

**A Framework for SDP Attributes when Multiplexing
draft-nandakumar-mmusic-sdp-mux-attributes-02**

Abstract

The Session Description Protocol (SDP) provides mechanisms to describe attributes of multimedia sessions and of individual media streams (e.g., Real-time Transport Protocol (RTP) sessions) within a multimedia session. In the RTCWeb WG, there is a need to use a single 5-tuple for sending and receiving media associated with multiple media descriptions ("m=" lines). Such a requirement has raised concerns over the semantic implications of the SDP attributes associated with the RTP Sessions multiplexed over a single transport layer flow.

The scope of this specification is to provide a framework for analyzing the multiplexing characteristics of SDP attributes. The specification also categorizes existing attributes based on the framework described herein.

Status of this Memo

This Internet-Draft is submitted in full conformance with the provisions of [BCP 78](#) and [BCP 79](#).

Internet-Drafts are working documents of the Internet Engineering Task Force (IETF). Note that other groups may also distribute working documents as Internet-Drafts. The list of current Internet-Drafts is at <http://datatracker.ietf.org/drafts/current/>.

Internet-Drafts are draft documents valid for a maximum of six months and may be updated, replaced, or obsoleted by other documents at any time. It is inappropriate to use Internet-Drafts as reference material or to cite them other than as "work in progress."

This Internet-Draft will expire on October 27, 2013.

Copyright Notice

Copyright (c) 2013 IETF Trust and the persons identified as the document authors. All rights reserved.

This document is subject to [BCP 78](#) and the IETF Trust's Legal Provisions Relating to IETF Documents (<http://trustee.ietf.org/license-info>) in effect on the date of publication of this document. Please review these documents carefully, as they describe your rights and restrictions with respect to this document. Code Components extracted from this document must include Simplified BSD License text as described in Section 4.e of the Trust Legal Provisions and are provided without warranty as described in the Simplified BSD License.

Table of Contents

1.	Introduction	5
2.	Terminology	5
3.	Motivation	5
4.	SDP Attribute Analysis Framework	6
5.	Analysis of Existing Attributes	9
5.1.	RFC4566	10
5.2.	RFC4585	11
5.3.	RFC5761	11
5.4.	RFC4574	11
5.5.	RFC5432	12
5.6.	RFC4568	12
5.7.	RFC5762	13
5.8.	RFC6773	13
5.9.	RFC5506	14
5.10.	RFC6787	14
5.11.	RFC5245	15
5.12.	RFC5285	16
5.13.	RFC3605	16
5.14.	RFC5576	16
5.15.	RFC6236	17
5.16.	RFC6285	18
5.17.	RFC6230	18
5.18.	RFC6364	18
5.19.	RFC4796	19
5.20.	RFC3407	19
5.21.	RFC6284	20
5.22.	RFC6714	21
5.23.	RFC4583	21
5.24.	RFC5547	22
5.25.	draft-ietf-mmusic-media-loopback	22
5.26.	RFC5760	23
5.27.	RFC3611	23
5.28.	RFC5939	24
5.29.	draft-ietf-mmusic-sdp-media-capabilities	24
5.30.	RFC4567	25

5.31.	RFC4572	26
5.32.	RFC4570	26
5.33.	RFC6128	27
5.34.	RFC6189	27
5.35.	RFC4145	27
5.36.	RFC5159	28
5.37.	RFC6193	28
5.38.	RFC6064	29
5.39.	RFC3108	32
5.40.	3GPP TS 24.182	35
5.41.	3GPP TS 24.183	35
5.42.	3GPP TS 24.229	35
5.43.	ITU T.38	36
5.44.	ITU-T H.248.15	37
5.45.	RFC4975	37
5.46.	Unknowns	38
6.	bwtype Attribute Analysis	39
6.1.	RFC4566	39
6.2.	RFC3556	39
6.3.	RFC3890	39
7.	rtcp-fb Attribute Analysis	40
7.1.	RFC4585	40
7.2.	RFC5104	40
8.	rtcp-fb "ack/nack" Attribute Analysis	41
8.1.	RFC4585	41
8.2.	RFC6285	42
8.3.	RFC6679	42
8.4.	RFC6642	42
9.	Codec Control Messages Analysis	43
9.1.	RFC5104	43
10.	group Attribute Analysis	43
10.1.	RFC5888	43
10.2.	RFC3524	44
10.3.	RFC4091	44
10.4.	RFC5956	45
10.5.	RFC5583	45
11.	ssrc-group Attribute Analysis	45
11.1.	RFC5576	46
12.	QoS Mechanism Token Analysis	46
12.1.	RFC5432	46
13.	k= Attribute Analysis	46
13.1.	RFC4566	46
14.	content Attribute Analysis	47
14.1.	RFC4796	47
15.	Payload Formats	47
15.1.	RFC5109	47
16.	IANA Considerations	48
17.	Security Considerations	48

18.	Acknowledgments	49
19.	Change Log	49
20.	References	49
20.1.	Normative References	49
20.2.	Informative References	49
Author's	Address	55

1. Introduction

Real-Time Communication Web (RTCWeb) framework requires Real-time Transport Protocol as the media transport protocol and Session Description Protocol (SDP) [[RFC4566](#)] for describing and negotiating multi-media communication sessions.

SDP defines several attributes for capturing characteristics that apply to the individual media descriptions (described by "m=" lines") and the overall multimedia session. Typically different media types (audio, video etc) described using different media descriptions represent separate RTP Sessions that are carried over individual transport layer flows. However, in the RTCWeb WG, a requirement has arisen to multiplex several RTP Sessions over a single transport layer flow. This in turn has made necessary to understand the interpretation and usage of the SDP attributes defined for the multiplexed media descriptions.

Given the number of SDP attributes registered with the IANA [[IANA](#)] and possibility of new attributes being defined in the future, there is need for generic future-proof framework to analyze these attributes for their applicability in the transport multiplexing use-cases.

The document starts with providing the motivation for requiring such a framework. This is followed by introduction to the SDP attribute analysis framework/procedures, following which several sections applies the framework to the SDP attributes registered with the IANA [[IANA](#)]

2. Terminology

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

3. Motivation

The time and complications of setting up ICE [[RFC5245](#)] and DTLS-SRTP [[RFC5763](#)] transports for use by RTP, and conservation of ports, forms an requirement to try and reduce the number of transport level flows needed. This has resulted in the definition of ways, such as, [[I-D.ietf-mmusic-sdp-bundle-negotiation](#)] and [[I-D.ietf-avt-multiplexing-rtp](#)] to multiplex RTP over a single transport flow in order to preserve network resources such as port numbers. This imposes further restrictions on applicability of these

SDP attributes as they are defined today.

The specific problem is that there are attribute combinations which make sense when specified on independent m-lines -- as with classical SDP -- that do not make sense when those m-lines are then multiplexed over the same transport. To give an obvious example, ICE permits each m-line to have an independently specified ice-ufrag attribute. However, if the media from multiple m-lines is multiplexed over the same ICE component, then the meaning of media-level ice-ufrag attributes becomes muddled.

As of today there are close to 250 SDP attributes registered with the IANA [[IANA](#)] and more will be added in the future. There is no clearly defined procedure to establish the validity/applicability of these attribute when used with transport multiplexing.

4. SDP Attribute Analysis Framework

Attributes in an SDP session description can be defined at the session-level and media-level. These attributes could be semantically grouped as noted below.

- o Attributes related to media content such as media type, encoding schemes, payload types.
- o Attributes specifying media transport characteristics like RTP/RTCP port numbers, network addresses, QOS.
- o Metadata description attributes capturing session timing and origin information.
- o Attributes establishing relationships between media streams such as grouping framework

With the above semantic grouping as the reference, the proposed framework classifies each attribute into one of the following categories:

NORMAL Attributes that can be independently specified when multiplexing and retain their original semantics.

In the example given below, the direction and label attributes are independently specified for audio and video m=lines. These attributes are not impacted by multiplexing these media streams over a single transport layer flow.


```
v=0
o=alice 2890844526 2890844527 IN IP4 host.atlanta.example.com
s=
c=IN IP4 host.atlanta.example.com
t=0 0
m=audio 49172 RTP/AVP 99
a=sendonly
a=label:1
a=rtpmap:99 iLBC/8000
m=video 49172 RTP/AVP 31
a=recvonly
a=label:2
a=rtpmap:31 H261/90000
```

NOT RECOMMENDED Attributes where multiplexing is not recommended if these attributes are in use in the SDP since doing so MAY result in incorrect behaviors

Example: Multiplexing media descriptions having attribute `zrtp-hash` defined with the media descriptions lacking it, would either complicate the handling of multiplexed stream or fail multiplexing.

```
v=0
o=bob 2890844527 2890844527 IN IP4 client.biloxi.example.com
s=
c=IN IP4 client.biloxi.example.com
t=0 0
m=audio 3456 RTP/AVP 97
a=rtpmap:97 iLBC/8000
<allOneLine>
a=zrtp-hash:1.10 fe30efd02423cb054e50efd0248742ac7a52c8f91bc2
df881ae642c371ba46df
</allOneLine>
m=video 34567 RTP/AVP 31
a=rtpmap:31 H261/90000
```

IDENTICAL Attributes that MUST be identical across all the media descriptions being multiplexed.

Attributes such as `rtcp-mux` fall into this category. Since RTCP reporting is done per RTP Session, there is no way to receive RTCP control data for the video `m=line` in the example below. Hence `rtcp-mux` MUST be repeated for the video `m=line` as well, when multiplexed.


```
v=0
o=bob 2890844527 2890844527 IN IP4 client.biloxi.example.com
s=
c=IN IP4 client.biloxi.example.com
t=0 0
m=audio 34567 RTP/AVP 97
a=rtcp-mux
m=video 34567 RTP/AVP 31
a=rtmap:31 H261/90000
```

SUM Attributes can be set as they are normally used but software using them in a multiplex case, MUST apply the sum of all the attributes being multiplexed instead of trying to use each one. This is typically used for bandwidth or other rate limiting attributes to the underlining transport.

The software parsing the SDP sample below, should use the aggregate Application Specific (AS) bandwidth value from the individual media descriptions to determine the AS value for the multiplexed session. Thus the calculated AS value would be 256+64 bytes for the given example.

```
v=0
o=mhandley 2890844526 2890842807 IN IP4 126.16.64.4
c=IN IP4 client.biloxi.example.com
t=0 0
m=audio 49170 RTP/AVP 0
b=AS:64
m=video 51372 RTP/AVP 31
b=AS:256
```

TRANSPORT Attributes that can be set normally for multiple items in a multiplexed group but the software MUST pick just one of the attribute of the given type for use. The one chosen is the attribute associated with the "m=" lines that represents the information being used for the transport of the RTP.

In this example, "a=crypto" attribute is defined for both the audio and the video m=lines. The one that MUST be used for the multiplexed RTP Session is the one that corresponds to m=line with mid "two" even though the audio m=line with mid "one" occurs ahead of it. This is due to BUNDLE grouping semantics [[I-D.ietf-mmusic-sdp-bundle-negotiation](#)] which mandates the values from mid occurring first on the a=group:BUNDLE line to be considered for setting up the RTP Transport.


```
v=0
o=alice 2890844526 2890844527 IN IP4 host.atlanta.example.com
s=
c=IN IP4 host.atlanta.example.com
t=0 0
a=group:BUNDLE second,first
m=audio 49172 RTP/AVP 99
a=mid:one
a=crypto:1 AES_CM_128_HMAC_SHA1_80
    inline:d0RmdmcmVCspeEc3QGZiNWpVLFJhQX1cfHAWJSoj|2^20|1:32
a=rtpmap:99 iLBC/8000
m=video 51374 RTP/AVP 31
a=mid:two
a=crypto:1 AES_CM_128_HMAC_SHA1_80
    inline:EcGZiNWpFJhQXdspcl1ekcmVCNWpVLcfHAWJSoj|2^20|1:32
a=rtpmap:96 H261/90000
```

SPECIAL Attributes where the text in the source draft must be consulted for further handling when multiplexed.

As an example, for the attribute extmap, the specification defining the extension MUST be referred to understand the multiplexing implications.

TBD This category defines attributes that need more information to assign an appropriate category.

The idea behind these categories is to provide recommendations for using the attributes under RTP session multiplexing scenarios.

[Section 5](#) analyzes attributes listed in IANA [[IANA](#)] grouped under the IETF document that defines them. The "Current" column indicates whether the attribute is currently specified as:

- o S -- Session level
- o M -- Media level
- o B -- Both
- o SR -- Source-level (for a single SSRC)

[5. Analysis of Existing Attributes](#)

5.1. [RFC4566](#)

[RFC4566](#) [[RFC4566](#)] defines the Session Description Protocol (SDP) that is intended for describing multimedia sessions for the purposes of session announcement, session invitation, and other forms of multimedia session initiation

Attr Name	Notes	Current	Category
sendrecv	Not impacted	B	NORMAL
sendonly	Not impacted	B	NORMAL
recvonly	Not impacted	B	NORMAL
inactive	Not impacted	B	NORMAL
cat	Not impacted	S	NORMAL
ptime	Not Impacted	M	NORMAL
maxptime	Not Impacted	M	NORMAL
orient	Not Impacted	M	NORMAL
framerate	Not Impacted	M	NORMAL
quality	Not Impacted	M	NORMAL
rtpmap	Not Impacted	M	NORMAL
fntp	Not Impacted	M	NORMAL
keywds	Not impacted	S	NORMAL
type	Not Impacted	S	NORMAL
tool	Not Impacted	S	NORMAL
charset	Not Impacted	S	NORMAL
sdplang	Not Impacted	B	NORMAL
lang	Not Impacted	B	NORMAL

[RFC4566](#) Attribute Analysis**5.2. [RFC4585](#)**

[RFC4585](#) [[RFC4585](#)] defines an extension to the Audio-visual Profile (AVP) that enables receivers to provide, statistically, more immediate feedback to the senders and thus allows for short-term adaptation and efficient feedback-based repair mechanisms to be implemented.

Attr	Notes	Current	Category
Name			
rtcp-fb	Since RTCP feedback are reported per RTP Session, this attribute should be repeated across m= lines	M	IDENTICAL

[RFC4585](#) Attribute Analysis**5.3. [RFC5761](#)**

[RFC5761](#) [[RFC5761](#)] discusses issues that arise when multiplexing RTP data packets and RTP Control Protocol (RTCP) packets on a single UDP port. It describes when such multiplexing is and is not appropriate, and it explains how the Session Description Protocol (SDP) can be used to signal multiplexed sessions.

Name	Notes	Current	Category
rtcp-mux	RTCP muxing should be repeated across all the m=lines	M	IDENTICAL

[RFC5761](#) Attribute Analysis**5.4. [RFC4574](#)**

[RFC4574](#) [[RFC4574](#)] defines a new Session Description Protocol (SDP) media-level attribute: "label". The "label" attribute carries a pointer to a media stream in the context of an arbitrary network application that uses SDP. The sender of the SDP document can attach the "label" attribute to a particular media stream or streams. The

application can then use the provided pointer to refer to each particular media stream in its context.

Name	Notes	Current	Category
label	Not Impacted	M	NORMAL

[RFC4574](#) Attribute Analysis

5.5. [RFC5432](#)

[RFC5432](#) [[RFC5432](#)] defines prordures to negotiate QOS mechanisms using the Session Description Protocol (SDP) offer/answer model.

Name	Notes	Current	Category
qos-mech-send	QOS mechanism should be same across all the m=lines multiplexed	B	IDENTICAL
qos-mech-recv	AQOS mechanism should be same across all the m=lines multiplexed	B	IDENTICAL

[RFC5432](#) Attribute Analysis

5.6. [RFC4568](#)

[RFC4568](#) [[RFC4568](#)] defines a Session Description Protocol (SDP) cryptographic attribute for unicast media streams. The attribute describes a cryptographic key and other parameters that serve to configure security for a unicast media stream in either a single message or a roundtrip exchange.

Name	Notes	Current	Category
crypto		M	TRANSPORT

[RFC4568](#) Attribute Analysis

Open Issue: should this be NORMAL

5.7. [RFC5762](#)

The Real-time Transport Protocol (RTP) is a widely used transport for real-time multimedia on IP networks. The Datagram Congestion Control Protocol (DCCP) is a transport protocol that provides desirable services for real-time applications. [RFC5762](#) [[RFC5762](#)] specifies a mapping of RTP onto DCCP, along with associated signalling, such that real-time applications can make use of the services provided by DCCP

Name	Notes	Current	Category
dccp-service-code	Not recommended due to DCCP service code mismatch between different media types	M	NOT RECOMMENDED

[RFC5762](#) Attribute Analysis

5.8. [RFC6773](#)

[RFC6773](#) [[RFC6773](#)] document specifies an alternative encapsulation of the Datagram Congestion Control Protocol (DCCP), referred to as DCCP-UDP. This encapsulation allows DCCP to be carried through the current generation of Network Address Translation (NAT) middleboxes without modification of those middleboxes

Name	Notes	Current	Category
dccp-port	Not recommended due to DCCP service code mismatch between different media types	M	NOT RECOMMENDED

[RFC6773](#) Attribute Analysis

5.9. [RFC5506](#)

[RFC5506](#) [[RFC5506](#)] discusses benefits and issues that arise when allowing Real-time Transport Protocol (RTCP) packets to be transmitted with reduced size.

Name	Notes	Current	Category
rtcp-rsize	RTCP reduced size MUST be repeated across all the m=lines	M	IDENTICAL

[RFC5506](#) Attribute Analysis**5.10. [RFC6787](#)**

The Media Resource Control Protocol Version 2 (MRCPv2) allows client hosts to control media service resources such as speech synthesizers, recognizers, verifiers, and identifiers residing in servers on the network. MRCPv2 is not a "stand-alone" protocol -- it relies on other protocols, such as the Session Initiation Protocol (SIP), to coordinate MRCPv2 clients and servers and manage sessions between them, and the Session Description Protocol (SDP) to describe, discover, and exchange capabilities. It also depends on SIP and SDP to establish the media sessions and associated parameters between the media source or sink and the media server. Once this is done, the MRCPv2 exchange operates over the control session established above, allowing the client to control the media processing resources on the speech resource server. [RFC6787](#) [[RFC6787](#)] defines attributes for this purpose.

Name	Notes	Current	Category
resource	Not Impacted	M	NORMAL
channel	Not Impacted	M	NORMAL
	Not Impacted	M	NORMAL

[RFC6787](#) Attribute Analysis

5.11. [RFC5245](#)

[RFC5245](#) [[RFC5245](#)] describes a protocol for Network Address Translator(NAT) traversal for UDP-based multimedia sessions established with the offer/answer model. This protocol is called Interactive Connectivity Establishment (ICE). ICE makes use of the Session Traversal Utilities for NAT (STUN) protocol and its extension, Traversal Using Relay NAT (TURN). ICE can be used by any protocol utilizing the offer/answer model, such as the Session Initiation Protocol (SIP).

Name	Notes	Current	Category
ice-lite	Not Impacted	S	NORMAL
ice-options	Not Impacted	S	NORMAL
ice-options	Not Impacted	S	NORMAL
ice-pwd	Per media-level attribute MUST be used per underlying transport flow	B	TRANSPORT
ice-ufrag	Per media-level attribute MUST be used per underlying transport flow	B	TRANSPORT
candidate	Per media-level attribute MUST be used per underlying transport flow		TRANSPORT
remote-candidates	Per media-level attribute MUST be used per underlying transport flow	M	TRANSPORT

[RFC5245](#) Attribute Analysis

5.12. [RFC5285](#)

[RFC5285](#) [[RFC5285](#)] provides a general mechanism to use the header extension feature of RTP (the Real-Time Transport Protocol). It provides the option to use a small number of small extensions in each RTP packet, where the universe of possible extensions is large and registration is de-centralized. The actual extensions in use in a session are signaled in the setup information for that session.

Name	Notes	Current	Category
extmap	Specific RTP extension document MUST be referred	B	SPECIAL

[RFC5285](#) Attribute Analysis**5.13. [RFC3605](#)**

Originally, SDP assumed that RTP and RTCP were carried on consecutive ports. However, this is not always true when NATs are involved. [[RFC3605](#)] specifies an early mechanism to indicate the RTCP port.

Name	Notes	Current	Category
rtcp	Case1:Same RTCP port is repeated across the m=lines. Case2:Different RTCP ports renders multiplexing impossible	M	TRANSPORT

[RFC3605](#) Attribute Analysis**5.14. [RFC5576](#)**

[RFC5576](#) [[RFC5576](#)] defines a mechanism to describe RTP media sources, which are identified by their synchronization source (SSRC) identifiers, in SDP, to associate attributes with these sources, and to express relationships among sources. It also defines several source-level attributes that can be used to describe properties of media sources.

Name	Notes	Current	Category
ssrc	SSRCs repeated over multiple m=lines is forbidden if the m-lines are in the same RTP session.	M	NOT RECOMMENDED
ssrc-group	Refer to section Section 11 for specific analysis of the grouping semantics	M	SPECIAL
cname	Not Impacted [Open Issues: what are the rules for CNAME duplication across sessions?]	SR	NORMAL
previous-ssrc	SSRCs repeated over multiple m=lines complicates multiplexing	SR	NOT RECOMMENDED
fntp	Not Impacted	SR	NORMAL

[RFC5576](#) Attribute Analysis

5.15. [RFC6236](#)

[RFC6236](#) [[RFC6236](#)] proposes a new generic session setup attribute to make it possible to negotiate different image attributes such as image size. A possible use case is to make it possible for a low-end hand-held terminal to display video without the need to rescale the image, something that may consume large amounts of memory and processing power. The document also helps to maintain an optimal bitrate for video as only the image size that is desired by the receiver is transmitted.

Name	Notes	Current	Category
imageattr	Not Impacted	M	NORMAL

[RFC6236](#) Attribute Analysis**5.16. [RFC6285](#)**

[RFC6285](#) [[RFC6285](#)] describes a method using the existing RTP and RTP Control Protocol (RTCP) machinery that reduces the acquisition delay. In this method, an auxiliary unicast RTP session carrying the Reference Information to the receiver precedes or accompanies the multicast stream. This unicast RTP flow can be transmitted at a faster than natural bitrate to further accelerate the acquisition. The motivating use case for this capability is multicast applications that carry real-time compressed audio and video.

Name	Notes	Current	Category
rams-updates	Not recommended	M	NOT RECOMMENDED

[RFC6285](#) Attribute Analysis**5.17. [RFC6230](#)**

[RFC6230](#) [[RFC6230](#)] describes a framework and protocol for application deployment where the application programming logic and media processing are distributed. This implies that application programming logic can seamlessly gain access to appropriate resources that are not co-located on the same physical network entity. The framework uses the Session Initiation Protocol (SIP) to establish an application-level control mechanism between application servers and associated external servers such as media servers.

Name	Notes	Current	Category
cw-id	Not Applicable	M	NORMAL

[RFC6230](#) Attribute Analysis**5.18. [RFC6364](#)**

[RFC6364](#) [[RFC6364](#)] specifies the use of the Session Description Protocol (SDP) to describe the parameters required to signal the Forward Error Correction (FEC) Framework Configuration Information between the sender(s) and receiver(s). This document also provides

examples that show the semantics for grouping multiple source and repair flows together for the applications that simultaneously use multiple instances of the FEC Framework.

Name	Notes	Current	Category
fec-source-flow	Not Impacted	M	NORMAL
fec-repair-flow	Not Impacted	M	NORMAL
repair-window	Not Impacted	M	NORMAL

[RFC6364](#) Attribute Analysis

5.19. [RFC4796](#)

[RFC4796](#) [[RFC4796](#)] defines a new Session Description Protocol (SDP) media- level attribute, 'content'. The 'content' attribute defines the content of the media stream to a more detailed level than the media description line. The sender of an SDP session description can attach the 'content' attribute to one or more media streams. The receiving application can then treat each media stream differently (e.g., show it on a big or small screen) based on its content.

Name	Notes	Current	Category
content	Not Impacted	M	NORMAL

[RFC4796](#) Attribute Analysis

5.20. [RFC3407](#)

[RFC3407](#) [[RFC3407](#)] defines a set of Session Description Protocol (SDP) attributes that enables SDP to provide a minimal and backwards compatible capability declaration mechanism.

Name	Notes	Current	Category
sqn	Not Impacted	B	NORMAL
csdc	Mismatch in the offered capability description MAY fail multiplexing.	B	TBD
cpar	Mismatch in the offered capability parameters MAY fail multiplexing.	B	TBD
cparmin	Mismatch in the offered capability parameters MAY fail multiplexing.	B	TBD
cparmax	Mismatch in the offered capability parameters MAY fail multiplexing.	B	TBD

[RFC3407](#) Attribute Analysis

5.21. [RFC6284](#)

[RFC6284](#) [[RFC6284](#)] presents a port mapping solution that allows RTP receivers to choose their own ports for an auxiliary unicast session in RTP applications using both unicast and multicast services. The solution provides protection against denial-of-service or packet amplification attacks that could be used to cause one or more RTP packets to be sent to a victim client

Name	Notes	Current	Category
portmapping-req	Not recommended, if port mapping is required by the application	M	NOT RECOMMENDED

[RFC6284](#) Attribute Analysis

5.22. [RFC6714](#)

[RFC6714](#) [[RFC6714](#)] defines a Message Session Relay Protocol (MSRP) extension, Connection Establishment for Media Anchoring (CEMA). Support of this extension is OPTIONAL. The extension allows middleboxes to anchor the MSRP connection, without the need for middleboxes to modify the MSRP messages; thus, it also enables secure end-to-end MSRP communication in networks where such middleboxes are deployed. This document also defines a Session Description Protocol (SDP) attribute, 'msrp-cema', that MSRP endpoints use to indicate support of the CEMA extension.

Name	Notes	Current	Category
msrp-cema	Not recommended due to legacy interop purposes	M	NORMAL

[RFC6714](#) Attribute Analysis**5.23. [RFC4583](#)**

[RFC4583](#) [[RFC4583](#)] document specifies how to describe Binary Floor Control Protocol (BFCP) streams in Session Description Protocol (SDP) descriptions. User agents using the offer/answer model to establish BFCP streams use this format in their offers and answers

Name	Notes	Current	Category
floorctrl	Not Impacted	M	NORMAL
confid	Not Impacted	M	NORMAL
userid	Not Impacted	M	NORMAL
floorid	Not Impacted	M	NORMAL

[RFC4583](#) Attribute Analysis

5.24. [RFC5547](#)

[RFC5547](#) [[RFC5547](#)] provides a mechanism to negotiate the transfer of one or more files between two endpoints by using the Session Description Protocol (SDP) offer/answer model specified in [[RFC3264](#)].

Name	Notes	Current	Category
file-selector	Not Impacted	M	NORMAL
file-transfer-id	Not Impacted	M	NORMAL
file-disposition	Not Impacted	M	NORMAL
file-date,file-iconfile-range	Not Impacted	M	NORMAL
file-iconfile-range	Not Impacted	M	NORMAL
file-iconfile-range	Not Impacted	M	NORMAL

[RFC5547](#) Attribute Analysis**5.25. [draft-ietf-mmusic-media-loopback](#)**

[MEDIA_LOOPBACK] adds new SDP media types and attributes, which enable establishment of media sessions where the media is looped back to the transmitter. Such media sessions will serve as monitoring and troubleshooting tools by providing the means for measurement of more advanced VoIP, Real-time Text and Video over IP performance metrics.

Name	Notes	Current	Category
loopback	The attribute MUST be repeated across all m=lines multiplexed	M	IDENTICAL
rtp-pkt-loopback			
loopback	Not Impacted	M	NORMAL
rtp-media-loopback			
loopback-source	Not Impacted	M	NORMAL
loopback-mirror	Not Impacted	M	NORMAL

[draft-ietf-mmusic-media-loopback](#) Attribute Analysis

5.26. [RFC5760](#)

[RFC5760](#) [[RFC5760](#)] specifies an extension to the Real-time Transport Control Protocol (RTCP) to use unicast feedback to a multicast sender. The proposed extension is useful for single-source multicast sessions such as Source-Specific Multicast (SSM) communication where the traditional model of many-to-many group communication is either not available or not desired.

Name	Notes	Current	Category
rtcp-unicast	The attribute MUST be reported across all m=lines multiplexed	M	IDENTICAL

[RFC5760](#) Attribute Analysis

5.27. [RFC3611](#)

[RFC3611](#) [[RFC3611](#)] defines the Extended Report (XR) packet type for the RTP Control Protocol (RTCP), and defines how the use of XR packets can be signaled by an application if it employs the Session Description Protocol (SDP).

Name	Notes	Current	Category
rtcp-xr	The attribute MUST be reported across all m=lines multiplexed	B	IDENTICAL

[RFC3611](#) Attribute Analysis

5.28. [RFC5939](#)

[RFC5939](#) [[RFC5939](#)] defines a general SDP Capability Negotiation framework. It also specifies how to provide attributes and transport protocols as capabilities and negotiate them using the framework. Extensions for other types of capabilities (e.g., media types and media formats) may be provided in other documents.

Name	Notes	Current	Category
pcfg	Depends on capability being negotiated	M	SPECIAL
acfg	Depends on capability being negotiated	M	SPECIAL
csup	Depends on capability being negotiated	B	SPECIAL
creq	Depends on capability being negotiated	B	SPECIAL
acap	Depends on capability being negotiated	B	SPECIAL
tcap	Repeat transport capability across all m= lines	B	IDENTICAL

[RFC5939](#) Attribute Analysis

5.29. [draft-ietf-mmusic-sdp-media-capabilities](#)

Session Description Protocol (SDP) capability negotiation provides a general framework for indicating and negotiating capabilities in SDP. The base framework defines only capabilities for negotiating

transport protocols and attributes. [[MEDIA_CAP](#)] extends the framework by defining media capabilities that can be used to negotiate media types and their associated parameters.

Name	Notes	Current	Category
rmcap	Not Impacted	B	NORMAL
omcap	Not Impacted	B	NORMAL
mfcap	Not Impacted	B	NORMAL
mscap	Not Impacted	B	NORMAL
lcfg	Not Impacted	B	NORMAL
secap	Not Impacted	S	NORMAL

[draft-ietf-mmusic-sdp-media-capabilities](#) Attribute Analysis

5.30. [RFC4567](#)

[RFC4567](#) [[RFC4567](#)] defines general extensions for Session Description Protocol (SDP) and Real Time Streaming Protocol (RTSP) to carry messages, as specified by a key management protocol, in order to secure the media. These extensions are presented as a framework, to be used by one or more key management protocols. As such, their use is meaningful only when complemented by an appropriate key management protocol.

Name	Notes	Current	Category
key-mgmt	Key management protocol MUST be identical across all the m=lines	B	IDENTICAL

[RFC4567](#) Attribute Analysis

5.31. [RFC4572](#)

[RFC4572](#) [[RFC4572](#)] specifies how to establish secure connection-oriented media transport sessions over the Transport Layer Security (TLS) protocol using the Session Description Protocol (SDP). It defines a new SDP protocol identifier, 'TCP/TLS'. It also defines the syntax and semantics for an SDP 'fingerprint' attribute that identifies the certificate that will be presented for the TLS session. This mechanism allows media transport over TLS connections to be established securely, so long as the integrity of session descriptions is assured.

Name	Notes	Current	Category
fingerprint	Fingerprint value MUST be identical across all the m=lines	B	IDENTICAL

[RFC4572](#) Attribute Analysis**5.32. [RFC4570](#)**

[RFC4570](#) [[RFC4570](#)] describes how to adapt the Session Description Protocol (SDP) to express one or more source addresses as a source filter for one or more destination "connection" addresses. It defines the syntax and semantics for an SDP "source-filter" attribute that may reference either IPv4 or IPv6 address(es) as either an inclusive or exclusive source list for either multicast or unicast destinations. In particular, an inclusive source-filter can be used to specify a Source-Specific Multicast (SSM) session

Name	Notes	Current	Category
source-filter	he attribute MUST be repeated across all m=lines multiplexed	B	IDENTICAL

[RFC4570](#) Attribute Analysis

5.33. [RFC6128](#)

The Session Description Protocol (SDP) has an attribute that allows RTP applications to specify an address and a port associated with the RTP Control Protocol (RTCP) traffic. In RTP-based source-specific multicast (SSM) sessions, the same attribute is used to designate the address and the RTCP port of the Feedback Target in the SDP description. However, the RTCP port associated with the SSM session itself cannot be specified by the same attribute to avoid ambiguity, and thus, is required to be derived from the "m=" line of the media description. Deriving the RTCP port from the "m=" line imposes an unnecessary restriction. [RFC6128](#) [[RFC6128](#)] removes this restriction by introducing a new SDP attribute.

Name	Notes	Current	Category
multicast-rtcp	Multicast RTCP port MUST be identical across all the m=lines	B	IDENTICAL

[RFC6128](#) Attribute Analysis**5.34. [RFC6189](#)**

[RFC6189](#) [[RFC6189](#)] defines ZRTP, a protocol for media path Diffie-Hellman exchange to agree on a session key and parameters for establishing unicast Secure Real-time Transport Protocol (SRTP) sessions for Voice over IP (VoIP) applications.

Name	Notes	Current	Category
zrtp-hash	Complicates if all the m=lines are not authenticated	M	NOT RECOMMENDED

[RFC6189](#) Attribute Analysis**5.35. [RFC4145](#)**

[RFC4145](#) [[RFC4145](#)] describes how to express media transport over TCP using the Session Description Protocol (SDP). It defines the SDP 'TCP' protocol identifier, the SDP 'setup' attribute, which describes

the connection setup procedure, and the SDP 'connection' attribute, which handles connection reestablishment.

Name	Notes	Current	Category
setup	Should be identical across all m=lines	B	R
connection	Should be identical across all m=lines	B	R

[RFC4145](#) Attribute Analysis

5.36. [RFC5159](#)

[RFC5159](#) [[RFC5159](#)] provides descriptions of Session Description Protocol (SDP) attributes used by the Open Mobile Alliance's Broadcast Service and Content Protection specification.

Name	Notes	Current	Category
bcastversion	Might cause legacy interop issues	S	TBD
stkmstream	Might cause legacy interop purposes	B	TBD
SRTPAuthentication	Might cause legacy interop issues	M	TBD
SRTPROCTxRate	Might cause legacy interop issues	M	TBD

[RFC5159](#) Attribute Analysis

5.37. [RFC6193](#)

[RFC6193](#) [[RFC6193](#)] specifies how to establish a media session that represents a virtual private network using the Session Initiation Protocol for the purpose of on-demand media/application sharing between peers. It extends the protocol identifier of the Session Description Protocol (SDP) so that it can negotiate use of the

Internet Key Exchange Protocol (IKE) for media sessions in the SDP offer/answer model.

Name	Notes	Current	Category
ike-setup	Attribute MUST be identical across all the m=lines	B	IDENTICAL
psk-fingerprint	Attribute MUST be identical across all the m=lines	B	IDENTICAL
ike-esp	Attribute MUST be identical across all the m=lines	B	IDENTICAL
ike-esp-udpencap	Attribute MUST be identical across all the m=lines	B	IDENTICAL

[RFC6193](#) Attribute Analysis

In the case of session multiplexed with multiple m=lines, this SHOULD create only one IPSEC association for all the m=lines.

5.38. [RFC6064](#)

The Packet-switched Streaming Service (PSS) and the Multimedia Broadcast/Multicast Service (MBMS) defined by 3GPP use the Session Description Protocol (SDP) and Real Time Streaming Protocol (RTSP) with some extensions. [RFC6064](#) [[RFC6064](#)] provides information about these extensions and registers the RTSP and SDP extensions with IANA.

Name	Notes	Current	Category
X-predecbufsize	Case1:Aggregate total when video m-lines are muxed Case2:Multiplexing with audio m=lines is invalid	M	NOT RECOMMENDED
X-initpredecbufperiod	Case1:Aggregate total when video m-lines are muxed Case2:Multiplexing with audio m=lines is invalid	M	NOT RECOMMENDED
X-initpostdecbufperiod	Case1:Aggregate total when video m-lines are muxed Case2:Multiplexing with audio m=lines is invalid	M	NOT RECOMMENDED
X-decbyterate	Case1:Aggregate total when video m-lines are muxed Case2:Multiplexing with audio m=lines is invalid	M	NOT RECOMMENDED
3gpp-videopostdecbufsize	Case1:Aggregate total when video m-lines are muxed. Case2:Multiplexing with audio m=lines is invalid	M	NOT RECOMMENDED
framesize	Not Impacted	M	NORMAL
3GPP-Integrity-Key	Not Impacted	S	NORMAL
3GPP-SRTP-Config	Same config SHALL apply to all the m=lines multiplexed	M	NORMAL

alt,alt-default-id	Specifying alternate m=lines when session with multiple m=lines of different types cannot be clearly specified	M	TBD
alt-group	Complicates selection of alternate m=lines grouped with alt-group on multiplexing	M	TBD
3GPP-Adaptation-Support	Not recommended for legacy interop purposes	M	TBD
3GPP-QoE-Metricsn	Not recommended for legacy interop purposes	B	TBD
3GPP-Asset-Informationo	Not recommended for legacy interop purposes	B	TBD
mbms-mode	Not recommended for legacy interop purposes	B	TBD
mbms-flowid	Multiplexing multiple m=lines complicates FEC mappings to the transport addresses.	M	TBD
mbms-repair	Not recommended for legacy interop purposes	B	TBD

5.39. [RFC3108](#)

[RFC3108](#) [[RFC3108](#)] describes conventions for using the Session Description Protocol (SDP) described for controlling ATM Bearer Connections, and any associated ATM Adaptation Layer (AAL)

Name	Notes	Current	Category
aalType	Not recommended for legacy interop purposes	M	TBD
eecid	Not recommended for legacy interop purposes	M	TBD
aalType	Not recommended for legacy interop purposes	M	TBD
capability	Not recommended for legacy interop purposes	M	TBD
qosClass	Not recommended for legacy interop purposes	M	TBD
bcob	Not recommended for legacy interop purposes	M	TBD
stc	Not recommended for legacy interop purposes	M	TBD
upcc	Not recommended for legacy interop purposes	M	TBD
atmQOSparms	Not recommended for legacy interop purposes	M	TBD
atmTrfcDesc	Not recommended for legacy interop purposes	M	TBD
abrParms	Not recommended for legacy interop purposes	M	TBD
abrSetup	Not recommended for legacy interop purposes	M	TBD
bearerType	Not recommended for legacy interop purposes	M	TBD

lij	Not recommended for legacy interop purposes	M	TBD
anycast	Not recommended for legacy interop purposes	M	TBD
cache	Not recommended for legacy interop purposes	M	TBD
bearerSigIE	Not recommended for legacy interop purposes	M	TBD
aalApp	Not recommended for legacy interop purposes	M	TBD
cbrRate	Not recommended for legacy interop purposes	M	TBD
sbc	Not recommended for legacy interop purposes	M	TBD
clkrec	Not recommended for legacy interop purposes	M	TBD
fec	Not recommended for legacy interop purposes	M	TBD
prtfl	Not recommended for legacy interop purposes	M	TBD
structure	Not recommended for legacy interop purposes	M	TBD
cpsSDUsize	Not recommended for legacy interop purposes	M	TBD
aal2CPS	Not recommended for legacy interop purposes	M	TBD
aal2CPSSDUrate	Not recommended for legacy interop purposes	M	TBD
aal2sscs3661unassured	Not recommended for legacy interop purposes	M	TBD
aal2sscs3661assured	Not recommended for legacy interop purposes	M	TBD

aal2sscs3662	Not recommended for legacy interop purposes	M	TBD
aal5sscop	Not recommended for legacy interop purposes	M	TBD
atmmap	Not recommended for legacy interop purposes	M	TBD
silenceSupp	Not recommended for legacy interop purposes	M	TBD
ecan	Not recommended for legacy interop purposes	M	TBD
gc	Not recommended for legacy interop purposes	M	TBD
profileDesc	Not recommended for legacy interop purposes	M	TBD
vsel	Not recommended for legacy interop purposes	M	TBD
dsel	Not recommended for legacy interop purposes	M	TBD
fsel	Not recommended for legacy interop purposes	M	TBD
onewaySel	Not recommended for legacy interop purposes	M	TBD
codecconfig	Not recommended for legacy interop purposes	M	TBD
isup_usi	Not recommended for legacy interop purposes	M	TBD
isup_usi	Not recommended for legacy interop purposes	M	TBD
chain	Not recommended for legacy interop purposes	M	TBD
+-----+-----+-----+-----+			

[RFC3108](#) Attribute Analysis**5.40. 3GPP TS 24.182**

3GPP TS 24.182 [3GPP TS 24.182] specifies IP multimedia subsystem
Custom Alerting tones

Name	Notes	Current	Category
g.3gpp.cat	Not recommended due to interop purposes	M	TBD

3GPP TS 24.182 Attribute Analysis

5.41. 3GPP TS 24.183

3GPP TS 24.183 [3GPP TS 24.183] specifies IP multimedia subsystem
Custom Ringing Signal

Name	Notes	Current	Category
g.3gpp.crs	Not recommended due to interop purposes	M	TBD

3GPP TS 24.183 Attribute Analysis

5.42. 3GPP TS 24.229

3GPP TS 24.229 [3GPP TS 24.229] IP multimedia call control protocol
based on Session Initial protocol and Session Description Protocol.

Name	Notes	Current	Category
secondary-realm	Not recommended due to interop purposes	M	TBD
visited realm	Not recommended due to interop purposes	M	TBD
omr-m-cksum	Not recommended due to interop purposes	M	TBD
omr-s-cksum	Not recommended due to interop purposes	M	TBD
omr-m-att	Not recommended due to interop purposes	M	TBD
omr-s-att	Not recommended due to interop purposes	M	TBD
omr-s-bw	Not recommended due to interop purposes	M	TBD
omr-m-att	Not recommended due to interop purposes	M	TBD
omr-codecs	Not recommended due to interop purposes	M	TBD

3GPP TS 24.229 Attribute Analysis

5.43. ITU T.38

ITU T.38[T.38] defines procedures for real-time Group 3 facsimile communications over IP networks.

Name	Notes	Current	Category
T38FaxVersion	Not Impacted	S	NORMAL
T38MaxBitRate	Not Impacted	S	NORMAL
T38FaxFillBitRemoval	Not Impacted	S	NORMAL
T38FaxTranscodingMMR	Not Impacted	S	NORMAL
T38FaxTranscodingJBIG	Not Impacted	S	NORMAL
T38FaxRateManagement	Not Impacted	S	NORMAL
T38FaxMaxBuffer	Not Impacted	S	NORMAL
T38FaxMaxDatagram	Not Impacted	S	NORMAL
T38FaxUdpEC	Not Impacted	S	NORMAL

Historic Attribute Analysis

5.44. ITU-T H.248.15

ITU-T H.248.15 [[H.248.15](#)] defines Gateway Control Protocol SDP H.248 package attribute

Name	Notes	Current	Category
h248item	Not recommended for interop purposes	S	TBD

Historic Attribute Analysis

5.45. RFC4975

[RFC4975](#) [[RFC4975](#)] the Message Session Relay Protocol, a protocol for transmitting a series of related instant messages in the context of a session. Message sessions are treated like any other media stream when set up via a rendezvous or session creation protocol such as the Session Initiation Protocol.

Name	Notes	Current	Category
accept-types	Not recommended due to incompatible media types	M	TBD
accept-wrapped-types	Not recommended due to incompatible media typess	M	TBD
max-size	Not recommended due to incompatible media types	M	TBD
path	Not recommended due to incompatible media types	M	TBD

[RFC4975](#) Attribute Analysis

5.46. Unknowns

This section specifies analysis for the attributes that are included for historic usage alone by the [IANA_REF]

Name	Notes	Current	Category
rtppred1	Not Applicable	Not-Applicable	TBD
rtppred2	Not Applicable	Not-Applicable	TBD
PSCid	Not Applicable	Not-Applicable	TBD
bc_service	Not Applicable	Not-Applicable	TBD
bc_program	Not Applicable	Not-Applicable	TBD
bc_service_package	Not Applicable	Not-Applicable	TBD

Unknowns Attribute Analysis

6. bwtype Attribute Analysis

This section specifies handling of specific bandwidth attributes when used in multiplexing scenarios.

6.1. [RFC4566](#)

Name	Notes	Current	Category
bwtype:CT	Aggregate bandwidth for the conference	S	NORMAL
bwtype:AS	Aggregate RTP session bandwidth	B	NORMAL,SUM

[RFC4566](#) bwtype Analysis

6.2. [RFC3556](#)

[RFC3556](#) [[RFC3556](#)] defines an extension to the Session Description Protocol (SDP) to specify two additional modifiers for the bandwidth attribute. These modifiers may be used to specify the bandwidth allowed for RTP Control Protocol (RTCP) packets in a Real-time Transport Protocol (RTP) session

Name	Notes	Current	Category
bwtype:RS		B	NORMAL,SUM;
bwtype:RR		B	NORMAL,SUM

[RFC3556](#) bwtype Analysis

6.3. [RFC3890](#)

[RFC3890](#) [[RFC3890](#)] defines a Session Description Protocol (SDP) Transport Independent Application Specific Maximum (TIAS) bandwidth modifier that does not include transport overhead; instead an additional packet rate attribute is defined. The transport independent bit-rate value together with the maximum packet rate can then be used to calculate the real bit-rate over the transport actually used.

Name	Notes	Current	Category
bwtype:TIAS	Application MUST SUM bandwidth from all m=lines of same type and MUST NOT use default values	B	SUM

[RFC3890](#) bwtype Analysis

7. rtcp-fb Attribute Analysis

This section analyzes rtcp-fb SDP attributes [[RTCP-FB](#)].

7.1. [RFC4585](#)

[RFC4585](#) [[RFC4585](#)] defines an extension to the Audio-visual Profile (AVP) that enables receivers to provide, statistically, more immediate feedback to the senders and thus allows for short-term adaptation and efficient feedback-based repair mechanisms to be implemented.

Attr Name	Notes	Current	Category
ack	Not Impacted	M	NORMAL
app	Not Impacted	M	NORMAL
nack	Not Impacted	M	NORMAL
trr-int	Not Impacted	M	NORMAL

[RFC4585](#) Attribute Analysis

7.2. [RFC5104](#)

[RFC5104](#) [[RFC5104](#)] specifies a few extensions to the messages defined in the Audio-Visual Profile with Feedback (AVPF). They are helpful primarily in conversational multimedia scenarios where centralized multipoint functionalities are in use. However, some are also usable in smaller multicast environments and point-to-point calls.

Attr Name	Notes	Current	Category
ccm	Not Impacted	M	Normal

[RFC5104](#) Attribute Analysis

8. rtcp-fb "ack/nack" Attribute Analysis

This section analyzes rtcp-fb SDP attributes specific to ack and nack feedback types [[ACK-NACK](#)].

8.1. [RFC4585](#)

[RFC4585](#) [[RFC4585](#)] defines an extension to the Audio-visual Profile (AVP) that enables receivers to provide, statistically, more immediate feedback to the senders and thus allows for short-term adaptation and efficient feedback-based repair mechanisms to be implemented.

Attr Name	Notes	Current	Category
nack sli	Not Impacted	M	NORMAL
nack pli	Not Impacted	M	NORMAL
ack rpsi	Not Impacted	M	NORMAL
ack app	Feedback parameters MUST be handled in the app specific way when multiplexed	M	SPECIAL
nack rpsi	Not Impacted	M	NORMAL
nack app	Feedback parameters MUST be handled in the app specific way when multiplexed	M	SPECIAL

[RFC4585](#) Attribute Analysis**8.2. [RFC6285](#)**

Name	Notes	Current	Category
nack rai	Not Impacted	M	NORMAL

[RFC6285](#) Attribute Analysis**8.3. [RFC6679](#)**

[RFC6679](#) [[RFC6679](#)] specifies how Explicit Congestion Notification (ECN) can be used with the Real-time Transport Protocol (RTP) running over UDP, using the RTP Control Protocol (RTCP) as a feedback mechanism. It defines a new RTCP Extended Report (XR) block for periodic ECN feedback, a new RTCP transport feedback message for timely reporting of congestion events, and a Session Traversal Utilities for NAT (STUN) extension used in the optional initialisation method using Interactive Connectivity Establishment (ICE)

Name	Notes	Current	Category
nack ecn	Complicates ECN marking when m=lines of different types are used	M	SPECIAL

[RFC6679](#) Attribute Analysis**8.4. [RFC6642](#)**

In a large RTP session using the RTP Control Protocol (RTCP) feedback mechanism defined in [RFC 4585](#) [[RFC4585](#)], a feedback target may experience transient overload if some event causes a large number of receivers to send feedback at once. This overload is usually avoided by ensuring that feedback reports are forwarded to all receivers, allowing them to avoid sending duplicate feedback reports. However, there are cases where it is not recommended to forward feedback reports, and this may allow feedback implosion. [RFC6642](#) [[RFC6642](#)] memo discusses these cases and defines a new RTCP Third-Party Loss Report that can be used to inform receivers that the feedback target is aware of some loss event, allowing them to suppress feedback.

Associated Session Description Protocol (SDP) signaling is also defined.

Name	Notes	Current	Category
tllei	Not Impacted	M	NORMAL
pslei	Not Impacted	M	NORMAL

[RFC6642](#) Attribute Analysis

9. Codec Control Messages Analysis

This section analyzes rtcp-fb Codec Control Message [[CCM](#)].

9.1. [RFC5104](#)

Attr Name	Notes	Current	Category
fir	Not Impacted	M	NORMAL
tmmbr	Not Impacted	M	NORMAL
tstr	Not Impacted	M	NORMAL
vbcm	Not Impacted	M	NORMAL

[RFC5104](#) Attribute Analysis

10. group Attribute Analysis

This section analyzes SDP "group" semantics [[GROUP-SEM](#)].

10.1. [RFC5888](#)

[RFC5888](#) [[RFC5888](#)] defines a framework to group "m" lines in the Session Description Protocol (SDP) for different purposes.

Name	Notes	Current	Category
group:LS	Not Impacted	S	NORMAL
group:FID	Not Impacted	S	NORMAL

[RFC5888](#) Attribute Analysis

10.2. [RFC3524](#)

[RFC3524](#) [[RFC3524](#)] defines an extension to the Session Description Protocol (SDP) grouping framework. It allows requesting a group of media streams to be mapped into a single resource reservation flow. The SDP syntax needed is defined, as well as a new "semantics" attribute called Single Reservation Flow (SRF).

Name	Notes	Current	Category
group:SRF	Not Impacted	S	NORMAL

[RFC3524](#) Attribute Analysis

10.3. [RFC4091](#)

[RFC4091](#) [[RFC4091](#)] defines the Alternative Network Address Types (ANAT) semantics for the Session Description Protocol (SDP) grouping framework. The ANAT semantics allow alternative types of network addresses to establish a particular media stream.

Name	Notes	Current	Category
group:ANAT	Not Impacted	S	NOT RECOMMENDED

[RFC4091](#) Attribute Analysis

10.4. [RFC5956](#)

[RFC5956](#) [[RFC5956](#)] defines the semantics for grouping the associated source and FEC-based (Forward Error Correction) repair flows in the Session Description Protocol (SDP). The semantics defined in the document are to be used with the SDP Grouping Framework ([RFC 5888](#)). These semantics allow the description of grouping relationships between the source and repair flows when one or more source and/or repair flows are associated in the same group, and they provide support for additive repair flows. SSRC-level (Synchronization Source) grouping semantics are also defined in this document for Real-time Transport Protocol (RTP) streams using SSRC multiplexing.

Name	Notes	Current	Category
group:FEC-FR	Not Impacted	S	NORMAL

[RFC5956](#) Attribute Analysis**10.5. [RFC5583](#)**

[RFC5583](#) [[RFC5583](#)] defines semantics that allow for signaling the decoding dependency of different media descriptions with the same media type in the Session Description Protocol (SDP). This is required, for example, if media data is separated and transported in different network streams as a result of the use of a layered or multiple descriptive media coding process.

Name	Notes	Current	Category
depend lay	Not Impacted	M	NORMAL
depend mdc	Not Impacted	M	NORMAL

[RFC5583](#) Attribute Analysis**11. [ssrc-group](#) Attribute Analysis**

This section analyzes "ssrc-group" semantics [[SSRC-GROUP](#)].

11.1. [RFC5576](#)

Name	Notes	Current	Category
FID	Not Impacted	M	NORMAL
FEC	Not Impacted	M	NORMAL
FEC-FR	Not Impacted	M	NORMAL

[RFC5576](#) Attribute Analysis**12. QoS Mechanism Token Analysis**

This section analyzes QoS tokens specified with SDP[QOS].

12.1. [RFC5432](#)

Name	Notes	Current	Category
rsvp	Not Impacted	B	NORMAL
nsis	Not Impacted	B	NORMAL

[RFC5432](#) Attribute Analysis**13. k= Attribute Analysis****13.1. [RFC4566](#)**

Name	Notes	Current	Category
k=	It is NOT recommended to use this attribute	S	NOT RECOMMENDED

[RFC4566](#) Attribute Analysis

14. content Attribute Analysis

14.1. [RFC4796](#)

Name	Notes	Current	Category
content:slides	Not Impacted	M	NORMAL
content:speaker	Not Impacted	M	NORMAL
content:main	Not Impacted	M	NORMAL
content:sl	Not Impacted	M	NORMAL
content:alt	Not Impacted	M	NORMAL

[RFC4796](#) Attribute Analysis

15. Payload Formats

15.1. [RFC5109](#)

[RFC5109](#) [[RFC5109](#)] describes a payload format for generic Forward Error Correction (FEC) for media data encapsulated in RTP. It is based on the exclusive-or (parity) operation. The payload format allows end systems to apply protection using various protection lengths and levels, in addition to using various protection group sizes to adapt to different media and channel characteristics. It enables complete recovery of the protected packets or partial recovery of the critical parts of the payload depending on the packet loss situation.

Name	Notes	Current	Category
audio/ulpfec	Not recommended for multiplexing due to reuse of SSRCs	M	NOT RECOMMENDED
video/ulpfec	Not recommended for multiplexing due to reuse of SSRCs	M	NOT RECOMMENDED

text/ulpfec	Not recommended	M	NOT
	for multiplexing		RECOMMENDED
	due to reuse of		
	SSRCs		
application/ulpfec	Not recommended	M	NOT
	for multiplexing		RECOMMENDED
	due to reuse of		
	SSRCs		
+-----+	+-----+	+-----+	+-----+

[RFC5109](#) Payload Format Analysis

Draft [draft-lennox-payload-ulp-ssrc-mux](#) proposes a simple fix to make it possible to use ULP with multiplexing and ULP is allowed when used with that.

16. IANA Considerations

IANA shall register categories from this specification by expanding the Session Description Protocol (SDP) Parameters table with a column listing categories against each SDP parameter.

+-----+
Category
+-----+
NORMAL
+-----+
NOT RECOMMENDED
+-----+
IDENTICAL
+-----+
TRANSPORT
+-----+
SPECIAL
+-----+

17. Security Considerations

All the attributes which involve security key needs a careful review to ensure two-time pad vulnerability is not created

18. Acknowledgments

I would like to thank Cullen Jennings for suggesting the categories, contributing text and helping review the draft.

19. Change Log

[RFC EDITOR NOTE: Please remove this section when publishing]

Changes from [draft-nandakumar-mmusic-mux-attributes-01](#)

- o Replaced Category BAD with NOT RECOMMENDED.
- o Added Category TBD.
- o Updated IANA Consideration Section.

Changes from [draft-nandakumar-mmusic-mux-attributes-00](#)

- o Added new section for dealing with FEC payload types.

20. References

20.1. Normative References

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

[RFC4566] Handley, M., Jacobson, V., and C. Perkins, "SDP: Session Description Protocol", [RFC 4566](#), July 2006.

20.2. Informative References

[3GPP TS 24.182]

"IP Multimedia Subsystem (IMS) Customized Alerting Tones (CAT); Protocol specification",
<<http://www.3gpp.org/ftp/Specs/html-info/24182.htm>>.

[3GPP TS 24.183]

"IP Multimedia Subsystem (IMS) Customized Ringing Signal (CRS); Protocol specification",
<<http://www.3gpp.org/ftp/Specs/html-info/24183.htm>>.

[3GPP TS 24.229]

"IP multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP);",
<<http://www.3gpp.org/ftp/Specs/html-info/24229.htm>>.

[ACK-NACK]

- "Session Description Protocol (SDP) RTCP ACK/NACK Feedback attributes", <<http://www.iana.org/assignments/sdp-parameters/sdp-parameters.xml#sdp-parameters-15>>.
- [CCM] "Session Description Protocol (SDP) RTCP-FB Codec Control Messages", <<http://www.iana.org/assignments/sdp-parameters/sdp-parameters.xml#sdp-parameters-19>>.
- [GROUP-SEM] "Session Description Protocol (SDP) "group" semantics", <<http://www.iana.org/assignments/sdp-parameters/sdp-parameters.xml#sdp-parameters-13>>.
- [H.248.15] "Gateway control protocol: SDP H.248 package attribute", <<http://www.itu.int/rec/T-REC-H.248.15>>.
- [I-D.ietf-avt-multiplexing-rtp] El-Khatib, K., Luo, G., Bochmann, G., and Pinjiang. Feng, "Multiplexing Scheme for RTP Flows between Access Routers", Internet-Draft <http://tools.ietf.org/html/draft-ietf-avt-multiplexing-rtp-01>, October 1999.
- [I-D.ietf-mmusic-sdp-bundle-negotiation] Holmberg, C., Alvestrand, H., and C. Jennings, "Multiplexing Negotiation Using Session Description Protocol (SDP) Port Numbers", [draft-ietf-mmusic-sdp-bundle-negotiation-03](http://tools.ietf.org/html/draft-ietf-mmusic-sdp-bundle-negotiation-03) (work in progress), February 2013.
- [IANA] "Session Description Protocol (SDP) Parameters", <<http://www.iana.org/assignments/sdp-parameters/sdp-parameters.xml>>.
- [MEDIA_CAP] Kaplan, H., Hedayat, K., and N. Venna, "Session Description Protocol (SDP) Media Capabilities Negotiation", [draft-ietf-mmusic-sdp-media-capabilities-17](http://tools.ietf.org/html/draft-ietf-mmusic-sdp-media-capabilities-17) (work in progress), January 2013.
- [MEDIA_LOOPBACK] Kaplan, H., Hedayat, K., Venna, N., Jones, P., and N. Stratton, "An Extension to the Session Description Protocol (SDP) and Real-time Transport Protocol (RTP) for Media Loopback", [draft-ietf-mmusic-media-loopback-27](http://tools.ietf.org/html/draft-ietf-mmusic-media-loopback-27) (work in progress), January 2013.
- [QOS] "Session Description Protocol (SDP) QoS Mechanism Tokens",

<<http://www.iana.org/assignments/sdp-parameters/sdp-parameters.xml#sdp-parameters-20>>.

- [RFC3108] Kumar, R. and M. Mostafa, "Conventions for the use of the Session Description Protocol (SDP) for ATM Bearer Connections", [RFC 3108](#), May 2001.
- [RFC3264] Rosenberg, J. and H. Schulzrinne, "An Offer/Answer Model with Session Description Protocol (SDP)", [RFC 3264](#), June 2002.
- [RFC3407] Andreasen, F., "Session Description Protocol (SDP) Simple Capability Declaration", [RFC 3407](#), October 2002.
- [RFC3524] Camarillo, G. and A. Monrad, "Mapping of Media Streams to Resource Reservation Flows", [RFC 3524](#), April 2003.
- [RFC3556] Casner, S., "Session Description Protocol (SDP) Bandwidth Modifiers for RTP Control Protocol (RTCP) Bandwidth", [RFC 3556](#), July 2003.
- [RFC3605] Huitema, C., "Real Time Control Protocol (RTCP) attribute in Session Description Protocol (SDP)", [RFC 3605](#), October 2003.
- [RFC3611] Friedman, T., Caceres, R., and A. Clark, "RTP Control Protocol Extended Reports (RTCP XR)", [RFC 3611](#), November 2003.
- [RFC3890] Westerlund, M., "A Transport Independent Bandwidth Modifier for the Session Description Protocol (SDP)", [RFC 3890](#), September 2004.
- [RFC4091] Camarillo, G. and J. Rosenberg, "The Alternative Network Address Types (ANAT) Semantics for the Session Description Protocol (SDP) Grouping Framework", [RFC 4091](#), June 2005.
- [RFC4145] Yon, D. and G. Camarillo, "TCP-Based Media Transport in the Session Description Protocol (SDP)", [RFC 4145](#), September 2005.
- [RFC4567] Arkko, J., Lindholm, F., Naslund, M., Norrman, K., and E. Carrara, "Key Management Extensions for Session Description Protocol (SDP) and Real Time Streaming Protocol (RTSP)", [RFC 4567](#), July 2006.
- [RFC4568] Andreasen, F., Baugher, M., and D. Wing, "Session Description Protocol (SDP) Security Descriptions for Media

Streams", [RFC 4568](#), July 2006.

- [RFC4570] Quinn, B. and R. Finlayson, "Session Description Protocol (SDP) Source Filters", [RFC 4570](#), July 2006.
- [RFC4572] Lennox, J., "Connection-Oriented Media Transport over the Transport Layer Security (TLS) Protocol in the Session Description Protocol (SDP)", [RFC 4572](#), July 2006.
- [RFC4574] Levin, O. and G. Camarillo, "The Session Description Protocol (SDP) Label Attribute", [RFC 4574](#), August 2006.
- [RFC4583] Camarillo, G., "Session Description Protocol (SDP) Format for Binary Floor Control Protocol (BFCP) Streams", [RFC 4583](#), November 2006.
- [RFC4585] Ott, J., Wenger, S., Sato, N., Burmeister, C., and J. Rey, "Extended RTP Profile for Real-time Transport Control Protocol (RTCP)-Based Feedback (RTP/AVPF)", [RFC 4585](#), July 2006.
- [RFC4796] Hautakorpi, J. and G. Camarillo, "The Session Description Protocol (SDP) Content Attribute", [RFC 4796](#), February 2007.
- [RFC4975] Campbell, B., Mahy, R., and C. Jennings, "The Message Session Relay Protocol (MSRP)", [RFC 4975](#), September 2007.
- [RFC5104] Wenger, S., Chandra, U., Westerlund, M., and B. Burman, "Codec Control Messages in the RTP Audio-Visual Profile with Feedback (AVPF)", [RFC 5104](#), February 2008.
- [RFC5109] Li, A., "RTP Payload Format for Generic Forward Error Correction", [RFC 5109](#), December 2007.
- [RFC5159] Dondeti, L. and A. Jerichow, "Session Description Protocol (SDP) Attributes for Open Mobile Alliance (OMA) Broadcast (BCAST) Service and Content Protection", [RFC 5159](#), March 2008.
- [RFC5245] Rosenberg, J., "Interactive Connectivity Establishment (ICE): A Protocol for Network Address Translator (NAT) Traversal for Offer/Answer Protocols", [RFC 5245](#), July 2006.
- [RFC5285] Singer, D. and H. Desineni, "A General Mechanism for RTP Header Extensions", [RFC 5285](#), July 2008.

- [RFC5432] Polk, J., Dhesikan, S., and G. Camarillo, "Quality of Service (QoS) Mechanism Selection in the Session Description Protocol (SDP)", [RFC 5432](#), March 2009.
- [RFC5506] Johansson, I., "Support for Reduced-Size Real-Time Transport Control Protocol (RTCP): Opportunities and Consequences", [RFC 5506](#), April 2009.
- [RFC5547] Garcia-Martin, M., Isomaki, M., Camarillo, G., Loreto, S., and P. Kyzivat, "A Session Description Protocol (SDP) Offer/Answer Mechanism to Enable File Transfer", [RFC 5547](#), May 2009.
- [RFC5576] Lennox, J., Ott, J., and T. Schierl, "Source-Specific Media Attributes in the Session Description Protocol (SDP)", [RFC 5576](#), June 2009.
- [RFC5583] Schierl, T. and S. Wenger, "Signaling Media Decoding Dependency in the Session Description Protocol (SDP)", [RFC 5583](#), July 2009.
- [RFC5760] Ott, J., Chesterfield, J., and E. Schooler, "RTP Control Protocol (RTCP) Extensions for Single-Source Multicast Sessions with Unicast Feedback", [RFC 5760](#), February 2010.
- [RFC5761] Perkins, C. and M. Westerlund, "Multiplexing RTP Data and Control Packets on a Single Port", [RFC 5761](#), April 2010.
- [RFC5762] Perkins, C., "RTP and the Datagram Congestion Control Protocol (DCCP)", [RFC 5762](#), April 2010.
- [RFC5763] Fischl, J., Tschofenig, H., and E. Rescorla, "Framework for Establishing a Secure Real-time Transport Protocol (SRTP) Security Context Using Datagram Transport Layer Security (DTLS)", [RFC 5763](#), May 2010.
- [RFC5888] Camarillo, G. and H. Schulzrinne, "The Session Description Protocol (SDP) Grouping Framework", [RFC 5888](#), June 2010.
- [RFC5939] Andreasen, F., "Session Description Protocol (SDP) Capability Negotiation", [RFC 5939](#), September 2010.
- [RFC5956] Begen, A., "Forward Error Correction Grouping Semantics in the Session Description Protocol", [RFC 5956](#), September 2010.
- [RFC6064] Westerlund, M. and P. Frojdh, "SDP and RTSP Extensions Defined for 3GPP Packet-Switched Streaming Service and

Multimedia Broadcast/Multicast Service", [RFC 6064](#), January 2011.

- [RFC6128] Begen, A., "RTP Control Protocol (RTCP) Port for Source-Specific Multicast (SSM) Sessions", [RFC 6128](#), February 2011.
- [RFC6189] Zimmermann, P., Johnston, A., and J. Callas, "ZRTP: Media Path Key Agreement for Unicast Secure RTP", [RFC 6189](#), April 2011.
- [RFC6193] Saito, M., Wing, D., and M. Toyama, "Media Description for the Internet Key Exchange Protocol (IKE) in the Session Description Protocol (SDP)", [RFC 6193](#), April 2011.
- [RFC6230] Boulton, C., Melanchuk, T., and S. McGlashan, "Media Control Channel Framework", [RFC 6230](#), May 2011.
- [RFC6236] Johansson, I. and K. Jung, "Negotiation of Generic Image Attributes in the Session Description Protocol (SDP)", [RFC 6236](#), May 2011.
- [RFC6284] Begen, A., Wing, D., and T. Van Caenegem, "Port Mapping between Unicast and Multicast RTP Sessions", [RFC 6284](#), June 2011.
- [RFC6285] Ver Steeg, B., Begen, A., Van Caenegem, T., and Z. Vax, "Unicast-Based Rapid Acquisition of Multicast RTP Sessions", [RFC 6285](#), June 2011.
- [RFC6364] Begen, A., "Session Description Protocol Elements for the Forward Error Correction (FEC) Framework", [RFC 6364](#), October 2011.
- [RFC6642] Wu, Q., Xia, F., and R. Even, "RTP Control Protocol (RTCP) Extension for a Third-Party Loss Report", [RFC 6642](#), June 2012.
- [RFC6679] Westerlund, M., Johansson, I., Perkins, C., O'Hanlon, P., and K. Carlberg, "Explicit Congestion Notification (ECN) for RTP over UDP", [RFC 6679](#), August 2012.
- [RFC6714] Holmberg, C., Blau, S., and E. Burger, "Connection Establishment for Media Anchoring (CEMA) for the Message Session Relay Protocol (MSRP)", [RFC 6714](#), August 2012.
- [RFC6773] Phelan, T., Fairhurst, G., and C. Perkins, "DCCP-UDP: A Datagram Congestion Control Protocol UDP Encapsulation for

NAT Traversal", [RFC 6773](#), November 2012.

[RFC6787] Burnett, D. and S. Shanmugham, "Media Resource Control Protocol Version 2 (MRCPv2)", [RFC 6787](#), November 2012.

[RTCP-FB] "Session Description Protocol (SDP) RTCP Feedback attributes", <<http://www.iana.org/assignments/sdp-parameters/sdp-parameters.xml#sdp-parameters-14>>.

[SSRC-GROUP]
"Session Description Protocol (SDP) "ssrc-group" semantics", <<http://www.iana.org/assignments/sdp-parameters/sdp-parameters.xml#sdp-parameters-17>>.

[T.38] "Procedures for real-time Group 3 facsimile communication over IP networks", <<http://www.itu.int/rec/T-REC-T.38/e>>.

Author's Address

Suhas Nandakumar
Cisco
170 West Tasman Drive
San Jose, CA 95134
USA

Email: snandaku@cisco.com

