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SERIES H: AUDIOVISUAL AND MULTIMEDIA SYSTEMS

Infrastructure of audiovisual services – Communication
procedures

**Gateway control protocol: H.248 SDP parameter
identification and wildcarding**

ITU-T Recommendation H.248.39

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ITU-T Recommendation H.248.39

Gateway control protocol: H.248 SDP parameter identification and wildcarding

Summary

This Recommendation describes the principles used to identify a single SDP sub-field and how to apply wildcarding to that sub-field. The sub-field may be fully specified, wildcarded (CHOOSE "\$" or ALL "*") or not significant "-". Being able to identify a single sub-field is of use when requesting the MG to choose a parameter, specifying a range or for the purposes of auditing. Further specification of how SDP can be wildcarded will assist in interoperation between a Media Gateway Controller and a Media Gateway.

Source

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FOREWORD

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ITU-T Recommendation H.248.39

Gateway control protocol: H.248 SDP parameter identification and wildcarding

1 Scope

This Recommendation describes the principles to be used to identify a single SDP sub-field and how to apply wildcarding to that sub-field. The sub-field may be fully specified, wildcarded (CHOOSE "\$" or ALL "*") or not significant "-". Being able to identify a single sub-field is of use when requesting the MG to choose a parameter, specifying a range or for the purposes of auditing.

2 References

2.1 Normative references

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

- ITU-T Recommendation H.248.1 (2005), *Gateway control protocol: Version 3*.
- ITU-T Recommendation H.248.15 (2002), *Gateway control protocol: SDP H.248 package attribute*.

2.2 Informative references

- IETF RFC 2327 (1998), *SDP: Session Description Protocol*.
- IETF RFC 3108 (2001), *Conventions for the use of the Session Description Protocol (SDP) for ATM Bearer Connections*.
- IETF RFC 3605 (2003), *Real Time Control Protocol (RTCP) attribute in Session Description Protocol (SDP)*.

3 Terms and Definitions

None.

4 Abbreviations

This Recommendation uses the following abbreviations:

FFS	For further study
MG	Media Gateway
RTP	Real-time Transport Protocol
SDP	Session Description Protocol

5 H.248 wildcarding guiding principles

The overriding guidance provided by ITU-T Rec. H.248.1 on the use of CHOOSE in SDP is: "the use of CHOOSE is allowed in place of a single parameter value".

Subsequent principles are:

- 1) In any SDP scheme each mandatory element SHALL therefore be represented by a single CHOOSE "\$".
- 2) Any part that contain text tokens (e.g. those in " ") that are mandatory SHALL also be included in the wildcard command.
- 3) Optional parts of SDP scheme should not be included unless the wildcard or value applies to them.
- 4) When an item specifies a wildcard for a single sub-field, this applies to the nested ABNF in that parameter.

6 Identification of single parameters

The subclauses below define which parts of SDP are classified as "single sub-fields (values)" for the purposes of H.248.1 wildcarding. Each of these sub-fields may be fully specified, designated as CHOOSE "\$", designated as ALL "*" or designated as not significant "-". The sub-fields should not be partially wildcarded.

Each of the examples indicates what type of wildcarding is not valid. It also highlights some valid types of wildcarding and what should be returned.

NOTE 1 – For the purposes of the examples below, "?" is used to denote the potential wildcards:

- "\$" for Choose
- "*" for All, and
- "-" "Not Significant"

NOTE 2 – Not to be confused with Annex B.2/H.248.1 encoding for NULL Context

ABNF grammar in subsequent clauses is copied from Appendix A (SDP Grammar) in RFC 2327.

6.1 Protocol version

Table 6-1/H.248.39 – Protocol version

SDP Specification:	
Definition: (Clause 6/RFC 2327)	v= (protocol version)
ABNF: (Appendix A/RFC 2327)	proto-version = "v=" 1*DIGIT CRLF
H.248/SDP encoding example with applied wildcarding:	Result:
v=?	Is valid. It would give v= 1*DIGIT The only parameter that may be wildcarded is 1*DIGIT.

6.2 Owner/Creator

Table 6-2/H.248.39 – Owner/Creator

SDP Specification:	
Definition: (Clause 6/RFC 2327)	o= (owner/creator and session identifier)
ABNF: (Appendix A/RFC 2327)	origin-field = "o=" username space sess-id space sess-version space nettype space addrtype space addr CRLF
H.248/SDP encoding examples with applied wildcarding:	Results:
o=? o=? ? o=? ? ? o=? ? ? ? o=? ? ? ? ?	Are all invalid. There are six mandatory parameters "username", "sess-id", "sess-version", "nettype", "addrtype" and "addr".
o=? ? ? ? ? ?	Would return: o=username sess-id sess-version nettype addrtype addr

6.3 Session name

Table 6-3/H.248.39 – Session name

SDP Specification:	
Definition: (Clause 6/RFC 2327)	s= (session name)
ABNF: (Appendix A/RFC 2327)	session-name-field = "s=" text CRLF
H.248/SDP encoding example with applied wildcarding:	Result:
s=?	Is valid. It would give s=text The only parameter that may be wildcarded is "text".

6.4 URI of description

Table 6-4/H.248.39 – URI of Description

SDP Specification:	
Definition: (Clause 6/RFC 2327)	u=* (URI of description)
ABNF: (Appendix A/RFC 2327)	uri-field = ["u=" uri CRLF] uri= ;defined in RFC 1630
H.248/SDP encoding example with applied wildcarding:	Result:
FFS.	—

6.5 Email address

Table 6-5/H.248.39 – Email address

SDP Specification:	
Definition: (Clause 6/RFC 2327)	e=* (email address)
ABNF: (Appendix A/RFC 2327)	email-fields = *("e=" email-address CRLF) email-address = email email "(" email-safe ")" email-safe "<" email ">" email = ;defined in RFC 822
H.248/SDP encoding example with applied wildcarding:	Result:
FFS.	—

6.6 Phone number

Table 6-6/H.248.39 – Phone number

SDP Specification:	
Definition: (Clause 6/RFC 2327)	p=* (phone number)
ABNF: (Appendix A/RFC 2327)	phone-fields = *("p=" phone-number CRLF) phone-number = phone phone "(" email-safe ")" email-safe "<" phone ">" phone = "+" POS-DIGIT 1*(space "-" DIGIT)
H.248/SDP encoding example with applied wildcarding:	Result:
FFS.	–

6.7 Encryption key

Table 6-7/H.248.39 – Encryption key

SDP Specification:	
Definition: (Clause 6/RFC 2327)	k=* (encryption key)
ABNF: (Appendix A/RFC 2327)	key-field = ["k=" key-type CRLF] key-type = "prompt" "clear:" key-data "base64:" key-data "uri:" uri key-data = email-safe "~" " There is one mandatory field "key-type".
H.248/SDP encoding examples with applied wildcarding:	Results:
k=?	Would give k=key-type
k=?:?	Would give k=key-type:key-data where key-type is "clear" or "base64", k=key-type:uri where key-type is "uri".

6.8 Time description

Table 6-8/H.248.39 – Time description

SDP Specification:	
Definition: (Clause 6/RFC 2327)	t= (time the session is active)
ABNF: (Appendix A/RFC 2327)	time-fields = 1*("t=" start-time space stop-time *(CRLF repeat-fields) CRLF) [zone-adjustments CRLF]
H.248/SDP encoding examples with applied wildcarding:	Results:
t=?	Is invalid. There are two mandatory parameters "start-time" and "stop-time".
t=? ?	Would give t=start-time stop-time
NOTE – For repeat-fields and zone-adjustments see below.	

6.9 Repeat

Table 6-9/H.248.39 – Repeat

SDP Specification:	
Definition: (Clause 6/RFC 2327)	r=* (zero or more repeat times)
ABNF: (Appendix A/RFC 2327)	repeat-fields = "r=" repeat-interval space typed-time 1*(space typed-time)
H.248/SDP encoding examples with applied wildcarding:	Results:
r=?	Is invalid. There are two mandatory parameters "repeat-interval" and "typed-time".
r=? : ?	Would give r=repeat-interval typed-time
r=? ? ?	Would give r=repeat-interval typed-time typed-time

6.10 Time zone adjustments

Table 6-10/H.248.39 – Time zone adjustments

SDP Specification:	
Definition: (Clause 6/RFC 2327)	<code>z=* (time zone adjustments)</code>
ABNF: (Appendix A/RFC 2327)	<code>zone-adjustments = time space ["-"] typed-time *(space time space ["-"] typed-time)</code>
H.248/SDP encoding examples with applied wildcarding:	Results:
<code>z=?</code> <code>z=? -</code> <code>z=-?</code> <code>z=? ? ?</code>	Are invalid. There are two mandatory parameters "time" and "typed-time". These two parameters can be grouped multiple times thus an odd number of wildcards are invalid.
<code>z=? ?</code>	Would give <code>z=time typed-time</code>
<code>z=? -?</code>	Would give <code>z=time -typed-time</code>
<code>z=? ? ? ?</code>	Would give <code>z=time typed-time time typed-time</code>

6.11 Media description

Table 6-11/H.248.39 – Media description

SDP Specification:	
Definition: (Clause 6/RFC 2327)	m= (media name and transport address)
ABNF: (Appendix A/RFC 2327)	media-field = "m=" media space port ["/" integer] space proto 1*(space fmt) CRLF
H.248/SDP encoding examples with applied wildcarding:	Results:
m=? m=? ? m=? ?/? m=? /? m=? /? ?	Are invalid. There are four mandatory parameters "media", "port", "proto" and "fmt" and one optional parameter "integer" that may be wildcarded.
m=? ? ? ?	Would give m=media port proto fmt
m=? ?/? ? ?	Would give m=media port/integer proto fmt
m=? ? ? ? ? ?	Would give m=media port proto fmt fmt This example is considering a "m=" line with multiple, here two, payload formats. See also clause 6.15.7
m=? ?/? ? ? ? ?	Would give m=media port/integer proto fmt fmt This example is considering a "m=" line with multiple, here two, payload formats. See also clause 6.15.7

6.12 Media title and session information

Table 6-12/H.248.39 – Media title and session information

SDP Specification:	
Definition: (Clause 6/RFC 2327)	i=* (media title)
ABNF: (Appendix A/RFC 2327)	information-field = ["i=" text CRLF]
H.248/SDP encoding examples with applied wildcarding:	Results:
i=?	Is valid. The only parameter that may be wildcarded is "text".
i=?	Would give z i=text

6.13 Connection information

Table 6-13/H.248.39 – Connection information

SDP Specification:	
Definition: (Clause 6/RFC 2327)	c=* (connection information - optional if included at session-level)
ABNF: (Appendix A/RFC 2327)	connection-field = ["c=" nettype space addrtype space connection-address CRLF]
H.248/SDP encoding examples with applied wildcarding:	Results:
c=? c=? ?	Are invalid. There are three mandatory parameters "nettype", "addrtype" and "connection-address" which may be wildcarded.
c=? ? ?	Would give c=nettype addrtype connection-address

6.14 Bandwidth information

Table 6-14/H.248.39 – Bandwidth information

SDP Specification:	
Definition: (Clause 6/RFC 2327)	b=* (bandwidth information)
ABNF: (Appendix A/RFC 2327)	bandwidth-fields = *("b=" bwtype ":" bandwidth CRLF)
H.248/SDP encoding examples with applied wildcarding:	Results:
b=?	Is invalid as ? is only for one parameter value. There are two mandatory values "bwtype" and "bandwidth" which may be wildcarded.
b=? : ?	Would give b=bwtype:bandwidth

6.15 Attributes

Table 6-15/H.248.39 – Attributes

SDP Specification:	
Definition: (Clause 6/RFC 2327)	<code>a=*</code> (zero or more media attribute lines)
ABNF: (Appendix A/RFC 2327)	<code>attribute-fields = *("a=" attribute CRLF)</code> <code>attribute = (att-field ":" att-value) att-field</code>
H.248/SDP encoding examples with applied wildcarding:	Results:
<code>a=? :</code> <code>a=? ?</code>	<p>Is invalid.</p> <p>There is one mandatory parameter "att-field" and one optional parameter "att-value".</p>
<code>a=?</code>	<p>Would give</p> <p style="padding-left: 40px;"><code>a=att-field</code></p> <p>This will only wildcard a single "a=value", e.g. "a=recvonly" or "a=sendrecv" or "a=sendonly".</p>
<code>a=? : ?</code>	<p>Would give</p> <p style="padding-left: 40px;"><code>a=att-field:att-value</code></p> <p>Depending on the value of the first parameter it may not be valid to wildcard the second value. The "att-value" field shall return all the mandatory parameters and may return the optional parameters associated with attribute type.</p>
<code>a=rtpmap:?</code>	<p>Should at least give:</p> <p style="padding-left: 40px;"><code>a=rtpmap:payload</code> <code>encodingname/clockrate</code></p> <p>and may give:</p> <p style="padding-left: 40px;"><code>a=rtpmap:payload</code> <code>encodingname/clockrate</code> <code>encodingparameters</code></p>

Where multiple attributes of the same type are sent by the MGC, it should fully specify at least one of the parameters to uniquely identify the instance of the attribute. For example: the payload type in the rtpmap attribute.

For a description of wildcarding various "att-value" parameters, see the clauses below.

6.15.1 RTP map

Table 6-15.1/H.248.39 – RTP map

SDP Specification:	
Definition: (Clause 6/RFC 2327)	–
ABNF: (Appendix A/RFC 2327)	a=rtpmap:<payload type> <encoding name>/<clock rate>[/<encodingparameters>]
H.248/SDP encoding examples with applied wildcarding:	Results:
a=rtpmap:? ? a=rtpmap:? ?/ a=rtpmap:? ? ? a=rtpmap:? ?//?	Are invalid. There are three mandatory parameters "payload type", "encoding name", "clock rate" and one optional parameter "encodingparameters".
a=rtpmap:? ?/?	Would give a=rtpmap:payloadtype encodingname/clockrate
a=rtpmap:? ?/?/?	Would give a=rtpmap:payloadtype encodingname/clockrate/encoding parameters

6.15.2 Packetization time

Table 6-15.2/H.248.39 – Packetization time

SDP Specification:	
Definition: (Clause 6/RFC 2327)	–
ABNF: (Appendix A/RFC 2327)	a=ptime:<packet time> There is one mandatory parameter "packet time".
H.248/SDP encoding example with applied wildcarding:	Result:
a=ptime:?	Would give a=ptime:packettime

6.15.3 Parameter format

Table 6-15.3/H.248.39 – Parameter format

SDP Specification:	
Definition: (Clause 6/RFC 2327)	–
ABNF: (Appendix A/RFC 2327)	a=fmtp:<format> <format specific parameters>
H.248/SDP encoding examples with applied wildcarding:	Results:
a=fmtp:?	Is invalid as there are two mandatory parameters "format" and "format specific parameters".
a=fmtp: ? ?	Would give a=fmtp:format formatspecificparameters

6.15.4 Path

Table 6-15.4/H.248.39 – Path

SDP Specification:	
Definition: (Clause 6/RFC 2327)	–
ABNF: (Appendix A/RFC 2327)	a=path:" MSRP-URL *(SP MSRP-URL) msrp-scheme"://"[userinfo "@"] hostport ["/" session-id] ";" transport
H.248/SDP encoding examples with applied wildcarding:	Results:
a=path:msrp://?	Is invalid as "?" is only for one parameter value. There are two mandatory values "hostport" and "transport".
a=path:msrp://?;?	Would give a=path:msrp://hostport;transport
a=path:msrp://?@?;?	Would give a=path:msrp://userinfo@hostport; transport
a=path:msrp://?/?;?	Would give a=path:msrp://hostport/session-id; transport
a=path:msrp://?@?/?;?	Would give a=path:msrp://userinfo@hostport/ session-id;transport

6.15.5 SDP H.248 package attribute

Table 6-15.5/H.248.39 – SDP H.248 package attribute

SDP Specification:	
Definition: (Clause 6/RFC 2327)	–
ABNF: (Appendix A/RFC 2327)	a=h248item:<package name>/<property name> = <value>
H.248/SDP encoding examples with applied wildcarding:	Results:
a=h248item:? a=h248item:? ? a=h248item:? ? ? a=h248item:*/=? a=h248item:? ?=?	Are invalid. There are three mandatory parameters "package name", "property name" and "value".
a=h248item:*/?=?	Would give a=h248item:packagename/ propertyname=value

6.15.6 RTCP attribute

Table 6-15.6/H.248.39 – RTCP attribute

SDP Specification:	
Definition: (Clause 6/RFC 2327)	–
ABNF: (Appendix A/RFC 2327)	rtcp-attribute = "a=rtcp:" port [nettype space addrtype space connection-address] CRLF
H.248/SDP encoding examples with applied wildcarding:	Results:
a=rtcp:? ? a=rtcp:? ? ?	Are invalid. There is one mandatory parameter "port". There are three optional parameters "nettype", "addrtype" and "connection-address" but all three must be included.
a=rtcp:?	Would give a=rtcp:port
a=rtcp:? ? ? ?	Would give a=rtcp:port nettype addrtype connection-address

6.15.7 Silence suppression attribute

The "silenceSupp" attribute is defined in clause 5.6.3.2/RFC 3108. This attribute may be used for enabling and disabling of silence suppression mode for voice codec types without embedded silence suppression support (e.g., ITU-T Recs G.711 or G.726). This attribute may be also used for non-ATM bearer types like RTP/UDP/IP.

The "silenceSupp" attribute provides five optional sub-fields for parameterization of the silence suppression function. Their usage may depend on the ephemeral H.248 Termination type, e.g., VoIP may only use the <silenceSuppEnable> sub-field, whereas VoATM may use additional sub-fields (see explicit statement in clause 5.6/RFC 3108).

Table 6-15.7/H.248.39 – Silence suppression attribute

SDP Specification:	
Definition: (Clause 6/RFC 2327)	–
ABNF: (Appendix A/RFC 2327)	a=silenceSupp: <silenceSuppEnable> <silenceTimer> <suppPref> <sidUse> <fxnslevel>
H.248/SDP encoding examples with applied wildcarding:	Results:
a=silenceSupp:? a=silenceSupp:? ? a=silenceSupp:? ? ? a=silenceSupp:? ? ? ?	Are invalid. There are five mandatory parameters "silenceSuppEnable", "silenceTimer", "suppPref", "sidUse" and "fxnslevel".
a=silenceSupp:? ? ? ? ?	Would give a=silenceSupp:silenceSuppEnable silenceTimer suppPref sidUse fxnslevel That means that the H.248 MG would reply with the default value for "silenceSuppEnable". That default value may, for instance, be defined within an H.248 Profile specification.

6.15.8 Media description with multiple payload types and multiple attribute lines

Clause 6.11 shows a wildcarding example with multiple list entries in <fmt list> in the "m=" line.

The fourth "m=" line parameter <fmt list> is a list of one or more payload formats. This subclause is considering another wildcarding example with multiple list entries in <fmt list>.

The unambiguous resource selection by the MG may require correspondent "a=" lines in case of wildcarding in the list of formats in the "m=" line. This is reflected in 7.1.8/H.248.1.

NOTE 1 – To avoid ambiguity when requesting the MG to reserve and commit resources, the MGC should supply as much information as needed when using under-specification (i.e., CHOOSE) so that the MG can make an unambiguous selection. For example, when using CHOOSE without specifying the required application type (e.g., "media name" in case of SDP encoding), further information may be needed (e.g., attribute lines in case of SDP encoding).

Such a wildcarding configuration must therefore consider the combination of a single "m=" and multiple "a=" lines.

NOTE 2 – Clause 6.1.1 has examples with scope on "m=" line only.

Table 6-15.8/H.248.39 – Examples

H.248/SDP encoding example with applied wildcarding:	Result:
H.248 request: Local{ v=0 c=IN IP4 \$ m=audio\$ RTP/AVP \$ \$ a=rtpmap:\$ G729D/8000 a=rtpmap:\$ G726-16/8000 a=ptime:10 }	H.248 reply: Local{ v=0 c=IN IP4 11.9.19.65 m=audio 5000 RTP/AVP 98 99 a=rtpmap:98 G729D/8000 a=rtpmap:99 G726-16/8000 a=ptime:10 }

In this example the MGC specifies the encoding name for the two RTP payload types. Thus the MG cannot choose a different encoding name. If the MGC would not send the "a=" line, the MG could choose the encoding name as well. This latter option is not preferred.

7 Use for Wildcarding (CHOOSE or ALL)

The MGC should fully specify as many of the SDP parameters as possible when specifying an SDP line in H.248. As indicated above, the MGC shall provide either a fully specified value, wildcard (CHOOSE "\$" or ALL "*") or not significant value "-" for each parameter.

For example (see Table 7): The MGC requests that the port be selected and issues the transaction below.

NOTE – Full SDP omitted for brevity.

Table 7/H.248.39 – Examples

H.248/SDP encoding example with applied wildcarding:	Result:
H.248 request: Transaction = 10 { Context = 20 { Modify = 30 { Media { Stream = 1 { Local { m=audio \$ RTP/AVP 4 } } } } } }	H.248 reply (the port is returned): Reply = 10 { Context = 20 { Modify = 30 { Media { Stream = 1 { Local { m=audio 1111 RTP/AVP 4 } } } } } }

8 Use in auditing

8.1 Audit value

Individual auditing of Local and Remote SDP was introduced in ITU-T Rec. H.248.1 Version 3.

For use in Auditing, the MGC should fully specify as many of the parameters in the SDP line as possible, to minimize the number of combinations that are returned. The actual parameters that the MGC requests to be returned should be designated with the ALL "*" wildcard. The parameters of which the MGC has no knowledge and does not require their values to be returned shall be designated with "-" (not significant). In the reply from the MG, these parameters will be marked as "-". Examples follow in Table 8.1.

Table 8-1/H.248.39 – Examples

H.248/SDP encoding examples with applied wildcarding:	Results:
<p>The MGC requests that all the attributes be returned with transaction:</p> <pre>Transaction = 10 { Context = 20 { AuditValue = 30{ Audit{ Media{ Local{ a=*:* } } } } } }</pre>	<p>This could potentially return a long list of all the attributes on the MG.</p>
<p>Whereas transaction:</p> <pre>Transaction = 10 { Context = 20 { AuditValue = 30{ Audit{ Media{ Local{ a=ptime:* } } } } } }</pre>	<p>This would only return the value of the ptime attribute.</p>
<p>If the MGC audits a line with multiple parameters (for example: "c=") and it only wants to know the type of network, it would issue the following transaction:</p> <pre>Transaction = 10 { Context = 20 { AuditValue = 30{ Audit{ Media{ Local{ c=- * - } } } } } }</pre>	<p>It would return the connection line:</p> <pre>c=- IP4 -</pre>

8.2 Audit capability

Wildcarding of SDP elements for Audit Capabilities is for further study.

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