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Albrecht Schwarz (ed.)
Alcatel-Lucent
Christian Groves
Huawei
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SDP codepoints for gateway control
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Abstract

SDP is used in many signalling protocols at call control level (such as SAP, SIP, BICC), bearer control level (such as RTSP, IPBCP) and gateway control level (such as H.248/MEGACO, MGCP). Scope of this RFC is related to gateway control specific SDP usage. Gateway control protocols do NOT usually define and introduce any new SDP parameters, however, gateway control protocols need specific SDP parameter values in addition to those defined at call or bearer control level. Such SDP codepoints are collected by this RFC with the purpose of registration with IANA.

Table of Contents

1.	Introduction.....	3
1.1.	Motivation.....	3
1.2.	Scope.....	3
2.	Conventions used in this document.....	4
2.1.	Prescriptive language.....	4
2.2.	Terminology used.....	4
2.3.	Abbreviations used.....	5
3.	Security Considerations.....	6
4.	IANA Considerations.....	6
4.1.	Registration aspects of "m="-line <proto> element.....	6
4.2.	SDP codepoints related to "m="-line <proto> element.....	7
5.	References.....	7
5.1.	Normative References.....	7
5.2.	Informative References.....	9
6.	Acknowledgments.....	9
Appendix A.	Background - Gateway control protocols in scope...	11
A.1.	Introduction.....	11
A.2.	Background - SDP usage in gateway control protocol(s)...	11

A.3.	Motivation - Why gateway control specific SDP?.....	12
Appendix B.	Decomposed gateways - usage of SDP.....	13
B.1.	SDP for bearer type indication.....	13
B.2.	SDP for controlling the mode of operation of a gateway..	13
Appendix C.	SDP codepoints related to "c="-line.....	13
C.1.	SDP codepoints related to "c="-line <addrtype> element..	13
Appendix D.	SDP codepoints related to "m="-line.....	13
D.1.	SDP codepoints related to "m="-line <proto> element.....	13
D.1.1.	Purpose.....	13
D.1.2.	Application-agnostic indications.....	14
D.1.3.	Protocol individual indications.....	14
D.1.4.	Gateway specific SDP codepoints.....	15
D.2.	SDP codepoints related to "m="-line <type> element.....	15
Appendix E.	SDP codepoints related to "a="-lines (SDP attrib.)	15
E.1.	SDP attribute "ITU-T H.248 package".....	15
7.	CHANGE LOG.....	16
7.1.	Initial draft name " draft-schwarz-sdp-for-gw ".....	16
7.1.1.	Changes against "-00".....	16
7.1.2.	Changes against "-01".....	16
7.1.3.	Changes against "-02".....	16
7.2.	WG draft name " draft-schwarz-mmusic-sdp-for-gw ".....	16
7.2.1.	Version "-00".....	16
7.2.2.	Changes against "-00".....	16
7.2.3.	Changes against "-01".....	17
7.2.4.	Changes against "-02".....	17
7.2.5.	Changes against "-03".....	17

[1. Introduction](#)

[1.1. Motivation](#)

There is a gap concerning the registration of some specific SDP codepoints, which are primarily required for gateway control. Detailed background information is summarized in [Appendix A](#).

[1.2. Scope](#)

The purpose of this document is to collect SDP codepoints, which are specific to gateway control protocols in order to identify any additional codepoints that require registration with IANA. The focus is (but not limited to) on SDP codepoints related to the SDP "m="-line.

These SDP codepoints for gateway control are defined by ITU-T in the ITU-T H.248.x-series of Recommendations [ITU-T H.248.x]. The individual "H.248.x" documents define specific gateway control applications.

Appendices C, D and E provide SDP line specific considerations ("c="-, "m="- and "a="-lines) from gateway perspective.

Clause 4 on "IANA consideration" addresses the SDP information as in scope of this document ("which is inter alia the result of such gateway control aspect as discussed in above referred Appendices).

2. Conventions used in this document

2.1. Prescriptive language

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [RFC-2119](#) [[RFC2119](#)].

2.2. Terminology used

APPLICATION:

This term, when used in the context of "application-agnostic" or "application-aware", refers to the IP application protocol on top of a "L4 transport protocol" (e.g., "TCP", "UDP") with or without a "transport security protocol" (e.g., "TLS", "DTLS").

NOTE - The notion of application includes (if present) also the associated protocol layer of "application level framing protocol" (e.g., "RTP").

BORDER GATEWAY:

A H.248 packet-to-packet (media) gateway, such as an IP-to-IP gateway, with scope on two-party communication services.

NOTE: not to be confused with border gateway entities in the native IP router space, such as a border router with support of border gateway protocols (such as BGP, e.g. [[RFC1163](#)]).

CODEPOINT:

The combination of a "signalling parameter" plus assigned "value" in protocol engineering. The "value" represents a codepoint (or code position) in the code space.

X-AGNOSTIC / X-AWARE:

Placeholder 'X' denotes a protocol layer, a protocol stack or an abstracted model such as "application", "media", "transport", etc. This term indicates whether the controlled entity (here: H.248 MG) is aware or not about information concerning 'X'.

2.3. Abbreviations used

B2BUA	Back-to-Back User Agent
BGF	Bearer Gateway Function
BGP	Border Gateway Protocol
BICC	Bearer Independent Call Control
DTLS	Datagram Transport Layer Security
GCP	Gateway Control Protocol
IPBCP	(ITU-T) IP Bearer Control Protocol
ITU-T	International Telecommunication Union Telecommunication Standardization Sector
IWF	Interworking Function
MEGACO	Media Gateway Control
MG	(H.248) Media Gateway
MGC	(H.248) Media Gateway Controller
RTP	Real-time Transport Protocol
RTSP	Real-Time Streaming Protocol
SAP	Session Announcement Protocol
SCTP	Stream Control Transmission Protocol
SDP	Session Description Protocol
SIP	Session Initiation Protocol
TCP	Transmission Control Protocol
TLS	Transport Layer Security

UA User Agent

UDP User Datagram Protocol

3. Security Considerations

This RFC is related to the registration of protocol codepoints, thus outside any security aspects.

4. IANA Considerations

4.1. Registration aspects of "m="-line <proto> element

The usual registration process is described in [Section 8.2.2 of \[RFC4566\]](#). Usage of such SDP codepoints for gateway control is specific (as outlined in [Appendix B](#) and section D.1), therefore leads to following considerations related to the registration process:

a) [\[RFC4566\]](#), 8.2.2: The "proto" field describes the transport protocol used.

Comment from gateway control: the notion of "transport protocol" translates to either single protocol layer or protocol stack segment (see section D.1).

b) [\[RFC4566\]](#), 8.2.2: New transport protocols SHOULD be registered with IANA. Registrations MUST reference an RFC describing the protocol.

Comment from gateway control: there are not any new IP transport protocols defined by ITU-T for gateway control, hence, there will be not any correspondent RFC. There will be rather a reference to an ITU-T document which specifies the usage of that SDP codepoint in the application-specific context of gateway control.

c) [\[RFC4566\]](#), 8.2.2: Registrations MUST also define the rules by which their "fmt" namespace is managed.

Comment from gateway control: not applicable because there are not any new IP transport protocols defined by ITU-T for gateway control, hence existing rules are used.

4.2. SDP codepoints related to "m="-line <proto> element

This document updates the "Session Description Protocol (SDP) Parameters" registry as specified in [Section 8.2.2 of \[RFC4566\]](#). Specifically, it adds the values in Table 1 to the table for the SDP "proto" field registry.

Type	SDP Name	Reference
proto	"TLS"	[ITU-T H.248.90]
proto	"TCP/TLS"	[ITU-T H.248.90] Note 1
proto	"SCTP/TLS"	[ITU-T H.248.90]
proto	"DTLS"	[ITU-T H.248.93]
proto	"UDP/DTLS"	[ITU-T H.248.93]
proto	"DCCP/DTLS"	[ITU-T H.248.93]
proto	"SCTP"	[ITU-T H.248.97] Note2
proto	"SCTP/DTLS"	[ITU-T H.248.97] Note2
proto	"DTLS/SCTP"	[ITU-T H.248.97] Note2

Table 1: SDP "proto" field values

Note 1 - Codepoint "TCP/TLS" already registered [[RFC4572](#)].

Note 2 - Table entry may be deleted again dependent on progress of IETF draft "[draft-ietf-mmusic-sctp-sdp](#)" (<http://tools.ietf.org/wg/mmusic/draft-ietf-mmusic-sctp-sdp/>).

5. References

5.1. Normative References

[RFC2119] [RFC 2119](#) (03/1997), "Key words for use in RFCs to Indicate Requirement Levels", [BCP 14](#).

[RFC2885] [RFC 2885](#) (08/2000), "Megaco Protocol version 0.8".

- [RFC3015] [RFC 3015](#) (11/2000), "Megaco Protocol Version 1.0".
- [RFC3525] [RFC 3525](#) (06/2003), "Gateway Control Protocol Version 1".
- [RFC4566] [RFC 4566](#) (07/2006), "SDP: Session Description Protocol".
- [RFC4572] [RFC 4572](#) (07/2006), "Connection-Oriented Media Transport over the Transport Layer Security (TLS) Protocol in the Session Description Protocol (SDP)".
- [RFC5125] [RFC 5125](#) (02/2008), "Reclassification of [RFC 3525](#) to Historic".
- [ITU-T H.248.x] The ITU-T H.248.x-series of Recommendations (Gateway Control Protocol).
Website: <http://www.itu.int/rec/T-REC-H/e>
- [ITU-T H.248.1] Recommendation ITU-T H.248.1 (03/2013), "Gateway control protocol: Version 3".
Free copy via: <http://www.itu.int/rec/T-REC-H.248.1-201303-I/en>
- [ITU-T H.248.15] Recommendation ITU-T H.248.15 (03/2013), "Gateway control protocol: SDP ITU-T H.248 package attribute".
Free copy via: <http://www.itu.int/rec/T-REC-H.248.15-201303-I/en>
- [ITU-T H.248.39] Recommendation ITU-T H.248.39 (10/2014), "Gateway control protocol: H.248 SDP parameter identification and wilddarding".
Free copy via: <http://www.itu.int/rec/T-REC-H.248.39/en>
- [ITU-T H.248.49] Recommendation ITU-T H.248.49 (08/2007), "Gateway control protocol: Session description protocol RFC and capabilities packages".
Free copy via: <http://www.itu.int/rec/T-REC-H.248.49/en>
- [ITU-T H.248.80] Recommendation ITU-T H.248.80 (01/2014), "Usage of the revised SDP offer / answer model with H.248".
Free copy via: <http://www.itu.int/rec/T-REC-H.248.80/en>
- [ITU-T H.248.90] Recommendation ITU-T H.248.90 (10/2014), "Gateway control protocol: H.248 packages for control of transport security using TLS".
Free copy via: <http://www.itu.int/rec/T-REC-H.248.90/en>

- [ITU-T H.248.92] Recommendation ITU-T H.248.92 (10/2014), "Gateway control protocol: Stream endpoint interlinkage package".
Free copy via: <http://www.itu.int/rec/T-REC-H.248.92/en>
- [ITU-T H.248.93] Recommendation ITU-T H.248.93 (10/2014), "Gateway control protocol: H.248 packages for control of transport security using DTLS".
Free copy via: <http://www.itu.int/rec/T-REC-H.248.93/en>
- [ITU-T H.248.97] Recommendation ITU-T H.248.97 (10/2015), "Gateway control protocol: H.248 support for control of SCTP bearer connections".
Free copy via: ### insert URL ###
- [ITU-T H.Sup14] Supplement ITU-T H.Sup14 (10/2015), "Gateway Control Protocol: ITU-T H.248.x-series - SDP codepoints for gateway control - Release 2".
Free copy via: ### insert URL ###
- [ETSI 183046] ETSI TR 183 046 V3.3.1 (2009-08), "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); SDP Interworking between Call/Session Control Protocols (SIP/SDP, RTSP/SDP; etc.) and the Gateway Control Protocol (H.248/SDP)".
- [ETSI 183068] ETSI TR 183 068 V3.1.1 (2009-08), "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Guidelines on using Ia H.248 profile for control of Border Gateway Functions (BGF); Border Gateway Guidelines".

5.2. Informative References

- [RFC1163] [RFC 1163](#) (06/1990), "A Border Gateway Protocol (BGP)".
- [RFC7092] [RFC 7092](#) (12/2013), "A Taxonomy of Session Initiation Protocol (SIP) Back-to-Back User Agents".

6. Acknowledgments

The work origins in ITU-T Study Group 16 Question 3 "Multimedia gateway control architectures and protocols" in cooperation with 3GPP CT4 (Technical Specification Group "Core Network and Terminals", Working Group 4). The authors like to thank all delegates for comments, review and contributions.

Authors' Addresses

Dr. Albrecht Schwarz (editor)
ALCATEL-LUCENT
Lorenzstrasse 10
D-70435 Stuttgart
GERMANY

Email: Albrecht.Schwarz@alcatel-lucent.com

Christian Groves
Huawei
Melbourne
AUSTRALIA

Email: Christian.Groves@nteczone.com

Appendix A. Background - Gateway control protocols in scope

A.1. Introduction

Gateway control protocols are required for decomposed network elements which separate media plane and signalling plane related network functions (see e.g., [\[RFC7092\]](#) concerning a decomposed B2BUA with a SIP specific signalling B2BUA plus a media plane B2BUA entity).

The gateway control interface between the controlling entity (known as media gateway controller, MGC) and controlled entity (known as media gateway) follows a disclosed, open, standardized protocol.

This RFC considers such gateway control protocols which use the SDP [\[RFC4566\]](#) as embedded signalling for media-related characteristics.

This RFC focuses on following gateway control protocol, known as "H.248", as standardized within the ITU-T H.248.x-series of Recommendations [ITU-T H.248.x]. The core protocol is defined by H.248.1 [ITU-T H.248.1], which actually originates in the IETF, known as MEGACO (media gateway control):

IETF history:

- o Closed working group "MEGACO" (since technology was transferred to ITU-T);
- o IETF MEGACO protocol versions: see [\[RFC2885\]](#), [\[RFC3015\]](#), [\[RFC3525\]](#);
- o Transfer IETF to ITU-T: "Reclassification of [RFC 3525](#) to Historic", [\[RFC5125\]](#).

A.2. Background - SDP usage in gateway control protocol(s)

Gateway control protocol H.248 supports two message encoding modes: binary and text. Gateway deployments in IP network environments use primarily H.248 text encoding mode in order to benefit from SDP usage at call control signalling level. For instance, the SIP level SDP information is mapped by the H.248 MGC entity to SDP information as used in H.248 gateway control signaling. The following list indicates areas where SDP is used in H.248 gateway control:

- o SDP in H.248: clause 7.1.8 "Local and Remote Descriptors" and particularly clause 7.1.8.1.1.2 "Summary - ITU-T H.248 usage of SDP" in [ITU-T H.248.1];
- o Wildcarding in SDP: "H.248 SDP parameter identification and wildcarding" [ITU-T H.248.39];
- o SDP versioning: "SDP RFC and capabilities packages", [ITU-T H.248.49];
- o SDP profiling: the allowed SDP elements and codespace could be limited by H.248 profile specifications, see "ITU-T H.248 profile definition template" in [Appendix III](#)/[ITU-T H.248.1] (profile template clauses 6.15 and 6.16 are related to SDP);
- o SDP offer/answer models: "Usage of the revised SDP offer / answer model with H.248", [ITU-T H.248.80];
- o SDP mapping between call control and H.248: "SDP Interworking between Call/Session Control Protocols (SIP/SDP, RTSP/SDP; etc.) and the Gateway Control Protocol (H.248/SDP)" [ETSI 183046].
- o SDP for mode control in border gateways: see Annex G "Illustration of BGF modes of operation" and particularly Annex G.2 "BGF modes driven by particular SDP lines" [ETSI 183068].

A.3. Motivation - Why gateway control specific SDP?

Gateway control protocol (GCP) specific SDP codepoints are primarily required in two areas:

1. SDP for bearer type indication
2. SDP for controlling the mode of operation of a gateway

Clause 3 provides detailed background and [ETSI 183068], Annex G illustrates several examples in the area of IP-to-IP gateways (also known as border gateways).

Appendix B. Decomposed gateways - usage of SDP

Gateway control protocol (GCP) specific SDP codepoints are primarily required in two areas:

B.1. SDP for bearer type indication

The bearer connection endpoint at media gateway level needs to be specified concerning the required bearer protocol or protocol stack segment respectively. This relates essentially to the SDP "m="line <proto> element. However, media gateways require in addition so called "agnostic" type of SDP codepoints, which is in contrast to the so called application-aware, transport protocol type aware SDP codepoints used by communication endpoints (such as a SIP UA located in an IP host entity).

B.2. SDP for controlling the mode of operation of a gateway

A media gateway (MG) typically internally interconnects multiple bearer connection endpoints. A plethora of interworking functions (IWF) may be supported in the media plane by the MG. The type of IWF is known as mode of operation. The mode of operation is typically controlled via SDP. The semantic is actually the result of the SDP information of ALL involved bearer connection endpoints (in H.248: terminations / stream endpoints). The operation may be traffic directions specific.

Appendix C. SDP codepoints related to "c="line

C.1. SDP codepoints related to "c="line <addrtype> element

H.248 may utilise the existing <addrtype> elements as defined in the IANA registry "<http://www.iana.org/assignments/sdp-parameters/sdp-parameters.xhtml#sdp-parameters-5>". No additional registrations are required.

Appendix D. SDP codepoints related to "m="line

D.1. SDP codepoints related to "m="line <proto> element

D.1.1. Purpose

The SDP "m=" line <proto> element allows the indication of

- a) a single protocol (layer) or
- b) a protocol stack (i.e., multiple, consecutive protocol layers).

The protocol stack based value is inherently ambiguous in case of the requirement in indicating a particular protocol layer out of the stack. This is a well-known issue of this element.

Example: <proto> = "x/y/z", i.e., indicates a protocol stack segment with protocol layering "z-over-y-over-x". The MGC wants to trigger a bearer control procedure for protocol 'y' at MG level and uses such an SDP codepoint. However, there are also the options of bearer control procedures at protocol layers 'x' or 'z'. Consequently, the SDP codepoint "x/y/z" can't be used because semantically ambiguous. What would be required here are separate SDP codepoints "x", "y" and "z".

The example illustrates that there are not any new IP transport protocols invented for gateway control.

D.1.2. Application-agnostic indications

Application-agnostic, - or X-agnostic in general -, indications are typically realized by using character "-" instead of a concrete value in SDP fields (see [ITU-T H.248.39]). Such an SDP value is basically out of scope of IANA registration.

D.1.3. Protocol individual indications

There is the so-called "interlinkage" capability defined for gateway control, see [ITU-T H.248.92]. This functionality allows to interlink connection/session oriented transport protocol endpoints within a media gateway. If two transport protocol endpoints are interlinked the establishment and/or release of a connection/session at the source transport protocol endpoint will trigger an MG-autonomous establishment and/or release of the interlinked transport protocol endpoint.

The configuration of the gateway internal interlinkage topology is defined in [section 7.1.1](#)/[ITU-T H.248.92] and uses the SDP <proto> element for the indication of interlinked protocol layers. However, the SDP codepoints are limited to single protocol layers only.

Reference: [ITU-T H.248.92] [section 7.1.1](#): "Value proto is as per clause 9/[IETF [RFC 4566](#)], with the restriction that a single transport protocol value should be selected when the IANA proto codepoint represents a protocol stack segment (format e.g. "x/y/z"), rather than a single individual protocol layer (format "x")."

D.1.4. Gateway specific SDP codepoints

See [ITU-T H.Sup14].

D.2. SDP codepoints related to "m="-line <type> element

No specific from H.248 perspective.

Appendix E. SDP codepoints related to "a="-lines (SDP attrib.)

E.1. SDP attribute "ITU-T H.248 package"

ITU-T Recommendation [ITU-T H.248.15] defines an ITU-T specific extension for SDP. The SDP attribute "a=h248item:" allows for the carriage of general ITU-T H.248 properties in the local and remote descriptor in the textual ITU-T H.248 protocol encoding mode. This attribute has already been registered with IANA (see: <http://www.iana.org/assignments/sdp-parameters/sdp-parameters.xhtml#sdp-parameters-5>).

7. CHANGE LOG

7.1. Initial draft name "[draft-schwarz-sdp-for-gw](#)"

7.1.1. Changes against "-00"

- o Replace Draft ITU-T Recommendation work item name by "H.248.x" number (H.248.90 (TLS), H.248.92 (SEPLINK))
- o Correction of clause 5: addition of ITU-T specific SDP attribute "a=h248item:"
- o Editorial: update of abbreviation list

7.1.2. Changes against "-01"

- o addition of SDP "c=" line information
- o complementary information on registration status (clauses 4.1 and 6.1)
- o Missing reference ([RFC 4572](#)) to codepoint "TCP/TLS" added.
- o Editorial: review & update of abbreviation list

7.1.3. Changes against "-02"

- o correction of draft name from "[draft-schwarz-sdp-for-gw-...](#)" to "[draft-schwarz-mmusic-sdp-for-gw-...](#)", i.e., a restart with version number 00 required
- o update of references

7.2. WG draft name "[draft-schwarz-mmusic-sdp-for-gw](#)"

7.2.1. Version "-00"

The June 2014 draft.

7.2.2. Changes against "-00"

- o clause 1.4 'scope': addition of complementary information
- o clause 5.1.1: there was still information solicited, which is added here

- o clause 5.1.3: there was still information solicited, dependent on progress of H.248.92, which is added here
- o clause 8.1: clarification of registration aspects related to [RFC 4566](#)
- o editorials: update of references due to recent approval of Recommendations (rev.) H.248.39, H.248.90, H.248.92 and H.248.93, and Supplement H.Sup14 by ITU-T.

[7.2.3.](#) Changes against "-01"

- o nearly all informative text of the main body was moved in Appendices in order to narrow and limit the normative text on the prime subject of this draft, thus, "-02" does provide only editorial updates, - in more detail:
 - new [Appendix A](#) = old sections [1.1](#), [1.2](#) and [1.3](#);
 - new [Appendix B](#) = old [section 3](#);
 - new [Appendix C](#) = old [section 4](#);
 - new [Appendix D](#) = old [section 5](#);
 - new [Appendix E](#) = old [section 6](#).

[7.2.4.](#) Changes against "-02"

- o editorial error corrected: [section 1.1](#) was splitted again in sections [1.1](#) "Motivation" and "Scope".

[7.2.5.](#) Changes against "-03"

- o Reference update I: ITU-T H.248.SCTP => H.248.97
- o Reference update II: ITU-T H.Sup14 Release 1 => H.Sup14 Release 2