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ITU-T H.248.1 Version 2 Implementors' Guide

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

**Implementors' Guide for Recommendation
H.248.1 Version 2 (05/2002) Corrigendum 1
(01/2004) ("Media Gateway Control Protocol")**

Summary

This document is a compilation of reported defects identified in ITU-T Recommendation H.248.1 Version 2 (05/2002) Corrigendum 1 (01/2004). It must be read in conjunction with the Recommendation to serve as an additional authoritative source of information for implementors.

This revision contains all updates submitted up to and including those at Study Group 16 meeting in April 2006.

This document was approved by ITU-T Study Group 16 on [13 April 2006].

NOTE: Changes relative to H.248.1 Version 3 (05/2002) and onwards are found in another document.

Change Log

(All changes that were included in H.248.1 V2 (05/2002) Corrigendum 1 (03/2004) are omitted here.)

V1 (Geneva, November 2005)

New document, already containing items 6.1 - 6.20.

New:

- 6.21 Protocol version negotiation

V2 (Geneva, April 2006)

New:

- 6.22 Clarification of error code usage in wildcarding procedures
- 6.23 ServiceStates clarification for continuity testing
- 6.24 Clarification of termination service state upon restart of MG
- 6.25 Alignment of text among events in the Tone Detection Package
- 6.26 Missing header in Long Tone Detected Event
- 6.27 Clarification of package definition requirements for enumerations
- 6.28 Clarification of use of ABNF encodings of octet strings
- 6.29 Clarification of encoding for packet loss statistic in Annex E.12

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Table of Contents

1	SCOPE.....	1
2	INTRODUCTION	1
3	DEFECT RESOLUTION PROCEDURE.....	1
4	REFERENCES	1
5	NOMENCLATURE	2
6	TECHNICAL AND EDITORIAL CORRECTIONS TO H.248.1 (05/2002) CORR.1 (03/2004).....	2
6.1	ERROR RESPONSE WHEN PROCESSING A CONTEXTID	2
6.2	SUPPORT OF PACKAGES.....	3
6.3	MISMATCH BETWEEN RFC2377 SUPPORT AND ONE “M=” LINE RESTRICTION	3
6.4	ANNEX C CODEPOINTS FOR RTCP	4
6.5	CLARIFICATION OF PACKAGEID AND NAME FOR ANNEX C	4
6.6	CLARIFICATION OF RESERVEGROUP AND RESERVEVALUE PROPERTIES.....	5
6.7	CLARIFICATION OF PROVISIONAL RESPONSE TIMER VALUES	6
6.8	CLARIFICATION OF NULL CONTEXT USAGE	7
6.9	MULTIPLE INDIVIDUAL AUDITING IN ABNF.....	9
6.10	LOOPBACK USAGE CLARIFICATION	10
6.11	COMMANDS IN SERVICECHANGE ON ROOT TRANSACTION	10
6.12	ANNEX C AND SDP PARAMETERS	11
6.13	CASE SENSITIVITY OF PROFILE NAMES	12
6.14	PROFILE NEGOTIATION.....	13
6.15	CONFLICT BETWEEN H.248.1 VERSION 2 CORRIGENDUM 1 AND H.248.8	13
6.16	AUDITCAPABILITY OF SIGNALS.....	14
6.17	MEDIA TYPE MISMATCH	14
6.18	NOTIFY AVALANCHE.....	15
6.19	TOPOLOGY REPLY	16
6.20	STATISTICS AND SUB-LISTS	16
6.21	PROTOCOL VERSION NEGOTIATION	18
6.22	CLARIFICATION OF ERROR CODE USAGE IN WILDCARDING PROCEDURES	18
6.23	SERVICESTATES CLARIFICATION FOR CONTINUITY TESTING.....	19
6.24	CLARIFICATION OF TERMINATION SERVICE STATE UPON RESTART OF MG.....	19
6.25	ALIGNMENT OF TEXT AMONG EVENTS IN THE TONE DETECTION PACKAGE	19
6.26	MISSING HEADER IN LONG TONE DETECTED EVENT	20
6.27	CLARIFICATION OF PACKAGE DEFINITION REQUIREMENTS FOR ENUMERATIONS.....	21
6.28	CLARIFICATION OF USE OF ABNF ENCODINGS OF OCTET STRINGS	22
6.29	CLARIFICATION OF ENCODING FOR PACKET LOSS STATISTIC IN ANNEX E.12	23
	ANNEX: DEFECT REPORT FORM FOR H.248.1 VERSION 2	25

Implementors' Guide for Recommendation H.248.1 Version 2

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.248.1 Version 2 Implementors' Guide is a compilation of reported defects for version 2 of Recommendation H.248.1 (05/2002) Corrigendum 1 (03/2004). This edition of the Guide contains reported defects identified as of 4/2006.

The Guide must be read in conjunction with Recommendation H.248.1 version 2 to serve as an additional source of information for implementors. For changes to version 3 or later of H.248.1 or for other Recommendations in the H.248.x sub-series, please reference the H.248 Sub-series Implementors' Guide.

3 Defect Resolution Procedure

Upon discovering technical defects with Recommendation H.248.1 Version 2, please provide a written description directly to the editor with a copy to the Q.3/16 Rapporteur. The template for a defect report is located at the end of the Guide. Contact information for these parties is included at the front of the document. Return contact information should also be supplied so a dialogue can be established to resolve the matter and an appropriate reply to the defect report can be conveyed. This defect resolution process is open to any interested party. Formal membership in the ITU is not required to participate in this process.

4 References

This document refers to the following Recommendation:

- ITU-T Recommendation H.248.1 Version 2 (05/2002) Corr.1 (03/2004), *Gateway control protocol: Version 2*

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 (05/2002) Corr.1 (03/2004)

6.1 Error response when processing a ContextID

Description:	H.248.1 § 8.2.2 discusses the action to be taken when a receiver encounters an error parsing a ContextID. It specifies that the ContextID is returned in an Action response with error code 422 "Syntax Error in action". It is very likely however that if a receiver cannot parse the context ID it will not be able to return the ContextID back to the sender. It is proposed below to allow sending of a response at a transaction level without including the ContextID.
Reference:	AVD-2467

[Begin Correction]

8.2.2 TransactionReply

...

If the receiver encounters an error in processing a ContextID but can parse the ContextID, the requested Action response will consist of the Context ID and a single error descriptor, 422 (Syntax Error in Action). If the receiver cannot parse the ContextID, it shall return a TransactionReply consisting of the TransactionID and a single error descriptor, 422 (Syntax Error in Action).

...

[End Correction]

6.2 Support of packages

Description:	There has been some confusion of what is meant by the term “To support a particular package the MG must support all properties, signals, events and statistics defined in a package. It must also support all Signal and Event parameters.” The term "Must Support" is different from "it is mandatory to implement all the functionality in the package." This term was added so that the MG had to support the reception of properties, signal, events and statistics. The MG must not return a syntax error or unknown ID for any of these elements. However the MG could give a meaningful response such as 501 not implemented. This shows that the MG has at least considered the complete package. It is encouraged to support the complete functionality of a package however it is better to return error code 501 and using an existing package rather than creating new packages with the same functionality as contained in existing packages. It is proposed to clarify this.
Reference:	Subject: RE: [Megaco] Support of a H.248 package Date: Tue, 23 Mar 2004 14:39:43 -0500 From: Kevin Boyle <kboyle@nortelnetworks.com> and AVD-2467

[Begin Correction]

6.2.3 Packages

...

To support a particular package the MG must ~~support~~ recognize all properties, signals, events and statistics defined in a package. It must also support all Signal and Event parameters. If the functionality behind these properties, signals, events and statistics is not implemented, the MG shall not return a syntax error or unknown ID error for any of these elements but should return error 501 “Not implemented”.

The MG may support a subset of the values listed in a package for a particular Property or Parameter. If an unsupported value is specified by the MGC, the MG shall return error 501 “Not implemented”.

...

[End Correction]

6.3 Mismatch between RFC2377 support and one “m=” line restriction

Description:	H.248.1 § 7.1.8 Local and Remote descriptor mandates that there shall only be one m= line per SDP. However further in the section it states that “Implementations shall accept session descriptions that are fully conformant to RFC 2327.” There could be some confusion over whether or not multiple m=lines should be accepted if they conform to RFC2327. Multiple m=lines per SDP should not be accepted by the MG. This should be clarified.
Reference:	AVD-2467

[Begin Correction]

7.1.8 Local and Remote descriptors

...

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. When binary encoding the protocol, the descriptor consists of groups of properties (tag-value pairs) as specified in Annex C. Each such group may contain the parameters of a session description.

...

[End Correction]

6.4 Annex C codepoints for RTCP

Description:	H.248.30 introduces a package for the support of RTCP XR. As part of the functioning of RTCP SDP bandwidth modifiers may be sent. This is currently supported in SDP but not in the Binary version of H.248.1. Thus the bandwidth modifiers RTCP(b=RS:xx, b=RR:xx) as defined in RFC3556 need to be added to H.248.1 Annex C.
Reference:	Subject: [Megaco] RTCP bandwidth modifiers Date: Thursday, March 25, 2004 5:41 AM From: Kalleitner Franz [mailto:franz.kalleitner@siemens.com]

[Begin Correction]

C.6 IP

PropertyID	Property tag	Type	Value
IPv4	6001	32 bits Ipv4Address	Ipv4Address Ref.: IETF RFC 791
IPv6	6002	128 bits	IPv6 Address Ref.: IETF RFC 2460
Port	6003	Unsigned integer	0..65535
Porttype	6004	Enumerated	TCP(0), UDP(1), SCTP(2)
<u>RtcpbwRS</u>	<u>6005</u>	<u>Integer</u>	<u>RS RTCP bandwidth modifier indicates the RTCP bandwidth allocated to active data senders (as defined by the RTP spec)</u> <u>Ref.: IETF RFC 3556</u>
<u>RtcpbwRR</u>	<u>6006</u>	<u>Integer</u>	<u>RR RTCP bandwidth modifier indicates the RTCP bandwidth allocated to other participants in the RTP session (i.e., receivers)</u> <u>Ref.: IETF RFC 3556</u>

[End Correction]

6.5 Clarification of PackageID and name for Annex C

Description:	The binary encoding of H.248.1 uses Annex C for a number of local and remote properties.
---------------------	--

	The identities of the Annex C properties use the normal package name/property id construct. It is not clear from reading Annex C what the Package name is. The Annex A ASN.1 syntax must be read to find out that the binary package name is H'0000. No text package name has been defined for Annex C for use with the H.248 property SDP element. Annex C should be modified to make the package name/id clear.
Reference:	<p>----- Original Message -----</p> <p>Subject: Re: Signaling of UDI rsp Clearmode Bearer Service; Re: TDM Hairpinning; Re: [Megaco] Hairpin case A/u Law conversion</p> <p>Date: Tue, 27 Apr 2004 13:55:12 +0200</p> <p>From: Carsten Waitzmann <cwaitzmann@alcatel.de></p>

[Begin Correction]

Annex C Tags for media stream properties

Parameters for Local, Remote and LocalControl descriptors are specified as tag-value pairs if binary encoding is used for the protocol. This annex contains the property names (PropertyID), the tags (Property tag), type of the property (Type) and the values (Value). Values presented in the Value field when the field contains references shall be regarded as "information". The reference contains the normative values. If a value field does not contain a reference, then the values in that field can be considered as "normative".

The referencing of Annex C properties follows the PackageID/PropertyID structure; however Annex C is not in itself a package. Annex C is considered to have PackageID 0x0000 for binary encoding and "anxc" for text encoding. For text encoding of H.248.1, Annex C shall only be used in the case that the required property is not already defined by a package or represented by SDP. The nesting of one Annex C property inside another is forbidden.

Tags are given as hexadecimal numbers in this annex. When setting the value of a property, a MGC may underspecify the value according to one of the mechanisms specified in 7.1.1.

...

[End Correction]

6.6 Clarification of ReserveGroup and ReserveValue Properties

Description:	The use of the Reserve property is described in H.248.1 sections 7.1.7 and 7.1.8. Currently there is a mismatch between the stated behaviour of Reserve Group. Section 7.1.7 states: "If the value of a Reserve property is True, the MG SHALL reserve resources for all alternatives specified in the Local and/or Remote descriptors for which it currently has resources available." however section 7.1.8 states "If ReserveGroup is True, the MG reserves the resources required to support any of the requested property group alternatives that it can currently support. If ReserveValue is True, the MG reserves the resources required to support any of the requested property value alternatives that it can currently support." It is proposed to update 7.1.8 to align with the definition in 7.1.7.
Reference:	AVD-2569

[Begin Correction]

7.1.8 Local and remote descriptors

...

If ReserveGroup is True, the MG reserves the resources required to support ~~any~~as many as possible of the requested property group alternatives that it can currently support. If ReserveValue is True, the MG reserves the resources required to support ~~any~~as many as possible of the requested property value alternatives that it can currently support.

...

[End Correction]

6.7 Clarification of Provisional Response Timer Values

Description:	<p>H.248.1 has 2 sections that discuss the setting of the (MG)provisionalResponseTimer value. Section D.1.4 states: “The root Termination has a property (ProvisionalResponseTimerValue), which can be set to the requested maximum number of milliseconds between receipt of a command and transmission of the TransactionPending response.”</p> <p>Section E.2.1 states: “Initially set to normalMGExecutionTime plus network delay, but may be lowered.”\</p> <p>These two sections give conflicting advice of what to set the timer to, D.1.4 does not take into account network delay which may result in messages being repeated unnecessary. It is proposed to remove the text from D.1.4 and rely on the definition in E.2.1.</p> <p>Furthermore section 8.2.3 discusses procedures for the sending of Transaction Pending. It however has omitted the (MG/MGC)ProvisionalResponseTimerValue the use of which should be documented.</p>
Reference:	AVD-2569

[Begin Correction]

8.2.3 TransactionPending

...

TransactionPending(TransactionID { })

The TransactionID parameter must be the same as that of the corresponding TransactionRequest. A property of root (normalMGExecutionTime) is settable by the MGC to indicate the interval within which the MGC expects a response to any transaction from the MG (exclusive of network delay). Another property (normalMGCEExecutionTime) is settable by the MGC to indicate the interval within which the MG should expect a response to any transaction from the MGC (exclusive of network delay). MGProvisionalResponseTimerValue indicates the time within which the MGC should expect a Pending Response from the MG if a Transaction cannot be completed (initially set to normalMGExecutionTime plus network delay, but may be lowered). MGCProvisionalResponseTimerValue has the corresponding meaning to the MG. Senders may receive more than one TransactionPending for a command. If a duplicate request is received when pending, the responder may send a duplicate pending immediately, or continue waiting for its timer to trigger another TransactionPending.

...

[End Correction]

D.1.4 Provisional responses

Executing some transactions may require a long time. Long execution times may interact with the timer-based retransmission procedure. This may result either in an inordinate number of retransmissions, or in timer values that become too long to be efficient. Entities that can predict that a transaction will require a long execution time may send a provisional response, "Transaction Pending". They **SHOULD** send this response if they receive a repetition of a transaction that is still being executed.

Entities that receive a Transaction Pending shall switch to a different repetition timer for repeating requests. ~~The root Termination has a property (ProvisionalResponseTimerValue), which can be set to the requested maximum number of milliseconds between receipt of a command and transmission of the TransactionPending response.~~ Upon receipt of a final response following receipt of provisional responses, an immediate confirmation shall be sent, and normal repetition timers shall be used thereafter. An entity that sends a provisional response, **SHALL** include the immAckRequired field in the ensuing final response, indicating that an immediate confirmation is expected. Receipt of a Transaction Pending after receipt of a reply shall be ignored.

...

6.8 Clarification of NULL Context Usage

Description:	<p>There has been some confusion over what terminations in the NULL context actually represent. H.248.1 § 6. Connection Model gives some guidance:</p> <p>“A Context is an association between a collection of Terminations. There is a special type of Context, the null Context, which contains all Terminations that are not associated to any other Termination. For instance, in a decomposed access gateway, all idle lines are represented by Terminations in the null Context.”</p> <p>Terminations in the NULL context typically have default descriptor values associated with them. For example: the termination may have an event detecting “off-hook”. Therefore according to the above text it could be stated that terminations with default descriptor values could be considered as IDLE lines.</p> <p>H.248.1 § 7.2.3 Subtract gives further guidance on what happens to property values when a termination is SUBTRACTED back to the NULL context:</p> <p>“When a provisioned Termination is Subtracted from a Context, its property values shall revert to:</p> <ul style="list-style-type: none">• the default value, if specified for the property and not overridden by provisioning;• otherwise, the provisioned value.” <p>It is the contributor’s contention that the term “property values” is a generic term and what is really meant is “descriptor values”. Therefore the conclusion that when a termination is subtracted back to the NULL context this represents an IDLE line.</p>
Reference:	AVD-2570

6.2.4 Termination properties and descriptors

[Begin Correction]

Terminations have properties. The properties have unique PropertyIDs. Most properties have default values, which are explicitly defined in this protocol specification or in a package (see clause 12) or set by provisioning. If not provisioned otherwise, the properties in all descriptors except TerminationState and LocalControl default to empty/"no value" when a Termination is first created or returned to the null Context. When a termination is first created or returned to the null context, this state represents an "idle" line, trunk or other entity. The default contents of the two exceptions are described in 7.1.5 and 7.1.7.

The provisioning of a property value in the MG will override any default value, be it supplied in this protocol specification or in a package. Therefore, if it is essential for the MGC to have full control over the property values of a Termination, it should supply explicit values when ADDing the Termination to a Context. Alternatively, for a physical Termination the MGC can determine any provisioned property values by auditing the Termination while it is in the NULL Context.

There are a number of common properties for Terminations and properties specific to media streams. The common properties are also called the Termination state properties. For each media stream, there are local properties and properties of the received and transmitted flows.

Properties not included in the base protocol are defined in Packages. These properties are referred to by a name consisting of the PackageName and a PropertyId. Most properties have default values described in the Package description. Properties may be read-only or read/write. The possible values of a property may be audited, as can their current values. For properties that are read/write, the MGC can set their values. A property may be declared as "Global" which has a single value shared by all Terminations realizing the package. Related properties are grouped into descriptors for convenience.

When a Termination is added to a Context, the value of its read/write properties can be set by including the appropriate descriptors as parameters to the Add command. Similarly, a property of a Termination in a Context may have its value changed by the Modify command. Properties may also have their values changed when a Termination is moved from one Context to another as a result of a Move command. In some cases, descriptors are returned as output from a command.

In general, if a Descriptor is completely omitted from one of the aforementioned Commands, the properties in that Descriptor retain their prior values for the Termination(s) upon which the Command acts. On the other hand, if some read/write properties are omitted from a Descriptor in a Command (i.e., the Descriptor is only partially specified), those properties will be reset to their default values for the Termination(s) upon which the Command acts, unless the package specifies other behavior. For more details, see 7.1 dealing with the individual Descriptors.

The above behavior applies equally to Signals, Events and their parameters.

...

[End Correction]

7.2.3 Subtract

[Begin Correction]

...

When a provisioned Termination is Subtracted from a Context, its descriptor values shall revert to:

- the default value, if specified for the descriptor and not overridden by provisioning;
- otherwise, the provisioned value.

...

[End Correction]

6.9 Multiple Individual Auditing in ABNF

Description:	<p>In the ASN.1 specification of IndAudLocalControlDescriptor it is allowed to use one each of stream mode, reserve value and reserve group <u>plus</u> any number of package names:</p> <pre>IndAudLocalControlDescriptor ::= SEQUENCE { streamMode NULL OPTIONAL, reserveValue NULL OPTIONAL, reserveGroup NULL OPTIONAL, propertyParms SEQUENCE OF IndAudPropertyParm OPTIONAL, ... }</pre> <p>IndAudPropertyParm ::= SEQUENCE { name PkgdName, ...}</p> <p>while in the ABNF specification of indAudlocalControlDescriptor it is limited to be exactly <u>one</u> of stream mode, reserve value, reserve group and package name:</p> <pre>indAudlocalControlDescriptor = LocalControlToken LBRKT indAudlocalParm RBRKT ; at-most-once per item</pre> <pre>indAudlocalParm = (ModeToken / pkgdName / ReservedValueToken / ReservedGroupToken)</pre> <p>For example this means that it is possible to have both stream mode and package name in ASN.1, while this is not allowed in ABNF. The ASN.1 encoding and ABNF encoding is not semantically equivalent in this case.</p> <p>H.248.1 sect 7.2.5 states: "It is possible to audit multiple individual items in one request."</p> <p>The ABNF should be changed to the following in order to be compliant with ASN.1:</p> <pre>indAudlocalControlDescriptor = LocalControlToken LBRKT indAudlocalParm *(COMMA indAudlocalParm) RBRKT</pre>
Reference:	<p>Date: Mon, 9 Aug 2004 17:55:26 +0200 (CEST)</p> <p>From: Hakan Mattsson <hakan@cslab.ericsson.se></p> <p>To: megaco@ietf.org</p> <p>Subject: IndAudlocalControlDescriptor inconsistency</p>

[Begin Correction]

B.2 ABNF specification

```

...
; at-most-once
indAudstreamParm          = ( indAudlocalControlDescriptor )
; SDP too complex to pull out individual pieces for audit,
; hence no individual audit for Local and Remote

indAudstreamDescriptor    = StreamToken EQUAL StreamID
                           LBRKT indAudstreamParm RBRKT

```

```
indAudlocalControlDescriptor = LocalControlToken LBRKT indAudlocalParm
                               *(COMMA indAudlocalParm) RBRKT
```

...

[End Correction]

6.10 Loopback usage clarification

Description:	There are 4 stream mode properties in H.248.1: send, receive, inactive and loopback. Send, receive and inactive are described by section 7.1.7 however H.248.1 is largely silent on the operation of loopback. The use of loopback should be clarified.
Reference:	COM 16 D-44

[Begin Correction]

7.1.7 LocalControl Descriptor

The LocalControl descriptor contains the Mode property, the ReserveGroup and ReserveValue properties and properties of a Termination (defined in Packages) that are stream specific, and are of interest between the MG and the MGC. Values of properties may be specified as in 7.1.1.

The allowed values for the mode property are send-only, receive-only, send/receive, inactive and loop-back. "Send", ~~and "receive"~~ and "loopback" are with respect to the exterior of the Context, so that, for example, a stream set to mode = sendOnly does not pass received media into the Context. When a stream is set to "loop-back" on a termination, media received (local descriptor) on that termination will be looped back to the sending side (remote descriptor) of the termination and no media is passed between that termination and other terminations in the context. The looped back media shall be sent according to the remote descriptor. The default value for the mode property is "Inactive". Signals and Events are not affected by mode.

[End Correction]

6.11 Commands in ServiceChange on root transaction

Description:	H.248.1 allows multiple commands to be grouped per Transaction. An exception to this is a transaction containing a ServiceChange command specifying the "Root" terminationID and ServiceChangeMethod equal to Restart or Failover. This is because subsequent transactions shall use any ServiceChangeAddress supplied in the transaction response and the negotiated protocol version. This is already implied in the H.248.1 text however the prevention of multiple commands in this scenario is not explicit and may lead to confusion. It is proposed to make this explicit in H.248.1.
Reference:	COM 16 D-44

[Begin Correction]

7.2.8 ServiceChange

...

A ServiceChange Command specifying the "Root" for the TerminationID and ServiceChangeMethod equal to Restart is a registration command by which a Media Gateway announces its existence to the Media Gateway Controller. The Media Gateway may register by specifying the "Root" for the TerminationID and ServiceChangeMethod equal to

Failover when the MG detects MGC failures. The Media Gateway is expected to be provisioned with the name of one primary and optionally some number of alternate Media Gateway Controllers. Acknowledgement of the ServiceChange Command completes the registration process, except when the MGC has returned an alternative ServiceChangeMgcId as described in the following paragraph. The MG may specify the transport ServiceChangeAddress to be used by the MGC for sending messages in the ServiceChangeAddress parameter in the input ServiceChangeDescriptor. The MG may specify an address in the ServiceChangeAddress parameter of the ServiceChange request, and the MGC may also do so in the ServiceChange reply. In either case, the recipient must use the supplied address as the destination for all subsequent transaction requests within the association. At the same time, as indicated in clause 9, transaction replies and pending indications must be sent to the address from which the corresponding requests originated. This must be done even if it implies extra messaging because commands and responses cannot be packed together. The TimeStamp parameter shall be sent with a registration command and its response. A message containing a ServiceChange Command specifying “Root” for the TerminationID and a ServiceChangeMethod equal to Restart or Failover shall not contain other commands as these commands should use the new ServiceChangeAddress and negotiated protocol version.

...

[End Correction]

6.12 Annex C and SDP parameters

Description:	<p>H.248.1 Annex C.11 allows the use of SDP equivalents for use in binary implementations of the protocol. One issue that is not clear is whether the SDP is 100% RFC2327 compliant or is subject to the exceptions of H.248.1 section 7.1.8 “Local and Remote Descriptor”.</p> <p>3GPP in their technical specification TS29.332 “Media Gateway Control Function (MGCF) – IM Media Gateway; Mn Interface”, V6.0.0 (2004-09) make use of SDP equivalents. The note to Table 10.1: “required parameters” makes the assumption that the exceptions of H.248.1 apply.</p> <p>It is believed that 3GPP2 also make this assumption.</p> <p>It is proposed to clarify the text in H.248.1 Annex C.1 that the SDP is subject to the behavior of H.248.1 section 7.1.8.</p>
Reference:	AVD-2663

[Begin Correction]

C.11 SDP equivalents

The SDP equivalents are subject to the SDP exceptions of 7.1.8 described for text encoding of the protocol. Also the CHOOSE wildcard is used as in text encoding of the protocol.

PropertyID	Property tag	Type	Value
SDP_V	B001	String	Protocol Version Ref.: RFC 2327
SDP_O	B002	String	Owner/creator and session ID Ref.: RFC 2327
SDP_S	B003	String	Session name Ref.: RFC 2327
SDP_I	B004	String	Session identifier Ref.: RFC 2327
SDP_U	B005	String	URI of descriptor Ref.: RFC 2327

PropertyID	Property tag	Type	Value
SDC_E	B006	String	email address Ref.: RFC 2327
SDP_P	B007	String	phone number Ref.: RFC 2327
SDP_C	B008	String	Connection information Ref.: RFC 2327
SDP_B	B009	String	Bandwidth Information Ref.: RFC 2327
SDP_Z	B00A	String	Time zone adjustment Ref.: RFC 2327
SDP_K	B00B	String	Encryption Key Ref.: RFC 2327
SDP_A	B00C	String	Zero or more session attributes Ref.: RFC 2327
SDP_T	B00D	String	Active Session Time Ref.: RFC 2327
SDP_R	B00E	String	Zero or more repeat times Reference: RFC 2327
SDP_M	B00F	String	Media type, port, transport and format Ref.: RFC 2327

[End Correction]

6.13 Case Sensitivity of Profile Names

Description:	<p>Profiles of H.248 are becoming more widely used. One of the important features of the registration of profiles is that the profile name is unique and able to be agreed upon by a MGC and MG. There is a potential interoperability problem in that some implementers may assume that the “Profile Name” is case sensitive, where others may assume that the name is case insensitive. This could cause failure at profile negotiation.</p> <p>H.248.1 is largely silent of the case sensitivity of profile names. However as other protocol constructs such as package names are case-insensitive it is believed that profile names are also case insensitive. Thus H.248.1 § 13 should be updated to reflect this.</p>
Reference:	AVD-2663

[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.

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.

...

[End Correction]

6.14 Profile Negotiation

Description:	<p>Profile negotiation is ambiguous in the situation where the MG issues a ServiceChange request without the ServiceChangeProfile parameter (ie. NoProfile) and the MGC requires a profile to work.</p> <p>It is assumed that the MGC responds with the profile that it wants to support in this situation.</p> <p>However the current text in 7.2.8.1.11 indicates that the profile is “only” returned when the MGC cannot support the profiles in the ServiceChangeRequest. The contributors contend that if no ServiceChangeProfile is added to the request this is the MG indicated “NoProfile”. This should be clarified.</p> <p>Furthermore on reception of the Profile in the ServiceChangeResponse it is unclear whether the MG should:</p> <ul style="list-style-type: none">a) reissue a ServiceChange registration with the MGC indicated profile to accept the profile, or, <p>simply await commands from the MGC.</p>
Reference:	AVD-2663

[Begin Correction]

7.2.8.1.11 ServiceChange Command and Response

- ServiceChangeProfile, if the responder wishes to negotiate the profile to be used for the association. The profile (name and version) is ~~only~~ returned in reply in the case that the MGC cannot support the specified profiles in the ServiceChangeRequest. The profile “NoProfile” is assumed if no ServiceChangeProfile is included in the ServiceChangeRequest. The returned reply shall indicate the profile and version supported or "NoProfile" if no profile is supported. Upon reception of a profile in the reply the MG may continue the relationship with the current MGC by issuing a subsequent ServiceChangeRequest with the appropriate profile or contact secondary MGCs and establish a relationship with them. If the profile is not returned the MGC will use the capabilities specified by the Profile indicated in the service change request;

[End Correction]

6.15 Conflict between H.248.1 Version 2 Corrigendum 1 and H.248.8

Description:	<p>H.248.1 contains a contradiction with H.248.8. H.248.1 Section 6.3.2 (added in H.248.1 V2 Corrigendum 1) indicates that error code 431 “No TerminationID matched a wildcard” is used when a specifically named termination does not exist in any context (besides NULL) when the ContextID is wildcarded. However, in the instance that there are no contexts at all, error code 411 “The transaction refers to an unknown ContextID” is clearly the more correct choice, since the MG can determine that an error has occurred without progressing to the command level of the message to process the TerminationID.</p>
Reference:	AVD-2706

[Begin Correction]

6.3.2 ContextID wildcarded (ALL) with TerminationID specific

In the case where the ContextID is wildcarded (i.e., ContextID = ALL) and the TerminationID is fully specified, the effect is identical to a command specifying the non-NULL context that contains the specified termination. Thus a search must be made to find the context and only one instance of the command is executed. No errors are reported for Contexts that do not contain the specified termination. If the termination is not contained in any (non-NULL) context, then error 431 is returned. If there are no contexts other than NULL in existence, error code 411 is returned. Use of this form of action rather than one specifying the ContextID is discouraged but may be useful, for example in correcting conflicting state between MG and MGC.

...

[End Correction]

6.16 AuditCapability of Signals

Description:	H.248.1 section 7.2.6 currently states that it is possible to perform an AuditCapabilities of a signal and that the reply contains a range of values for: the keepactive indication, signal type, duration, signal completion indication and package defined properties. However the encoding in Annex A and B does not allow a range of values to be returned for keepactive, signal type, duration, and signal completion. The contributors contend that to provide such a range provides little value as the values are defined in the H.248.1 protocol and signals have well defined defaults. Thus it proposed to delete the ability to return a range for the above parameters. This would not pose any backward compatibility problems as because the encoding was not defined noone has been able to use this function.
Reference:	COM 16 D-119

[Begin Correction]

7.2.6 AuditCapabilities

Descriptors or individual properties, signals, events and statistics can be audited.

- An audit of a entire descriptor may be requested by identifying the desired descriptor in the AuditDescriptor with no further information.
- To audit an individual property in the media descriptor the relevant stream ID (optional) and propertyID are included. A list of possible values of the property are returned.
- To audit a signal the relevant signal list ID and/or signal ID are provided. A list of possible values associated with each signal parameter is returned (including: package defined properties). ~~†The keepactive indication, signal type, duration and, signal completion indication and package defined properties are not returned.†~~

...

[End Correction]

6.17 Media Type Mismatch

Description:	H.248.1 allows media descriptor parameters to be set independently on terminations in different commands. The H.248 connection model also makes use of this fact to be able to describe different functions on an MG. For example if Codec=GSM AMR is specified on TerminationA and Codec=G.711 is specified on TerminationB then the MG can assume that
---------------------	--

	<p>transcoding will take place.</p> <p>The problem comes when the MGC tries to change the codec on one or more of the terminations. For example: the MGC wants to change Terminations A and B to both to G.729. It issues a MOD.req on Termination A Codec=G729. What does the MG do? Does it try to insert another transcoder to transcode G.729 to G.711? This would be a waste of resources as no transcoding will be required when TerminationB is set. Does the MG reject the command as it can't support G.729 to G.711 transcoding?</p> <p>The MG must have unambiguous knowledge of when to apply a function eg. transcoding. Therefore it is proposed that the MG only applies the function when the streammode associated with the function is NOT inactive.</p>
Reference:	COM 16 D-119

[Begin Correction]

6.2.4 Termination properties and descriptors

...

When a Termination is added to a Context, the value of its read/write properties can be set by including the appropriate descriptors as parameters to the Add command. Similarly, a property of a Termination in a Context may have its value changed by the Modify command. Properties may also have their values changed when a Termination is moved from one Context to another as a result of a Move command. In some cases, descriptors are returned as output from a command.

By setting properties on different terminations in the same context the MG can be instructed to perform certain functions. For example: if a G.711 codec is set on Termination A and a G.729 codec is set on Termination B then the MG performs a transcoding function. This transcoding function is activated when the Mode Property (see Local Control Descriptor 7.1.7) on the termination/streams affected by the function are not set to "Inactive".

In general, if a Descriptor is completely omitted from one of the aforementioned Commands, the properties in that Descriptor retain their prior values for the Termination(s) upon which the Command acts. On the other hand, if some read/write properties are omitted from a Descriptor in a Command (i.e., the Descriptor is only partially specified), those properties will be reset to their default values for the Termination(s) upon which the Command acts, unless the package specifies other behavior. For more details, see 7.1 dealing with the individual Descriptors.

...

[End Correction]

6.18 Notify Avalanche

Description:	<p>During a failure of the MGC-MG control link a large number of events could occur on the MG. During this period the MG may still continue to generate Notify requests that need to be sent to the MGC. However as the control link has failed these Notify reqs would be queued. Once the link is re-established (ServiceChangeMethod = Disconnected) then these Notify requests would be sent. This could result in a potential signaling avalanche problem. An avalanche problem has previously been identified in H.248.1 section "9.2 Protection against restart avalanche" however this was restricted to ServiceChange commands.</p> <p>It is proposed to add some advisory text to minimize the chances of Notify avalanches.</p>
Reference:	COM 16 D-119

[Begin Correction]

9.3 Protection against Notify avalanche

In the event that a control association goes down the MG may continue to generate notify messages. These Notify messages must be buffered until the control association comes back into service (ServiceChangeMethod = Disconnected). When the control association comes back into service the rapid sending of the Notifications may result in a notification avalanche. To prevent this from occurring the MG should send the Notifications in a restricted manner until the buffer is cleared.

...

[End Correction]

6.19 Topology Reply

Description:	<p>H.248.1 section 7.1.18 states that "It is possible to have an action containing only a Topology descriptor". In the text encoding, what should the response be to such an action? The ABNF requires something in the actionReply - at least one context property, command reply or error descriptor.</p> <p>The behaviour for v1 and v2 needs to be described. E.g. the MG should echo back what was sent. If CHOOSE \$ was indicated you should send back the chosen TerminationID.</p> <p><i>Editor's Note: It is not permissible to have \$ in a TP descriptor without an Add command in the same action.</i></p>
Reference:	<p>Subject: RE: [Megaco] Topology Questions</p> <p>Date: Wed, 29 Jun 2005 05:35:39 +1000</p> <p>From: Kevin Boyle <kboyle@nortel.com></p> <p>To: Christian Groves (BR/EPA) <christian.groves@ericsson.com>, Frank Reno <hmegaco@yahoo.com></p> <p>CC: megaco@ietf.org</p>

[Begin Correction]

7.1.18 Topology 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. In the instance where there are no commands in an action containing a Topology Descriptor, the Topology Descriptor is echoed back to the MGC.

...

[End Correction]

6.20 Statistics and Sub-lists

Description:	<p>Section 12.1.5 indicates that a possible type for the value of a Statistic is "Sub-list-of". However in the ABNF encoding a statistic parameter may only have a single value. Ie.</p>
---------------------	--

	<p><u>ABNF</u></p> <pre>statisticsDescriptor = StatsToken LBRKT statisticsParameter * (COMMA statisticsParameter) RBRKT</pre> <p>;at-most-once per item</p> <pre>statisticsParameter = pkgdName [EQUAL VALUE]</pre> <p>The ASN.1 Syntax supports multiple values that may be used to encode a sub-list. However it does not support a flag as per the property relation field.</p> <p><u>ASN.1</u></p> <p>StatisticsDescriptor ::= SEQUENCE OF StatisticsParameter</p> <p>StatisticsParameter ::= SEQUENCE</p> <pre>{ statName PkgdName, statValue Value OPTIONAL }</pre> <p>Value ::= SEQUENCE OF OCTET STRING</p> <p>This apparent conflict between the encoding and the procedures was probably introduced when the value of Statistic was changed from UNIT to Type in H.248.1v2 IG. Therefore it is proposed to update the ASN.1 and ABNF so that the types of statistics are consistent with existing types for properties and parameters.</p>
Reference:	COM 16 D-119

[Begin Correction]

A.1 ASN.1 Specification

```

...
StatisticsDescriptor ::= SEQUENCE OF StatisticsParameter

StatisticsParameter ::= SEQUENCE
{
    statName          PkgdName,
    statValue         Value OPTIONAL
    -- A sequence of values indicates a sub-list
}

```

B.2 ABNF Specification

```

...

statisticsDescriptor = StatsToken LBRKT statisticsParameter *(COMMA
    statisticsParameter) RBRKT

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

```

[End Correction]

6.21 Protocol version negotiation

Description:	<p>H.248.1 is silent on what to do when either the MGC or the MG fails to abide by the negotiated protocol version within a control association. Consider the following:</p> <p>The MG offers Version 2, which the MGC accepts. The MG then starts sending all messages as Version 1.</p> <p>This is clearly not what was intended in the version negotiation procedures. H.248.1 should allow the receiver of the “off-version” messaging to reject it as not in line with the negotiated version. The most appropriate error code is 406, “Version not supported”.</p>
Reference:	AVD-2820

[Begin Correction]

11.3 Negotiation of protocol version

...

If the MGC supports the version indicated by the MG, ~~it both the MGC and MG~~ shall conform to that version in all subsequent messages. In this case it is optional for the MGC to return a version in the ServiceChange Reply. ~~Any subsequent messaging that does not conform to the negotiated version shall be rejected with Error Code 406 (“Version Not Supported”).~~

...

[End Correction]

6.22 Clarification of error code usage in wildcarding procedures

Description:	It appears that the error code required in clause 6.3.2/H.248.1 is a cut and paste error, as error code 435 makes more sense. However, the long-standing existence of 431 in that clause may lead to backwards compatibility problems if the error code is just changed. The text needs to be updated to allow either possibility.
Reference:	COM16 D-223

[Begin Correction]

6.3.2 ContextID wildcarded (ALL) with TerminationID specific

In the case where the ContextID is wildcarded (i.e., ContextID = ALL) and the TerminationID is fully specified, the effect is identical to a command specifying the non-NULL context that contains the specified termination. Thus a search must be made to find the context and only one instance of the command is executed. No errors are reported for Contexts that do not contain the specified termination. If the termination is not contained in any (non-NULL) context, then error code 435 (“TerminationID is not in specified context”) is returned, though error code 431 (“No TerminationID matched a wildcard”) may be returned in order to maintain backward compatibility~~is returned~~. Use of this form of action rather than one specifying the ContextID is discouraged but may be useful, for example in correcting conflicting state between MG and MGC.

...

[End Correction]

6.23 ServiceStates clarification for continuity testing

Description:	The continuity package does not specify whether or not a termination must be placed in the Test state prior to conducting a continuity test.
Reference:	COM16 D-224

[Begin Correction]

E.10.5 Procedures

...

When a continuity test is performed on a Termination, no echo devices or codecs shall be active on that Termination. The termination under test does not need to have its ServiceStates Property set to Test.

...

[End Correction]

6.24 Clarification of termination service state upon restart of MG

Description:	During discussion on the 3GPP and IETF Megaco mailing lists it became apparent that there is a source of confusion on the default states of all terminations after a ServiceChange restart. It is widely agreed that all terminations including physical and ephemeral terminations are default "InService" after the ServiceChange. However H.248.1 doesn't explicitly make this statement.
Reference:	COM16 D-274

[Begin Correction]

7.2.8 ServiceChange

...

- 3) Restart – indicates that service will be restored on the specified terminations after expiration of the ServiceChangeDelay. The ~~ServiceStates Property~~ should be set to "~~inService~~InService" upon expiry of ServiceChangeDelay. Upon receipt of a ServiceChange Command on Root with ServiceChangeMethod Restart all terminations are assumed to be "InService". This includes physical and ephemeral terminations. Those terminations which are "OutOfService" may be reported by subsequent ServiceChange Commands with ServiceChangeMethod Forced.

...

[End Correction]

6.25 Alignment of text among events in the Tone Detection Package

Description:	The Tone Detection Package specifies three different events for tone detection: 'Start Tone Detected', 'End Tone Detected' and 'Long Tone Detected'. While the '*' wildcard in the EventsDescriptor parameter 'tl' is allowed for the 'Start Tone Detected' and 'Long Tone Detected' events, H.248 currently doesn't allow it in the 'End Tone Detected' event.
---------------------	---

	There is no reason why the wildcard should not be allowed in the ‘End Tone Detected’ event. In fact, a very common use of this event, as of the other two, is the detection of DTMF tones. For DTMF it is common to order the MGW to detect any DTMF digit, as it is not known in advance which DTMF digit will be received in the line.
Reference:	COM16 D-303

[Begin Correction]

E.4.2 Events

...

End tone detected

EventID: etd, 0x0002

Detects the end of a tone.

EventDescriptor parameters:

Tone id list

ParameterID: tl (0x0001)

Type: enumeration or list of enumerated types

Possible values: The only tone id defined in this package is "wild card" which is "*" in text encoding and 0x0000 in binary. No possible values are specified in this package. Extensions to this package would add possible values for tone id. If tl is "wild card", any tone id is detected.

...

[End Correction]

6.26 Missing header in Long Tone Detected Event

Description:	The ‘Long Tone Detected’ event in H.248.1 v2 lists three parameters under the EventsDescriptor. However the last one, the Tone Id, is not an EventsDescriptor parameter, but an ObservedEventsDescriptor parameter.
Reference:	COM16 D-303

[Begin Correction]

E.4.2 Events

...

Long tone detected

EventID: ltd, 0x0003

Detects that a tone has been playing for at least a certain amount of time

EventDescriptor parameters:

Tone id list

ParameterID: tl (0x0001)

Type: enumeration or list

Possible values: "wildcard" as defined above is the only value defined in this package. Extensions to this package would add possible values for tone id.

Duration:

ParameterID: dur (0x0002)

Type: integer, duration to test against

Possible values: any legal integer, expressed in milliseconds

———ObservedEventsDescriptor parameters:

Tone id:

ParameterID: tid (0x0003)

Type: Enumeration

Possible values: No possible values are specified in this package. Extensions to this package would add possible values for tone id.

...

[End Correction]

6.27 Clarification of package definition requirements for enumerations

Description:	Packages may define properties, statistics and parameters for signals and events of enumeration type. As stated in the guideline for package definition in H.248.1, the possible values for these parameters must be also specified in the package. Once the values are specified, the binary encoding is unambiguous, as with ASN.1 each of the values of an enumeration type is associated to an integer. However, with text encoding, the encoded values may use any character or character string, not only integers. Therefore it is important that the package specifies not only the possible values that a property, statistic or parameter of type enumeration may take, but also the strings to be used to encode each of the values if ABNF, Annex B/H.248.1 is used.
Reference:	COM16 D-303

[Begin Correction]

12.1.2 Properties

Properties defined by the package, specifying:

...

Type: One of:

Boolean

String: UTF-8 string

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

Integer: 4 byte signed integer

Double: 8 byte signed integer

Character: ~~unicode~~Unicode UTF-8 encoding of a single letter. Could be more than one octet.

Enumeration: one of a list of possible unique values (see 12.3). Packages MUST define the text and binary encodings for each value in the enumeration.

Sub-list: a list of several values from a list. The type of sub-list SHALL also be specified. The type shall be chosen from the types specified in this clause (with the exception of sub-list). For example, Type: sublist of enumeration. The encoding of sub-lists is specified in Annexes A and B.3.

...

12.1.5 Statistics

Statistics defined by the package, specifying:

...

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

Double: 8 byte signed integer

Character: Unicode UTF-8 encoding of a single letter. Could be more than one octet.

Enumeration: One of a list of possible unique values (see 12.3). Packages MUST define the text and binary encodings for each value in the enumeration.

Sub-list: A list of several values from a list. The type of sub-list SHALL also be specified. The type shall be chosen from the types specified in this clause (with the exception of sub-list). For example, Type: sub-list of enumeration. The encoding of sub-lists is specified in Annex A and B.3.

...

12.2 Guidelines to defining Parameters to Events and Signals

...

Type: One of:

Boolean

String: UTF-8 octet string

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

Integer: 4-octet signed integer

Double: 8-octet signed integer

Character: ~~unicode~~Unicode UTF-8 encoding of a single letter. Could be more than one octet.

Enumeration: one of a list of possible unique values (see 12.3). Packages MUST define the text and binary encodings for each value in the enumeration.

Sub-list: a list of several values from a list (not supported for statistics). The type of sub-list SHALL also be specified. The type shall be chosen from the types specified in this clause (with the exception of sub-list). For example, Type: sub-list of enumeration. The encoding of sub-lists is specified in Annexes A and B.3.

...

[End Correction]

6.28 Clarification of use of ABNF encodings of octet strings

Description:	Properties, statistics and signal and events parameters can be defined as of type Octet String, among other types. This is described in H.248.1 12.1.2, 12.1.5 and 12.2. These chapters refer to Annex B.3 for how the actual encoding of the Octet String shall be done. Annex B.3 does indeed describe a method for the encoding of strings, but fails to make a precise reference to the type Octet String, as the object of the method it is describing. Instead, it talks about “representing a string of octets” or “encoding octet strings”. As ABNF defines still another type called “octetString” to describe SDP lines, and which is different to the type Octet String defined above (is not compatible), there is a risk to misinterpret the
---------------------	---

	applicability of B.3.
Reference:	COM16 D-303

[Begin Correction]

B.3 Hexadecimal octet coding

Hexadecimal octet coding is a means of representing a string of octets 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 octet strings 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; bit 7 is the last.

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

Examples:

Octet bit pattern	Hexadecimal coding
00011011	D8
11100100	27
10000011 10100010 11001000 00001001	C1451390

This encoding is not applicable to the octetString construct defined in section B.2

[End Correction]

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

Description:	H.248.1 E.12.4 defines the statistics packet loss rtp/pl to describe the packet loss rate, as a percentage. Although this statistics element is defined as type double, it is meant to hold both the whole part and the fractional part of the percentage. The ASN.1 “double” encoding of this element entails multiplying the percentage by 2^{32} in order to obtain an integer and then use 4 octets to encode the resulting integer. In ABNF is questionable if the same applies, as that would lead to a long string. This seems unnecessary, especially considering that RFC 3550, to which E.12.4 refers to when defining rtp/pl, defines the packet fraction lost with only 8 bits. Therefore it is proposed to clarify that the notation x.y is allowed when encoding rtp/pl with ABNF.
Reference:	COM16 D-303

[Begin Correction]

E.12.4 Statistics

...

Packet Loss

StatisticID: pl (0x0006)

Describes the current rate of packet loss on an RTP stream, as defined in RFC 1889. Packet loss is expressed as percentage value: number of packets lost in the interval between two reception reports, divided by the number of packets expected during that interval.

Type: double

Possible values: a 32-bit whole number and a 32-bit fraction. The value shall be encoded in ABNF as “x.y” where x is the whole part and y the fractional part of the percentage.

...

[End Correction]

Annex: Defect Report Form for H.248.1 Version 2
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DATE:	
CONTACT INFORMATION <div style="text-align: right; padding-right: 10px;"> NAME: COMPANY: ADDRESS: TEL: FAX: EMAIL: </div>	
AFFECTED RECOMMENDATIONS:	
DESCRIPTION OF PROBLEM:	
SUGGESTIONS FOR RESOLUTION:	

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