
    Context = - {Notify = A5555}
}

```

From MGC to MG2:

```

MEGACO/3 [123.123.123.4]:55555
Transaction = 50006 {
    Context = 5000 {
        Modify = A5555 {
            Events = 1235 {al/on{+strict=state+}},
            Signals ; to turn off ringing
        }
    }
}

```

From MG2 to MGC:

```

MEGACO/3 [125.125.125.111]:55555
Reply = 50006 {

```

```
Context = 5000 {Modify = A4445}
}
```

...

- 21) When the MGC receives an on-hook signal from one of the MGs, it brings down the call. In this example, the user at MG2 hangs up first.

From MG2 to MGC:

```
MEGACO/3 [125.125.125.111]:55555
Transaction = 50008 {
  Context = 5000 {
    Notify = A5555 {ObservedEvents =1235 {
      19990729T24020002:al/on{+init=off}+}
    }
  }
}
```

From MGC to MG2:

```
MEGACO/3 [123.123.123.4]:55555
Reply = 50008 {
  Context = - {Notify = A5555}
}
```

...

---

*[End Correction]*

## 6.7 Multiplexing and Maximum number of terminations per context property

<b>Description:</b>	The Base Root package provides the MaxTerminationsPerContext property. Termination types which are counted are physical and ephemeral terminations, but what about “multiplexing terminations”? Multiplexing terminations should be included.
<b>Reference:</b>	AVD-3212

---

*[Begin Correction]*

### E.2.1.2 Maximum Terminations Per Context

**Property Name:** MaxTerminationsPerContext

**PropertyID:** maxTerminationsPerContext (0x0002)

**Description:** The maximum number of allowed terminations in a context, see [clause 6.1](#). This is not related to the capacity of the NULL Context. This is related to non-Root termination types (physical, ephemeral), ~~in~~exclusive multiplexing terminations.

**Type:** Integer

**Possible values:** any positive integer

**Default:** Provisioned

**Defined in:** TerminationState

---

[End Correction]

## 6.8 Clarification of the behavior of sub-lists

<b>Description:</b>	There is an inconsistency between the ASN.1 and Text encodings with regards to the behaviour of sub-lists. This should be rectified.
<b>Reference:</b>	AVD-3279

---

[Begin Correction]

### A.2 ASN.1 syntax specification

...

```
-- In PropertyParm, value is a SEQUENCE OF octet string. When sent
-- by an MGC the interpretation is as follows:
-- empty sequence means CHOOSE
-- one element sequence specifies value
-- If the sublist field is not selected, a longer sequence means
-- "choose one of the values" (i.e., value1 or value2 etc from a OR...)
-- collection of values).
-- If the sublist field is selected,
-- a sequence with more than one element encodes the value of a
-- list-valued property (i.e., a collection of values, value1 and value2
-- and ...). value1 AND value2 AND ...).
-- The relation field may only be selected if the value sequence
-- has length 1. It indicates that the MG has to choose a value
-- for the property. E.g., x > 3 (using the greaterThan
-- value for relation) instructs the MG to choose any value larger
-- than 3 for property x.
-- The range field may only be selected if the value sequence
-- has length 2. It indicates that the MG has to choose a value
-- in the range between the first octet in the value sequence and
-- the trailing octet in the value sequence, including the
-- boundary values.
-- When sent by the MG, only responses to an AuditCapability request
-- may contain multiple values, a range, or a relation field.
```

...

---

[End Correction]

## B.2 ABNF specification

...

propertyParm = pkgdName parmValue

; the (Safe)Char '\$' means CHOOSE

; the (Safe)Char '\*' means ALL

parmValue = (EQUAL alternativeValue / INEQUAL VALUE)

alternativeValue = (VALUE

/ LSBRKT VALUE \*(COMMA VALUE) RSBRKT

~~; sublist (i.e., A AND B AND ...)~~

/ LBRKT VALUE \*(COMMA VALUE) RBRKT

; alternatives (i.e., A OR B OR ...)

/ LSBRKT VALUE COLON VALUE RSBRKT)

; range

; If the sublist field is not selected (alternative or range), a  
longer

; sequence means "choose one of the values" (i.e., value1 or  
value2 etc

; from a collection of values).

; If the sublist field is selected,

; a sequence with more than one element encodes the value of a

; list-valued property (i.e., a collection of values, value1 and  
; value2 and ...).

...

## 6.9 Orthogonal capabilities “Transcoding” and “Codec Negotiation/Determination”

<b>Description:</b>	Transcoding, i.e. the conversion of different media formats between two associated H.248 stream endpoints within a context, may be the result of either fully specified H.248 media descriptors (“single step resource reservation procedure”), or due to a previous media negotiation phase
---------------------	--

	("multi step resource reservation procedure"). The capability of transcoding is therefore disjoint to media negotiation principles.
<b>Reference:</b>	AVD-3280

*[Begin Correction]*

### 7.1.7.1.3 ReserveValue

**Property Name:** ReserveValue

**Description:** Specifies whether the MG should reserve the resources to support a single set of property values (e.g., a single codec and its associated attributes) or as many such sets as it can, as they are defined in the Local and Remote Descriptors. See 7.1.8.

**Type:** Boolean

**Possible values:**

- True: The MG is to reserve resources to serve as many as possible of the sets of property values indicated in the selected media group (if ReserveGroup is False) or in each media group (if ReserveGroup is True) in the Local and Remote Descriptors.
- False: The MG is to reserve a single set of property values from those indicated in the selected media group (if ReserveGroup is False) or in each media group (if ReserveGroup is True) in the Local and Remote Descriptors.

Note: ~~that~~ A single set of property values may consist of a single media type (e.g. audio or video) related media format complemented by a list of supplementary media formats. Supplementary media formats are for example:

- Comfort noise ([IETF RFC 3389]),
- RTP Payload for DTMF digits, telephony tones and telephony signals ([IETF RFC 4733]),
- Voiceband data (VBD) services (according to [ITU-T V.152]),
- or other auxiliary media (e.g. inband signaling) associated to the main media flow.

**Default:** False

**Defined in:** LocalControl

**Characteristics:** Read/Write

*[End Correction]*

## 6.10 Signal Type Override

<b>Description:</b>	When signals are defined in packages, a default type is also provided: Brief,
---------------------	---

	<p>TimeOut or OnOff. Still H.248.1 allows the MGC to change the type of a signal at the moment of activating it, by including the signal type in the SignalsDescriptor.</p> <p>The effect of changing the signal type is straightforward in most cases, most notably in H.248 signals that produce audible or visible media: tones, announcements, video, etc.</p> <p>However, there are H.248 signals whose effect is of instantaneous nature, rather than having an associated duration controlled by the MGC, and that are normally specified as type 'Brief' . Examples of these signals are the IPBCP tunnelling signal defined in Q.1950, or the latching signal defined in H.248.37. Changing the type of these signals, although allowed by H.248, may not have any effect in some cases without changing the semantics of the signal, and that is certainly not possible.</p>
<b>Reference:</b>	AVD-3204

*[Begin Correction]*

---

### 7.1.11 Signals Descriptor

...

There are three types of signals:

- OnOff (OO): the signal lasts until it is turned off;
- TimeOut (TO): the signal lasts until it is turned off or a specific period of time elapses;
- Brief (BR): the signal will stop on its own unless a new Signals Descriptor is applied that causes it to stop; no timeout value is needed.

If a signal of default type other than TO has its type overridden to type TO in the Signals Descriptor, the duration parameter must be present.

NOTE: It is not possible to change the semantics of a signal by overriding the signal type.

If the signal type is specified in a Signals Descriptor, it overrides the default signal type (see clause 12.1.4). It is not possible to change the semantics of a signal by overriding the signal type. If duration is specified for an on/off signal, it shall be ignored.

...

*[End Correction]*

---

## 6.11 rtp/pltrans event clarification

<b>Description:</b>	<p>The rtp/pltrans event allows a way to report a change in codec, however the initial value is unspecified which may lead to inconsistent behaviour between implementations. It is proposed that it can be assumed that there is an assumption that the initial codec is the first one listed in the Local/Remote descriptors (e.g. SDP). Therefore an MG receiving the rtp/pltrans event from the MGC in should consider the first codec listed as the “start codec”. If the MG chooses another codec it should send a Notify.req with the rtp/pltrans observed event.</p>
---------------------	--



<b>Reference:</b>	AVD-3316
-------------------	----------

[Begin Correction]

---

...

### E.12.5.1 Working with RTP

When RTCP is associated with an RTP stream, RTCP shall remain unaffected by the H.248.1 Mode Property in the LocalControl Descriptor.

When RTCP is associated with an RTP stream and the MG receives an Empty Remote Descriptor for that stream, the MG shall stop the RTCP stream along with the corresponding RTP stream.

Where the Payload Transition (*pltrans*) event is used the codec currently used by the relevant Stream on the MG is the start codec. In the case where a MG has not selected a codec for use it can be assumed that the initial codec is the first one listed in the Local descriptor (e.g. SDP). Therefore an MG receiving the *pltrans* event from the MGC in should consider the first codec listed as the “start codec”. If the MG chooses another codec it should send a Notify.req with the *pltrans* observed event.

...

[End Correction]

---

## 6.12 The use of Ignore with SDP

<b>Description:</b>	<p>Where SDP is used, some specifications indicate that if part of the SDP is not understood it is simply ignored. That is no error message is returned. SDP is used in the H.248 Local and Remote descriptors. Currently H.248 does not discuss this “Ignore” behavior. As a master/slave protocol H.248 always confirms any request with a success or failure indication. A failure usually halts execution unless the command is specified as “optional”. Therefore the use of the “Ignore” semantic is not appropriate as this does not fit the general H.248 behaviour. Also supporting an “Ignore” semantic would mean the process of Local and Remote descriptors would differ between the binary and text versions of the protocol as the binary version does not have an ignore semantic.</p> <p>The use of ignore should be clarified in the H.248.1 text.</p>
<b>Reference:</b>	AVD-3316

[Begin Correction]

---

### 7.1.8.1.1 Specific syntax for H.248 text encoding

When text encoding the protocol, the descriptors consist of session descriptions as defined in SDP (RFC 2327). In session descriptions sent from the MG to the MGC, the SDP must comply with RFC 2327. In session descriptions sent from the MGC to the MG, the following exceptions to the syntax of RFC 2327 are allowed:

- the "s = ", "t = " and "o = " lines are optional;

- the use of CHOOSE is allowed in place of a single parameter value; and
- the use of alternatives is allowed in place of a single parameter value.

A Stream Descriptor specifies a single bidirectional media stream and so a single session description must not include more than one media description ("m = " line). A Stream Descriptor may contain additional session descriptions as alternatives. Each media stream for a termination must appear in distinct Stream Descriptors. When multiple session descriptions are provided in one descriptor, the "v = " lines are required as delimiters; otherwise they are optional in session descriptions sent to the MG. Implementations shall accept session descriptions that are fully conformant to RFC 2327 according to the above restrictions.

If a MG does not understand the SDP provided rather than ignoring that piece of SDP an appropriate error response shall be provided.

...

---

*[End Correction]*

## 6.13 Base packages and Extended Packages

<b>Description:</b>	The MG in response to a Command with wildcarded PackageID returns the PackageIDs of the Packages where the H.248 Package Elements (properties, signal, events and statistics) were originally defined. This results in the return of a mix of base and extended PackageIDs. However there is an issue on whether the MG would make this information available, as it is optional for the MG to publish this information. If it did not publish both the base and extended PackageIDs then the MGC may not be aware of the base PackageIDs. Likewise if we mandate that the MG should return a mix or base and extended PackageIDs then this means that the optional publishing of 6.2.3 is removed.  This interaction needs to be specified.
<b>Reference:</b>	AVD-3382 & COM16-C.446 (2005-2008)

---

*[Begin Correction]*

### 6.2.3 Packages

...

When packages are extended, the properties, events, signals and statistics defined in the base package can be referred to using either the extended package name or the base package name. For example, if Package A defines Event e1, and Package B extends Package A, then B/e1 is an event for a termination implementing Package B. By definition, the MG must also implement the base package, but it is optional to publish the base package as an allowed interface. If it does publish A, then A would be reported on the Packages Descriptor in AuditValue as well as B, and Event A/e1 would be available on a termination. If the MG does not publish A, then only B/e1 would be available. If published through AuditValue, A/e1 and B/e1 are the same event.

For improved interoperability and backward compatibility, an MG may publish all packages supported by its terminations, including base packages from which extended packages are derived. An exception to this is in cases where the base packages are expressly defined as "Designed to be extended only".

In the case that the MG publishes the base PackageIDs in response to a Packages Descriptor Audit, it will also respond with the PackageID of the H.248 Package Element where the element was originally defined in response to a wildcarded PackageID Audit.

In the case that the MG only publishes the extended PackageID in response to a Packages Descriptor Audit then the MG will respond to a wildcarded PackageID Audit using the extended H.248 PackageIDs.

Note: Whilst a Subtract request does not explicitly request an AuditValue.req of Statistics with a wildcarded PackageID, it is implicit in the command. Similarly, an audit of a complete descriptor is equivalent to an audit with a wildcarded PackageID. Thus the procedure described above will be used in both these cases.

---

*[End Correction]*

## 6.14 Connection Endpoint Naming Conventions

<b>Description:</b>	<p>The terminology aspects of naming conventions for IP connection endpoint addresses has appeared in many discussions in past meetings. For instances in the work areas of H.248.30A1, H.Sup5, H.Sup7, H.248.37A1, H.248.48, H.248.43 or with regards to H.248 ServiceChange parameters ServiceChangeAddress and/or ServiceChangeMgcID (in case of IP based Control Associations).</p> <p>Furthermore there could be IP connectivity (for H.248 entities) in</p> <ul style="list-style-type: none"> <li>a) control plane: IP-based H.248 Control Association, and/or</li> <li>b) user/media plane: IP-based ephemeral Termination.</li> </ul> <p>The address naming issue is the same for both. The general assumption of address asymetry is also valid for both.</p> <p>Unfortunately terminology is not consistent concerning the naming conventions for endpoint addresses. This concept should be better explained.</p>
<b>Reference:</b>	AVD-3214

---

*[Begin Correction]*

## **5 Conventions**

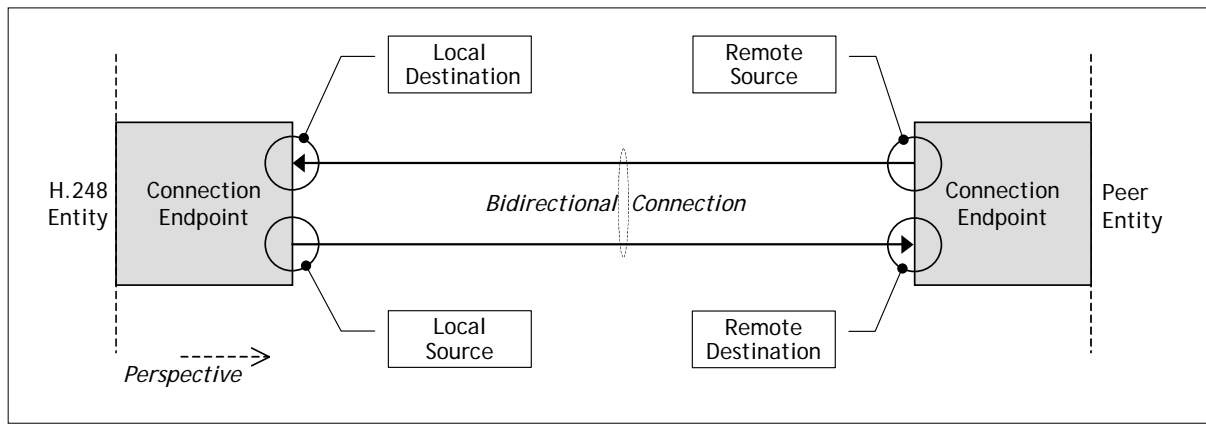
### **5.1 Key words to indicate requirement levels**

In this Recommendation, "shall" refers to a mandatory requirement, while "should" refers to a suggested but optional feature or procedure. The term "may" refers to an optional course of action without expressing a preference.

### **5.2 Connection endpoint naming conventions**

#### **5.2.1 Generic concept**

There are basically four connection endpoints (concerning sources and sinks of traffic) in case of a bidirectional connection. H.248 uses a specific terminology for naming these endpoints *from the perspective of an H.248 entity*. Figure 1 provides a conceptual overview. The naming scheme is generic because it is technology-independent.

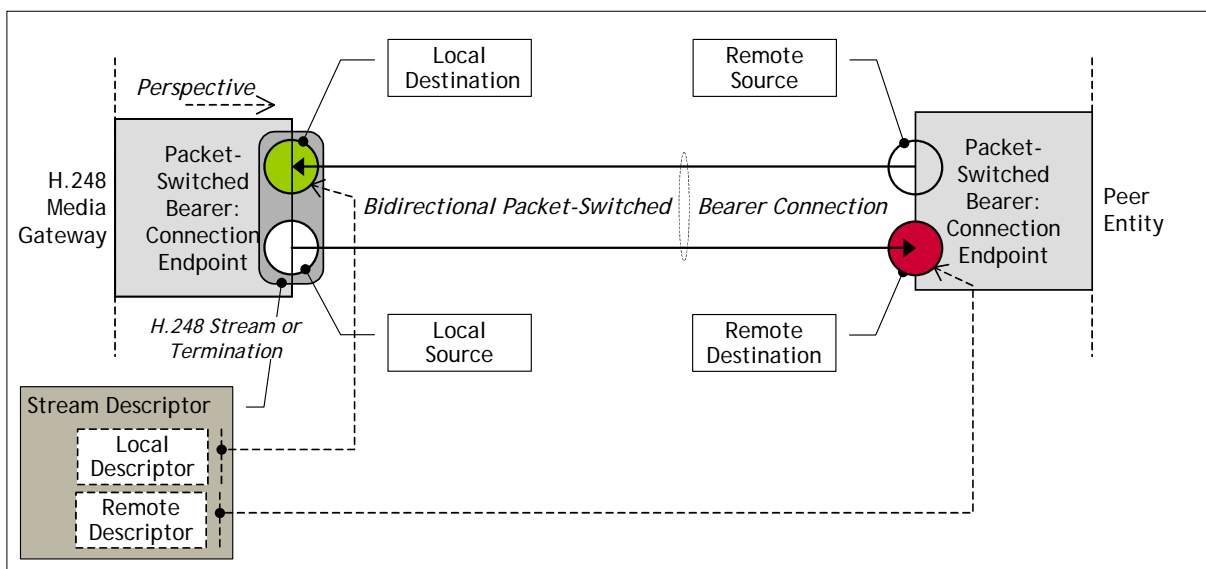


**Figure 1 – Connection endpoint naming conventions – Generic concept**

The *geographical locations* of the endpoints are termed as ‘*local*’ (also known as ‘*near-end*’) and as ‘*remote*’ (also known as ‘*far-end*’). The *traffic directions* are termed as ‘*source*’ (also known as ‘*egress*’, ‘*outgoing*’, ‘*outbound*’, ‘*transmit*’, or ‘*Tx*’) and as ‘*destination*’ (also known as ‘*ingress*’, ‘*incoming*’, ‘*inbound*’, ‘*receive*’, or ‘*Rx*’).

### 5.2.2 Scope of Local and Remote Descriptors

The *Local* and *Remote Descriptors* are defined in clause 7.1.8. Both descriptors have different connection endpoints in scope (see Figure 2). The *Local Descriptor* (LD) is related to the “*local destination*” endpoint, the *Remote Descriptor* (RD) is related to the “*remote destination*” endpoint. The media gateway is primarily responsible for the resources and configuration of the “*local source*” endpoint (Note: there are a few protocol elements which allow the MGC to control certain endpoint aspects). The “*remote source*” endpoint is completely out of scope of H.248 entities.



**Figure 2 – Connection endpoint naming conventions – Scope of Local and Remote Descriptors**

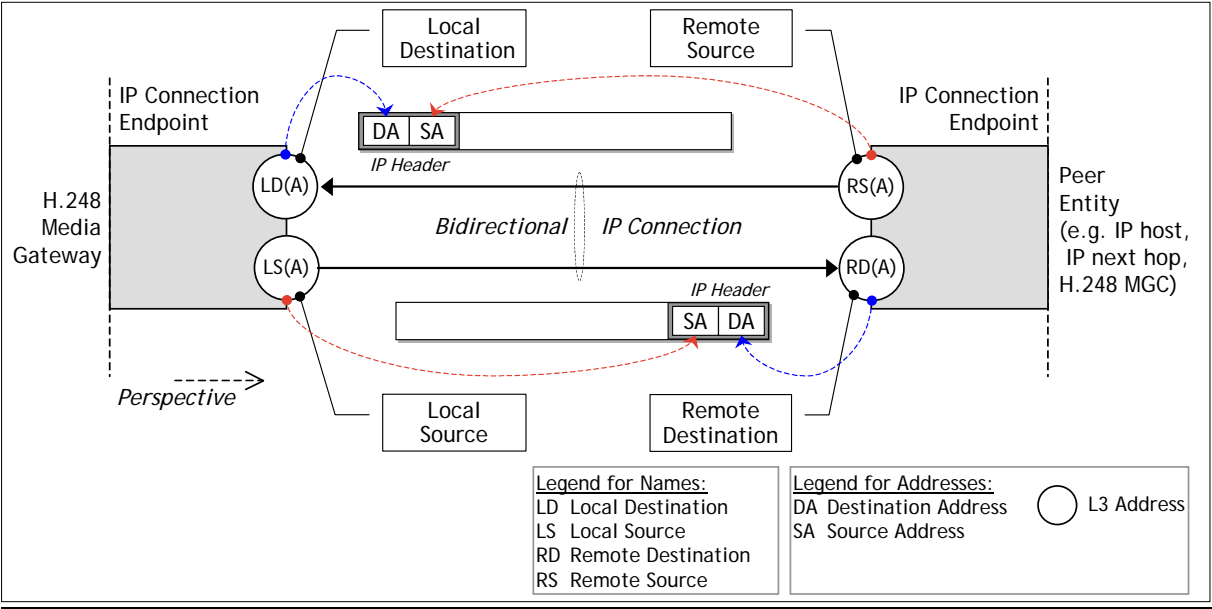
Figure 2 underlines that just the traffic sink endpoints of H.248 streams are controlled via the *Local* and *Remote Descriptors*.

### 5.2.3 Concrete “connection” types

An example shall illustrate the application of the naming conventions for a specific combination of a bearer technology and protocol layer.

### 5.2.3.1 Example “IP connection”

Figure 3 shows an IP connection, e.g. behind an H.248 IP stream or termination, or below an IP-based H.248 Control Association.



**Figure 3 – Connection endpoint naming conventions – IP connection**

The two local or remote connection endpoints may be assigned to the same or different IP interfaces. They are then so called *symmetrical* or *asymmetrical* (connection) addresses.

...

[End Correction]

## 6.15 Support of Profile Elements

<b>Description:</b>	Profiles enable the profile specifiers to indicate whether H.248 information elements are optional or mandatory. The current H.248 Profile Template has indicated a generic behaviour to be applied to the interpretation of optional and mandatory. A more specific definition is seen to be beneficial.
<b>Reference:</b>	AVD-3284

## Appendix III

### H.248 Profile Definition template

New H.248 profiles should be defined using the following profile template. It is in an ITU Recommendation format. Editors from non-ITU organization should, at a minimum, use the structures in clause 6 below. If this template format is not used, then editors of profiles should ensure that the headings and points in this appendix are covered by their profile.

#### **Support of Profile Elements**

The headings in the structure below represent items that may be considered as optional. For profile definitions, a certain H.248.1 item may be unused despite being mandatory in H.248.1. These items are also included in the structure below. Non-listed items are to be considered mandatory by the H.248.1 protocol. In the profile template below, elements can be defined as "optional" and "mandatory". "Optional" means that it is optional for either the sender or the receiver to include the element in a message.

The MGC may use the H.248 packages audit mechanism to determine which of the optional packages are supported by the MG.

Within each of the cited (mandatory and optional) packages, individual properties, signals, events or statistics are tagged as being optional or mandatory. The interpretation of this categorisation in this profile is as follows:-

- Any property, signal, event or statistic that is tagged as mandatory in a mandatory package must be supported by the MG. Such properties, signals, events and statistics may optionally be used by the MGC.
- Any property, signal, event or statistic that is tagged as mandatory in an optional package must be supported by the MG if the MG supports that optional package. As the MGC is the master it determines when properties/signals/events and statistics are set on the MG and as such properties, signals and events may optionally be used by the MGC.
- Any property, signal, event or statistic that is tagged as optional in a mandatory or optional package may be supported by the MG if the MG supports that package. Such properties, signals and events may optionally be used by the MGC. Should the MGC attempt to use such an unsupported optional property/signal/event/statistic, the MG shall respond with error code 501 (Not Implemented). If the MGC receives statistics that are not understood, then they are ignored.

Where the cited properties, events, signals and statistics have associated parameters, such parameters are also tagged as being mandatory or optional. Where a parameter is designated in the Package description to be "Optional: No" the Profile definition shall not specify this parameter to be "Optional". The interpretation of this categorisation in this profile is as follows:-

- Any parameter that is tagged as mandatory may be included by the sending entity and must be supported by the receiving entity,

Any parameter that is tagged as optional may be included by the sending entity and may be supported by the receiving entity. If the receiving entity receives an optional element that it has not implemented as per H.248.1 section 6.2.3 it should send Error Code 501 ("Not Implemented").

~~If the receiving entity receives an optional element that it has not implemented as per 6.2.3 it should send Error Code 501 ("Not Implemented").~~

The editor should provide written description in each of the subclauses below if it furthers clarifies H.248.1 behaviour. For example, if the Move Command (see 6.8.4) is limited to certain termination types, this should be indicated.

Italics text is to be removed.

<text> in brackets is to be filled in.

A MG supporting this profile must support all the mandatory packages and may support zero, some or all of the optional packages.

...

---

*[End Correction]*

## 6.16 Error in Context Audit example

<b>Description:</b>	Regarding the following example given in H.248.1v3, section 7.2.5: The command: Context={ContextAttr{ContextList={*}},AuditValue=Root{Audit{}}} returns: Context={ContextAttr{ContextList={1,2,3,4}},AuditValue=Root{}} When looking at the ABNF for auditOther, the {} cannot be empty and must contain an auditReturnParameter: auditOther = EQUAL termIDList [LBRKT terminationAudit RBRKT] terminationAudit = auditReturnParameter *(COMMA auditReturnParameter) Therefore the extraneous "{}" should be removed from the reply.
<b>Reference:</b>	Subject: Compact list of ContextIDs Date: Wed, 16 Apr 2008 16:59:46 +0100 From: Miri Epstein <a href="mailto:mepstein@juniper.net">mepstein@juniper.net</a> To: Christian Groves <a href="mailto:Christian.Groves@nteczone.com">Christian.Groves@nteczone.com</a> CC: megaco ietf <megaco@ietf.org>

---

*[Begin Correction]*

### 7.2.5 AuditValue

...

The command:

Context={ContextAttr{ContextList={\*}},AuditValue=Root{Audit{}}}

returns:

Context={ContextAttr{ContextList={1,2,3,4}},AuditValue=Root{}}

The following illustrates other information that can be obtained with the AuditValue Command:

...

---

*[End Correction]*

## 6.17 Simple value as allowed as a sub-list of length one

<b>Description:</b>	There seems to be some lack of clarity regarding the encoding of sub-lists of length one. According to Annexes A.2/H.248.1 and B.2/H.248.1, it appears that in such a case, the single value must still be encoded as a sub-list. However recent package drafts (e.g. H.248.53) seem to imply that a sub-list of length one can be encoded as a simple value (e.g. without the brackets when using text encoding). This later approach has the advantage that future versions of a package may change the type of a property from X to sub-list of X without breaking backward compatibility.
<b>Reference:</b>	COM16-C.341 and COM16-C.381 (2005-2008)

---

*[Begin Correction]*

### 12.1.2 Properties

Properties defined by the package, specifying:

**Property Name:** only descriptive

**PropertyID:** is an identifier.

**Description:** is a description of the function of the property

**Type:** One of:

Boolean

String: UTF-8 string

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

Integer: 4-byte signed integer

Unsigned Integer: 4-octet unsigned 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 (NOTE 1) of possible unique values. Packages **MUST** define the text and binary encodings for each value in the enumeration.



Sub-list: a list of several values from a list (NOTE 1). 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.2 and in B.2.

NOTE 1 – A Sub-list may contain a single list item. See Annex A.2 and B.2 for the encoding options.

...

### 12.1.5 Statistics

Statistics defined by the package, specifying:

**Statistic name:** only descriptive

**StatisticID:** is an identifier

StatisticID is used in a Statistics Descriptor

**Description:** a description of the statistic

**Type:** One of:

Boolean

String: UTF-8 string

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

Integer: 4-byte signed integer

Unsigned Integer: 4-octet unsigned 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 (NOTE 1) of possible unique values. Packages MUST define the text and binary encodings for each value in the enumeration.

Sub-list: A list of several values from a list (NOTE 1). 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 in B.2.

**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.

**Level:** Specify if the statistic can be kept at the termination level, Stream level or either.

---

*[End Correction]*

---

*[Begin Correction]*

---

## A.2 ASN.1 specification

...

-- In PropertyParm, value is a SEQUENCE OF octet string. When sent

```
-- by an MGC the interpretation is as follows:
-- empty sequence means CHOOSE
-- one element sequence specifies value
-- If the sublist field is not selected, a longer sequence means
-- "choose one of the values" (i.e., value1 OR value2 OR ...)
-- If the sublist field is selected,
-- a sequence with more than one element encodes the value of a
-- list-valued property (i.e., value1 AND value2 AND ...).
-- Note that when encoding a sub-list of length one, the sublist field
-- may be left unselected.
-- The relation field may only be selected if the value sequence
-- has length 1. It indicates that the MG has to choose a value
-- for the property. E.g., x > 3 (using the greaterThan
-- value for relation) instructs the MG to choose any value larger
-- than 3 for property x.
-- The range field may only be selected if the value sequence
-- has length 2. It indicates that the MG has to choose a value
-- in the range between the first octet in the value sequence and
-- the trailing octet in the value sequence, including the
-- boundary values.
-- When sent by the MG, only responses to an AuditCapability request
-- may contain multiple values, a range, or a relation field.
```

...

---

*[End Correction]*

---

*[Begin Correction]*

---

## B.2 ABNF specification

```
...
; Boolean: Boolean values are encoded as "on" and "off" and are
; case insensitive. The SafeChar form of VALUE must be used.
;
; Sub-list: Sub-lists are encoded using the "sublist" branch of
; alternativeValue. A sub-list with a length of one may also be encoded
; simply as a single VALUE of the appropriate type.
;
; Future types: Any defined types must fit within
; the ABNF specification of VALUE. Specifically, if a type's encoding
; allows characters other than SafeChars, the quotedString form must
; be used for all values of that type, even for specific values that
; consist only of SafeChars.
```

...

---

*[End Correction]*

### 6.18 Service Change extension parameter ABNF

<b>Description:</b>	<p>In the H.248.1v3 specification I have noticed an anomaly with respect to range specified for the “start (T)” digit timer.</p> <p>Clause 7.1.14.2 states that a value of “0” meaning an indefinite timer may only be specified for the “start” (T) digit timer.</p>
---------------------	---

	<p>However, the text in the ABNF copied below states that a value of “0” for the “start (T)” digit timer is invalid. My understanding is that the text below should be modified to say a range of “0-99” is valid for timer “T” and a range of “1-99” is valid for timers “S” and “L”.</p> <p>The ABNF and ASN.1 should be updated to allow Start Timer (T=0).</p>
<b>Reference:</b>	<p>Subject: Small anomaly with Start Digit Timer a</p> <p>Date: Tue, 5 Feb 2008 09:53:06 -0000</p> <p>From: dal chohan &lt;d.chohan@ftel.co.uk&gt;</p> <p>To: &lt;Christian.Groves@nteczone.com&gt;</p>

---

*[Begin Correction]*

---

## A.2 ASN.1 syntax specification

```

DigitMapValue ::= SEQUENCE
{
    startTimer      INTEGER(0..99) OPTIONAL,
    shortTimer      INTEGER(0..99) OPTIONAL,
    longTimer       INTEGER(0..99) OPTIONAL,
    digitMapBody    IA5String,
    -- Units are seconds for start, short and long timers, and hundreds
    -- of milliseconds for duration timer. Thus start, short, and long
    -- range from 1 to 99 seconds and duration from 100 ms to 9.9 s
    -- An exception is the start timer which may equal 0.
    -- See A.3 for explanation of DigitMap syntax
    ...,
    durationTimer   INTEGER (0..99) OPTIONAL
}

```

## B.2 ABNF specification

```

Timer      = 1*2DIGIT
; Units are seconds for T, S, and L timers, and hundreds of
; milliseconds for Z timer. Thus T, S, and L range from 1 to 99
; seconds and Z from 100 ms to 9.9 s
; An exception is the start timer which may equal 0.

```

---

*[End Correction]*

---

## 6.19 Segmentation Example Error

<b>Description:</b>	<p>Section 'E.14.6 Procedures' (Ref. ITU-T Rec. H.248.1 (09/2005)) dictates that "Upon reception of the final segment, the receiver shall determine if it has received all the message segments. If it has, then the receiver shall respond with a TransactionResponseAcknowledgement."</p> <p>Following examples illustrates this, but the Ack is shown as K=1.</p> <p>As per the ABNF for TransactionResponseAcknowledgement,</p> <p><b>transactionResponseAck =</b></p> <p><b>ResponseAckToken LBRKT transactionAck *(COMMA transactionAck) RBRKT</b></p> <p><b>transactionAck =TransactionID / (TransactionID "-" TransactionID)</b></p> <p>So K=1 is not a valid format and should be K{1}</p>
<b>Reference:</b>	<p>From: chaitanya.shubhachint@tektronix.com</p> <p>Sent: Monday, January 28, 2008 5:09 PM</p> <p>To: megaco@ietf.org</p> <p>Subject: [Megaco] FW: Segmentation and TransactionResponseAck</p>

*[Begin Correction]*

## E.14.6 Procedures

...

Example 1:

```

Sender:  !/3 [12.34.56.78]:2944 P=1/1{C=1{AV=term1{...},
AV=term2{...}}}
Receiver:  !/3 [12.34.56.79]:2944 SM=1/1
Sender:  !/3 [12.34.56.78]:2944
P=1/2{C=1{AV=term3{...}},C=2{AV=term4{...}}}
Receiver:  !/3 [12.34.56.79]:2944 SM=1/2
Sender:  !/3 [12.34.56.78]:2944 P=1/3/&{C=3{AV=term5{...}}}
Receiver:  !/3 [12.34.56.79]:2944 SM=1/3/&
Receiver:  !/3 [12.34.56.79]:2944 K=1

```

...

*[End Correction]*

## 6.20 Incorrect RTP Profile ID

<b>Description:</b>	<p>The introductory section of Appendix I "Example Call flows" of H.248.1 V3 (09/2005). There it says that "...For example, G.711 A-law is called PCMA in SDP, and is assigned profile 0. G.723.1 is called G723 and is profile 4; H.263 is called H263 and is profile 34. See also <a href="http://www.iana.org/assignments/rtp-parameters">http://www.iana.org/assignments/rtp-parameters</a>."</p> <p>The use of 0 for G.711 A-law is incorrect and should be 8.</p>
---------------------	---

<b>Reference:</b>	Subject: [Megaco] G.711 A-law assigned profile in H.248.1 Date: Tue, 26 Feb 2008 16:30:16 +0100 From: Beis, Grigoris (NSN - GR/Athens) <grigoris.beis@nsn.com> To: <megaco@ietf.org>
-------------------	---

---

*[Begin Correction]*

## Appendix I

### Example call flows

All H.248.1 implementors must read the normative part of this Recommendation carefully before implementing from it. No one should use the examples in this appendix as stand-alone explanations of how to create protocol messages.

The examples in this appendix use SDP for encoding of the Local and Remote Descriptors. SDP is defined in RFC 2327. If there is any discrepancy between the SDP in the examples and RFC 2327, the RFC should be consulted for verification. Audio profiles used are those defined in RFC ~~1890~~3551, and others registered with IANA. For example, G.711 A-law is called PCMA in SDP, and is assigned profile 08. G.723.1 is called G723 and is profile 4; H.263 is called H263 and is profile 34. See also <http://www.iana.org/assignments/rtp-parameters>.

...

---

*[End Correction]*

## 6.21 Unsuccessful Digit Map match reporting

<b>Description:</b>	<p>H.248.1v3 introduced the capability to allow a Media Gateway Controller (MGC) to control whether or not events were notified to the MGC or were to be notified at a modified rate. A prime driver for this capability was to allow a MGC to control the rate of call setup requests it received from an access gateway in order to minimize congestion. In this scenario emergency calls would always be notified to the MGC however normal priority calls would be subject to congestion control. H.248.1v3 section E.15 “Notification Behaviour” shows an example coding to handle this situation. In this example H.248 digit maps and notification behaviour were utilized to request the MG to act in the above manner.</p> <p>However recently on the IETF Megaco mailing list a potential problem was highlighted (See: <a href="http://www.ietf.org/mail-archive/web/megaco/current/msg07745.html">http://www.ietf.org/mail-archive/web/megaco/current/msg07745.html</a> for the discussion). Clause E.15.5.2.2/H.248.1v3 utilizes two digit maps, a PriorityDialPlan1 and a NonPriorityDialPlan1. The idea is that the two digit maps would have separate maps that would allow only one digit map event to be reported. Unfortunately digit map events are unique in that they are reported at either a successful or unsuccessful matching. The result is that even if the MG was able to suppress the reporting of one of the digit maps, the other digit map would be reported. This would defeat the purpose of the congestion control</p>
---------------------	---

	<p>mechanism.</p> <p>In order to prevent notification of unsuccessful matches it would be desirable for the MGC to be able to suppress the notification of unsuccessful matches.</p> <p>As this problem is confined to DigitMap Events rather than adding a generic parameter to the H.248.1 syntax it is proposed to add a new Event Parameter to the DigitMap Completion Event in the DTMF Detection Package (Clause E.6.22/H.248.1v3) and also the Extended Digit Map and the Matched Digit Map Completion Events in the Extended DTMF Detection Package (Clause 5.2/H.248.16).</p> <p>Note: An Implementors' Guides typically only provides clarification to existing behaviour. The item is considered to introduce new functionality. However given the nature of the issue it is raised and recorded here whilst an Amendment is being prepared.</p>
<b>Reference:</b>	COM16-C.445 (2005-2008)

*[Begin Correction]*

---

## E.6 DTMF Detection Package

**Package Name:** DTMF Detection Package

**PackageID:** dd (0x0006)

**Description:** This package defines the basic DTMF tones detection. This package extends the possible values of tone ID in the Start Tone Detected, End Tone Detected and Long Tone Detected Events.

Additional tone ID values are all tone IDs described in package dg (Basic DTMF Generator Package).

The following table maps DTMF events to DigitMap symbols as described in 7.1.14.

DTMF	Event Symbol
d0	"0"
d1	"1"
d2	"2"
d3	"3"
d4	"4"
d5	"5"
d6	"6"
d7	"7"
d8	"8"
d9	"9"
da	"A" or "a"
db	"B" or "b"
dc	"C" or "c"
dd	"D" or "d"
ds	"E" or "e"

DTMF	Event Symbol
do	"F" or "f"

**Version:** 42

**Extends:** tonedet version 1

## E.6.1 Properties

None

## E.6.2 Events

### E.6.2.1 DTMF Digits

**Event Name:** DTMF Digits

**EventID:** EventIDs are defined with the same names as the SignalIDs defined in the table found in E.5.3.

**Description:** Generated when the MG detects a digit.

**EventDescriptor Parameters:** None

**ObservedEvents Descriptor Parameters:** None

### E.6.2.2 DigitMap Completion Event

**Event Name:** DigitMap Completion Event

**EventID:** ce (0x0004)

**Description:** Generated when a DigitMap completes as described in 7.1.14.

**EventsDescriptor Parameters:** ~~None~~

#### Unsuccessful Match Reporting

**Parameter Name:** Unsuccessful Match Reporting

**ParameterID:** umr (0x0001)

**Description:** The MGC may use this parameter to control whether the DigitMap Completion Event is generated in the event of an unsuccessful DigitMap match (i.e. match with method “Partial match” or “Full Match”).

**Type:** Boolean

**Optional:** Yes

**Possible values:**

On      Generate DigitMap Completion Event on unsuccessful match.

Off      Do not generate a DigitMap Completion Event on an unsuccessful match.

**Default:** *On*

**ObservedEventsDescriptor Parameters:**

...

## E.6.5 Procedures

DigitMap processing is activated only if an Events Descriptor is activated that contains a DigitMap completion event as defined in E.6.2 and that DigitMap completion event contains an EventDM

field in the requested actions as defined in 7.1.9. Other parameters such as KeepActive or embedded Events or Signals Descriptors may also be present in the Events Descriptor and do not affect the activation of DigitMap processing. By default DigitMaps are processed according to the procedures of 7.1.14 and when the DigitMap has completed (see clause 7.1.14.4) it is notified to the MGC and any embedded signals and embedded events are triggered. However if the Unsuccessful Match Reporting is set to “off” and the DigitMap completion was triggered as a result of an unsuccessful match then the DigitMap completion event is not notified to the MGC nor are embedded signals and/or embedded events triggered. The DigiMap however will be de-activated.

...

---

[End Correction]

## 6.22 Empty Statistics Descriptor

<b>Description:</b>	<p>The text of clause 7.1.15/H.248.1 indicates that the MGC may send an empty Statistics Descriptor to the MG: <i>“The receipt of an empty descriptor means that no statistics shall be collected for the specified termination”</i>.</p> <p>Sending an empty Statistics Descriptor is possible using the binary encoding of Annex A; but impossible using the text encoding of Annex B. The text encoding needs to be fixed to allow an empty Statistics Descriptor.</p>
<b>Reference:</b>	<p>Subject: RE: H.248.1 Sub-series IG for review</p> <p>Date: Sun, 27 Apr 2008 21:35:56 +0100</p> <p>From: Elad Chomsky &lt;elad@juniper.net&gt;</p>

---

[Begin Correction]

## B.2 ABNF specification

```
; Time = hhmmssss
Time      = 8 (DIGIT)

statisticsDescriptor= StatsToken [_LBRKT statisticsParameter
                               * (COMMA statisticsParameter) RBRKT]

;at-most-once per item
statisticsParameter = pkgdName [EQUAL VALUE /
                               (LSBRKT VALUE * (COMMA VALUE) RSBRT)]
```

...

---

[End Correction]



## 7 Technical and Editorial Corrections to H.248.3 (2000)

### 7.1 Set Indicator Value Discrepancy

<b>Description:</b>	<p>There is a discrepancy in the possible values of "Indid" parameter of "Setindactor" signal of "Indicator" package recommended in the ITU-T Rec. H.248.3.</p> <p>The "Set of line indicators" for the parameter "Indid" are having values "l001-l999 (0x0003-0x03f9)".</p> <p>In decimal number notation, this range corresponds to 999 values while in hexadecimal notation, this range corresponds to 1015 values.</p> <p>The hexadecimal notation should also correspond to 999 values, i.e., it should be "l001-l999 (0x0003-0x03e9)".</p>
<b>Reference:</b>	<p>Subject: [Megaco] Discrepancy in possible values of parameter of Indicator package recommended in ITU-T Rec. H.248.3</p> <p>Date: Wed, 16 Apr 2008 12:36:08 +0530</p> <p>From: suruchi.agarwal <a href="mailto:suruchi.agarwal@aricent.com">suruchi.agarwal@aricent.com</a></p> <p>To: megaco@ietf.org &lt;megaco@ietf.org&gt;</p>

*[Begin Correction]*

### 8.3 Signals

#### *SetIndactor*

SignalID: is (0x0001)

Set indicator state.

Parameters:

Indid (0x0001)

Type: Enumeration.

Possible values:

Name	Description
il (0x0001)	Hold
ic (0x0002)	Conference
l001-l999 (0x0003-0x03e9)	Set of line indicators
f001-f999 (0x03fa-0x07e0)	Set of assignable function indicators
ir (0x07e1)	Ringer/Alerter indication
im (0x07e2)	Message waiting indicator

Note: Values 0x03ea to 0x03f9 are reserved.

state (0x0002)

Type: Enumeration.

Possible values: On (0x0001), off (0x0002), blink (0x0003), fast\_blink (0x0004), slow\_blink (0x0005).

Default is off.

## 8 Technical and Editorial Corrections to H.248.5 (2000)

### 8.1 Clarification of “At-Most-Once” Functionality

<b>Description:</b>	<p>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:</p> <p><i>“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.</i></p> <p><i>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.”</i></p> <p>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.</p>
<b>Reference:</b>	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.

...

## 9 Technical and Editorial Corrections to H.248.8 (2005)

### 9.1 Allow the MG to issue error #511

<b>Description:</b>	<p>H.248.8 currently defines three error codes dealing with lack of resources:</p> <ol style="list-style-type: none"><li>1. Error #510 indicates a lack of common resources. This error may only be issued by the MG.</li><li>2. Error #511 indicates a temporary lack of resources; usually due to an overload of H.248 commands. This error may only be issued by the MGC.</li><li>3. Error #526 indicates a lack of bandwidth resources. This error may only be issued by the MG.</li></ol> <p>Therefore an MG may use the error code in order differentiate between lack of common resources and bandwidth resources. However the MG cannot indicate that a command was not handled due to overload.</p>
<b>Reference:</b>	COM16-C.342 (2005-2008)

*[Begin Correction]*

#### 4.2.49 Error code #: 511

**Name:** Temporarily busy

**Definition:** The command(s) was rejected due to a temporary busy condition in the MGC or MG.

**Error text in the error descriptor:** –

**Comment:** Upon receiving this error code, the command may be resent as the busy condition may have abated.

*[End Correction]*

## 10 Technical and Editorial Corrections to H.248.9 (01/2005)

### 10.1 Duplicated Parameter ID

<b>Description:</b>	H.248.9 Clauses 9.2.2.2.1 and 9.2.2.2.3, the "Digits collected" and "Amount played" parameters have the same parameter id (0x0003). Digits collected should have a binary ID of (0x0001).
<b>Reference:</b>	<p>Subject: FW: [ref9218E] ITU-T Recommendation H.248.9 (2005) Amend.1 (29.08.2007) editorial problems</p> <p>Date: Tue, 12 Feb 2008 11:35:00 +0100</p> <p>From: &lt;simao.campos@itu.int&gt;</p>

### 9.2.2 PlayCollect Success

Event Name: Play Collect Success

EventID: pcollsucc (0x0002)

Description: This event signifies the successful completion of a playcol signal.

#### 9.2.2.1 EventDescriptor parameters

None.

#### 9.2.2.2 ObservedEventDescriptor parameters

##### 9.2.2.2.1 Digits Collected

Parameter Name: Digits collected

ParameterID: dc (0x00013)

Description: The DTMF digits that were collected during a play collect signal.

Type: String

Optional: No

Possible values: Any sequence of valid DTMF digits 0-9, A-D or a-d, \*, or #. A digit may be preceded by the long-duration modifier "Z" or "z" if detection of a long-duration tone in that position was enabled by the digit map named in the playcol signal.

Default: None

## 11 Technical and Editorial Corrections to H.248.12 (08/2007)

### 11.1 Overlapping Property and Event IDs

<b>Description:</b>	<p>There is an overlap between package h323bc and h245. The problem properties from the h323bc package are:</p> <p>fastconnect (0x0001),</p> <p>h245encapstatus(0x0002)</p> <p>and event: sepH245 (0x0001).</p> <p>There two ways to fix the problem:</p> <p>1) Renumber the properties to fastconnect (0x0003), H245encapstatus (0x0004) and event: sepH245 (0x0003).</p> <p>2) Deprecate the package extension. e.g. change the line:</p> <p>Extends: h245 Package version 1 (defined in this Recommendation)</p> <p>to:</p> <p>Extends: None.</p>
---------------------	--

	<p>Fix 1: would cause backwards incompatibility problems where people have implemented referring to h245 package elements by their ids rather than through the h323bcp package.</p> <p>Fix 2: would cause problem where people only specify elements through the h323bcp package. Package reporting may also change.</p> <p>In order to minimize impacts to implementations fix 2 is proposed.</p>
<b>Reference:</b>	AVD-3316

---

*[Begin Correction]*

---

...

## 6 H323 Bearer Control Package

Package Name: H.323 Bearer Control

PackageID: h323bc, (0x002b)

Version: 1

Extends: ~~Non-h245 Package version 1 (defined in this Recommendation)~~

...

---

*[End Correction]*

---

## 12 Technical and Editorial Corrections to H.248.14 (2002)

### 12.1 Provisioning of the Inactivity Timeout Event

<b>Description:</b>	<p>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:</p> <ol style="list-style-type: none"> <li>1. In the original discussions in mid-2001 people favoured a mechanism that did not cause extra burden on the MGC.</li> <li>2. H.248.14 was seen to be used for residential gateways where the signalling load was insufficient for a keep-alive mechanism.</li> <li>3. There could be tens of thousands of residential gateways per MGC.</li> <li>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.</li> </ol> <p>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</p>
---------------------	---

	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.
<b>Reference:</b>	COM16-D.274 (2005-2008)

---

*[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.

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.

...

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*[End Correction]*

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## 13 Technical and Editorial Corrections to H.248.16 (11/2002)

### 13.1 Unsuccessful Digit Map match reporting

<b>Description:</b>	See item 6.21.  As this problem is confined to DigitMap Events rather than adding a generic parameter to the H.248.1 syntax it is proposed to add a new Event Parameter to the DigitMap Completion Event in the DTMF Detection Package (Clause E.6.22/H.248.1v3) and also the Extended Digit Map and the Matched Digit Map Completion Events in the Extended DTMF Detection Package (Clause 5.2/H.248.16).  Note: An Implementors' Guides typically only provides clarification to existing behaviour. The item is considered to introduce new functionality. However given the nature of the issue it is raised and recorded here whilst an Amendment is being prepared.
<b>Reference:</b>	COM16-C.445 (2005-2008)

---

*[Begin Correction]*

---

## 5 Extended DTMF detection package

PackageID: xdd (0x0052)

Version: 42

Extends: dd (0x0006) version 42

This package provides an extended DTMF digit map completion event, incorporating detailed reporting of timeouts, digit buffering control, and reporting and control of processing of extra events.

## 5.1 Properties

None.

## 5.2 Events

### Extended DigitMap Completion Event

EventID: xce (0x0005)

Generated when a digit map completes as described in 7.1.14/H.248.1, or in 5.5 "Procedures" of this Recommendation, as appropriate.

EventsDescriptor parameters:

#### *Buffer Control*

ParameterID: bc (0x0001)

Type: integer

Possible values: 0 upwards. Default value is 0.

Description:

Maximum period for which digit buffering should occur following reporting of this event, in seconds.

#### *Extra Digit Disposition*

ParameterID: xdd (0x0002)

Type: Boolean

Possible values: ON or OFF. Default value is OFF.

Description:

If ON, an extra digit event triggering digit map completion by causing mismatch to all candidate patterns is discarded. If OFF, the extra digit event is processed as indicated by step 5 of the appropriate matching procedures.

#### *Match Procedure*

ParameterID: mp(0x0003)

Type: enumeration

Possible values: base or enhanced. Default value is base.

"base" (0x0001) Use match procedures described in 7.1.14/H.248.1.

"enhanced" (0x0002) Use match procedures described in 5.5.

Description:

Indicates which matching procedures should be used for this digitmap.

#### Unsuccessful Match Reporting

Parameter Name: Unsuccessful Match Reporting

ParameterID: umr (0x0004)

Description: The MGC may use this parameter to control whether the DigitMap Completion Event is generated in the event of an unsuccessful DigitMap match (i.e. match with method "Partial match" or "Full Match").

Type: Boolean

Optional: Yes

Possible values:

On      Generate DigitMap Completion Event on unsuccessful match.

Off      Do not generate a DigitMap Completion Event on an unsuccessful match.

Default: On

...

#### 5.5.1.4 DigitMap completion event

These procedures are identical to those in 7.1.14.4/H.248.1. By default DigitMaps are processed according to the procedures of 7.1.14 and when the DigitMap has completed (see clause 7.1.14.4) it is notified to the MGC and any embedded signals and embedded events are triggered. However if the Unsuccessful Match Reporting parameter is set to “off” and the DigitMap completion was triggered as a result of an unsuccessful match then the DigitMap completion event is not notified to the MGC nor are embedded signals and/or embedded events triggered. The DigitMap however will be de-activated.

...

### 6 Enhanced DTMF detection package

PackageID:    edd (0x0066)

Version:      12

Extends:      xdd (0x0052) version 1

This package provides an enhanced DTMF digit map completion event, incorporating additional digit collection procedures for reporting a completion event.

#### 6.1 Properties

None.

#### 6.2 Events

Matched DigitMap Completion Event

EventID:      mce (0x0006)

Generated when a digit map completes as described in 7.1.14/H.248.1, or in 5.5, as appropriate.

EventsDescriptor parameters:

##### *Buffer Control*

ParameterID:    bc (0x0001)

Type:            integer

Possible values:    0 upwards. Default value is 0.

Description:

Maximum period for which digit buffering should occur following reporting of this event, in seconds.

##### Unsuccessful Match Reporting

Parameter Name:    Unsuccessful Match Reporting



ParameterID: umr (0x0002)

Description: The MGC may use this parameter to control whether the DigitMap Completion Event is generated in the event of an unsuccessful DigitMap match (i.e. match with method “Partial match” or “Full Match”).

Type: Boolean

Optional: Yes

Possible values:

On Generate DigitMap Completion Event on unsuccessful match.

Off Do not generate a DigitMap Completion Event on an unsuccessful match.

Default: On

...

#### 6.5.1.4 DigitMap completion event

See clause 5.5.1.4. These procedures are identical to those in 7.1.14.4/H.248.1.

...

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*[End Correction]*

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

### 14.1 Correction of Typographical error in Clause 8.3.1.2/H.248.17

<b>Description:</b>	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”.
<b>Reference:</b>	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 "bcg/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.

...

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*[End Correction]*

## 15 Technical and Editorial Corrections to H.248.18 (11/2002)

### 15.1 Duplicated Error Code 459

<b>Description:</b>	<p>H.248.26 specifies error code #459:</p> <p><b>7.5.1 Invalid Combination of Metering Detection Events</b></p> <p><i>Error Code #: 459</i></p> <p><i>Name: Invalid Combination of Metering Detection Events</i></p> <p><i>Definition: The command was disregarded because the Events Descriptor contained more</i></p> <p><i>than one metering detection event.</i></p> <p><i>Error Text in the error Descriptor: --</i></p> <p><i>Comment: -/</i></p> <p>However H.248.18 (and the IANA registration page) also specifies error code #459 as:</p> <p><b>5.6 Error Codes</b></p> <p><i>This package defines a new error code:</i></p> <p><i>#: 459 Name: Unsupported or Unknown Profile</i></p> <p><i>Definition: The Profile Name is not supported by the receiver. The command related to the unknown profile is disregarded.</i></p> <p>This leads to a duplication of error codes numbers. Whilst H.248.18 was approval before H.248.26, H.248.26 has been more widely implemented, therefore it is proposed to change the error code in H.248.18 from 459 to 461.</p>
<b>Reference:</b>	<p>Subject: [Megaco] Duplicated Error Code 459</p> <p>Date: Thu, 31 Jan 2008 17:34:04 +1100</p> <p>From: megaco ietf &lt;megaco@ietf.org&gt;</p>

[Begin Correction]

### 5.5 Procedures

...

The MGC may set the Prof\_supp property using a Modify command to indicate the profile/s that it will use on the MG. The MGC shall use one or more of the profiles that the MG indicated in an AuditCapability of the Prof\_supp property. If the MGC tries to set the Prof\_supp property on the MG to a profile value that is unknown by the MG, at the first unknown profile the MG shall reply with error code ~~459~~ 461 "Unsupported or Unknown Profile". If the Prof\_supp property is not set by the MGC then it shall be assumed that the MGC supports all the profiles supported by MG and that the MGC can use functionalities/capabilities of any of the profiles.

NOTE – This aligns with the ServiceChange procedure where by the MGC may indicate which profile it supports.

An Audit value command may be used to determine the profile/s that have been set.

## 5.6 Error Codes

This package defines a new error code:

#: ~~459~~461 Name:     Unsupported or Unknown Profile

Definition:

The Profile Name is not supported by the receiver. The command related to the unknown profile is disregarded.

Package:             Profile Package prp, 0x0050

Reference:           H.248.18

Error Text in the error Descriptor:

The Profile Name is included in the error text in the error descriptor. String Length 1 – 67 characters – 64 for name, 1 for "/" and 2 for version.

Comment: –

---

[End Correction]

## 16 Technical and Editorial Corrections to H.248.20 (2002)

### 16.1 Media values

<b>Description:</b>	<p>H.248.20 defines the following for the use of the Media field in the SDP m= line:</p> <p><b>5.1.2 "m=line" Line for H.221 and H.223 MUX termination</b></p> <p><i>The syntax of the media field:</i></p> <p><b>media-field = "m=" media SP port ["/" integer] SP proto 1*(SP fmt) CRLF</b></p> <p><i>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.</i></p> <p>Currently the IETF are working on updating the SDP RFC (see: <a href="http://www.ietf.org/internet-drafts/draft-ietf-mmusic-sdp-new-23.txt">http://www.ietf.org/internet-drafts/draft-ietf-mmusic-sdp-new-23.txt</a>). 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.</p> <p>The draft defines the users of the media type “application” as:</p> <p><i>“Voice over IP, video teleconferencing, streaming media, instant messaging,</i></p>
---------------------	--

	<i>etc. See also section 3 of RFC XXXX.”</i> From this definition it is seen that type “application” would be appropriate for use for H.248.20.
<b>Reference:</b>	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”.

...

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*[End Correction]*

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## 17 Technical and Editorial Corrections to H.248.22 (2003)

### 17.1 Correction of typographical errors

<b>Description:</b>	<p>H.248.22 contains typographical errors in that the property “shrisk/srgi” is referenced however the correct property reference is “shrisk/srgir”.</p> <p>H.248.1 defines the “Include shared risk group” property with the values “on/off”. Eg.</p> <p>5.1.1 Property Name:        Include shared risk group</p> <p>PropertyID:    incl, 0x0001</p> <p>Description:</p> <p style="padding-left: 40px;">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).</p> <p>Type: Sublist of type Boolean</p> <p>Possible Values:</p> <p style="padding-left: 40px;">"on" (TRUE) Use resources from the specified SRGI only [Default]</p> <p style="padding-left: 40px;">"off" (FALSE) Use resources from any but the specified SRGI</p> <p>However the procedures use yes/no instead of on/off in one place. The procedures should be corrected to align with 5.1.1.</p>
<b>Reference:</b>	AVD-2467 and COM16-D.44 (2005-2008)

#### 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]

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

### 18.1 Clarification of default pattern ID

<b>Description:</b>	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.
<b>Reference:</b>	COM16-C.110 (2005-2008)

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[Begin Correction]

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#### 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.

...

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[End Correction]

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### 18.2 Clarification of solutions to possible race condition in dwa signal

<b>Description:</b>	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.
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<b>Reference:</b>	Discussions arising from COM16 C-70 (2005-2008)
-------------------	---

*[Begin Correction]*

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## 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]*

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## 19 Technical and Editorial Corrections to H.248.29 (01/2005)

### 19.1 Unsuccessful Digit Map match reporting

<b>Description:</b>	<p>See item 6.21.</p> <p>Also related to this issue but not strictly related to DTMF digit detection is the Generic CAS Compelled Register Signalling Package (<i>icascgen</i>) in H.248.29. The Generic Digit Information Event utilizes a Detection Event Map. The MGC may encounter overload issues with CAS signalling and as such the problem of double event notification may occur. Therefore it is proposed to modify H.248.29 to incorporate a new Event Parameter in the Generic Digit Information Event (Clause B.1.2.2.1/H.248.29).</p> <p>Note: An Implementors' Guides typically only provides clarification to existing behaviour. The item is considered to introduce new functionality. However given the nature of the issue it is raised and recorded here whilst an Amendment is being prepared.</p>
<b>Reference:</b>	COM16-C.445 (2005-2008)

*[Begin Correction]*

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#### B.1.2.2.1 EventsDescriptor parameters

##### B.1.2.2.1.1 Detection Events Map

Parameter Name: Detection Events Map

ParameterID: dem (0x0001)

Description: Detection Events Map parameter is activated for collection of register signals. When a Detection Events Map is missing, the received events are reported event by event.

Type: String

Optional: Yes

Possible values: A detected sequence of the characters '0' through '9' and 'B-F', 'x', '.' and the interdigit threshold timers 'T', 'S' and 'L'. In addition, it can also contain '<' and '>' indicating the used backward acknowledge signal. ABNF Syntax is specified in B.2.2.

NOTE 1 – The SSR2 Events Map is a specific Detection Events Map for Signalling System R2 codepoints.

NOTE 2 – "x" represents any character in the range of "0" through "9".

Default: None

#### **B.1.2.2.1.2 Unsuccessful Match Reporting**

Parameter Name: Unsuccessful Match Reporting

ParameterID: umr (0x0002)

Description: The MGC may use this parameter to control whether the Generic Digit Information Event is generated in the event of an unsuccessful events map match (i.e. match with method “Partial match, unmatched event” or “Partial Match, timer expired”).

Type: Boolean

Optional: Yes

Possible values:

On      Generate a Generic Digit Information Event on unsuccessful match.

Off      Do not generate a Generic Digit Information Event on an unsuccessful match.

Default: On

...

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*[End Correction]*

## **20 Technical and Editorial Corrections to H.248.30 (2007)**

### **20.1 Correction of title of clause 8**

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

[Begin Correction]

## 8 Received RTCP XR Burst Metrics Package

...

[End Correction]

## 21 Technical and Editorial Corrections to H.248.32 (2005)

### 21.1 Correction of Resource Extension names

<b>Description:</b>	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.
<b>Reference:</b>	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 <del>20</del> <u>32</u>	<del>ext20</del> <u>ext32</u>	0x0040

...

[End Correction]



## 22 Technical and Editorial Corrections to H.248.34 (2005)

### 22.1 Correction of inconsistent parameter value naming

<b>Description:</b>	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.
<b>Reference:</b>	COM16-C.277 (2005-2008)

*[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:			
	• Steady Signal type – Directly mapped to the parameter "Signal" as specified below.			
	<b>V5</b>		<b>H.248</b>	
	<b>Steady signal</b>	<b>Value</b>	<b>Text encoding</b>	<b>Binary encoding</b>
	Normal polarity	0	"normalPolarity"	(0x0000)
	Reversed polarity	1	"reversedPolarity"	(0x0001)
	Battery on c-wire	2	"batteryOnC-wire"	(0x0002)

...

*[End Correction]*

## 23 Technical and Editorial Corrections to H.248.36 (2005)

### 23.1 Clarification of cleanup of hanging terminations

<b>Description:</b>	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.
<b>Reference:</b>	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.

...

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*[End Correction]*

<b>Annex: Defect Report Form for H.248 Sub-series</b>
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<b>DATE:</b>	
<b>CONTACT INFORMATION</b>  <b>NAME:</b> <b>COMPANY:</b> <b>ADDRESS:</b>  <b>TEL:</b> <b>FAX:</b> <b>EMAIL:</b>	
<b>AFFECTED RECOMMENDATIONS:</b>	
<b>DESCRIPTION OF PROBLEM:</b>	
<b>SUGGESTIONS FOR RESOLUTION:</b>	

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