        Multiplexed Media Types (MMT) Using Session Description Protocol (SDP)
                              Port Numbers
              draft-holmberg-mmusic-sdp-mmt-negotiation-00.txt

Abstract

   This specification defines a new SDP Grouping Framework SDP grouping
   framework extension, "MMT", and a new SDP media type, "anymedia".
   Together they can be used with the Session Description Protocol (SDP)
   Offer/Answer mechanism to negotiate the usage of multiplexed media
   types, which refers to the usage of a single 5-tuple for different
   media types.

   This specification also defined a new SDP attribute, "mmtype", which
   can be used within a "anymedia" SDP Media Description to map PT
   (Payload Type) values to a specific media type.

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1. Introduction

   In the IETF RTCWEB WG, a need to use a single 5-tuple for sending and
   receiving media associated with multiple SDP Media Descriptions
   [RFC4566] has been identified. This would e.g. allow the usage of a
   single set of Interactive Connectivity Establishment (ICE) [RFC5245]
   candidates for multiple media descriptions. Normally different media
   types (audio, video etc) will be described using different SDP Media
   Descriptions.

   As defined in RFC 4566 [RFC4566], the semantics of using the same
   port number for multiple SDP Media Descriptions is undefined.
   Therefore, in order to be able to use the same port value for
   multiple media types, it must be possible to describe multiple media
   types within a single SDP Media Description.

   This specification defines a new SDP Grouping Framework SDP grouping
   framework [RFC5888] extension, "MMT", and a new SDP media type,
   "anymedia". Together they can be used with the Session Description
   Protocol (SDP) Offer/Answer mechanism [RFC3264] to negotiate the
   usage of multiplexed media types, which refers to the usage of a
   single 5-tuple for different media types.

   This specification also defined a new SDP attribute, "mmtype", which
   can be used within a "anymedia" SDP Media Description to map PT
   (Payload Type) values to a specific media type.

   When an endpoint generates an SDP Offer or SDP Answer, which
   includeds one or more "MMT" groups, each group will contain one
   "anymedia" SDP Media Description and one or more SDP Media
   Descriptions for specific media types (audio, video, etc).

   When media is transported using the Real-Time Protocol (RTP)
   [RFC3550], each SDP Media Description is assumed to form a separate
   RTP Session [RFC3550]. The same applies to media associated with a
   "anymedia" SDP Media Description, ie all media types associated with
   a "anymedia" SDP Media Description is by default assumed to form a
   single RTP Session.

   The mechanism is backward compatible. Entities that do not support
   (or, for a given session, are not willing to use) the "MMT" grouping
   extension and the "anymedia" media type, are expected to generate an
   SDP Answer, which does not contain a "MMT" group, and where the
   "anymedia" SDP Media Description is rejected.

2. Terminology

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].

5-tuple: A collection of the following values: source address, source
port, destination address, destination port and protocol.

Multiplexed media types: Two or more RTP streams, possibly of
different media types, using a single 5-tuple. The RTCP streams
associated with the RTP streams also use a single 5-tuple, which
might be the same, but can also be different, as the one used by the
RTP streams.

3. Conventions

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 BCP 14, RFC 2119
[RFC2119].

4. Applicability Statement

The mechanism in this specification only applies to the Session
Description Protocol (SDP) [RFC4566], when used together with the SDP
Offer/Answer mechanism [RFC3264].

5. SDP Grouping Framework MMT Extension Semantics

5.1. General

This section defines a new SDP Grouping Framework extension, "MMT".

The "MMT" extension can be indicated using a "group" SDP session-
level attribute. Each SDP Media Description ("m=" line) that is
grouped together, using a "mid" SDP media-level attribute, is part of
a specific "MMT" group.

A "MMT" group is not usable standalone. It MUST be used together
with a "anymedia" SDP Media Description.

5.2. Usage

5.2.1. General

A "MMT" group MUST contain a "anymedia" SDP Media Description, and at least one SDP Media Description for a specific SDP Media Type (audio, video, etc).

An SDP Offerer [RFC3264] uses the "MMT" group to offer at least one SDP Media Description for specific SDP Media Types, and a "anymedia" SDP Media Description, which can contain multiple SDP Media Types sharing a single SDP Media Description. From a "MMT" group the SDP Answerer [RFC3264] will accept either the SDP Media Descriptions for the specific SDP Media Types, or the "anymedia" SDP Media Description.

It is RECOMMENDED that the capabilities of the "anymedia" SDP Media Description match the capabilities (codecs, RTCP multiplexing etc) of the SDP Media Descriptions for the specific SDP Media Types, in order to provide the same capabilities no matter whether SDP Media Descriptions for specific SDP Media Types, or the "anymedia" SDP Media Description, is used to establish the session.

NOTE: An SDP Message Body can contain multiple "MMT" groups.

5.2.2. SDP Offer/Answer Usage

5.2.2.1. SDP Offererer Procedures

When an SDP Offerer generates an SDP Offer, which contains one or more "MMT" groups, for each "MMT" group the SDP Offerer MUST:

1) Include a "anymedia" SDP Media Description; and

2) Include at least one SDP Media Description for a specific media type (audio, video, etc).

5.2.2.2. SDP Answerer Procedures

When an SDP Answerer generates an SDP Answer, for each "MMT" group in the associated SDP Offer it MUST either:

1) Accept the "anymedia" SDP Media Description, and reject all other SDP Media Descriptions associated with the "MMT" group; or

2) Reject the "anymedia" SDP Media Description, and accept some or all of the other SDP Media Descriptions associated with the MMT group.

NOTE: As described in [RFC3264], an SDP Media Description can be
rejected by setting the port value of the associated m- line to zero
in the SDP Answer.

NOTE: As described in [RFC3264] the SDP Answer must contain the same
number of SDP Media Descriptions as the associated SDP Offer.

6. anymedia SDP Media Type

6.1. General

This section describes a new SDP media type [RFC4566], "anymedia",
for SDP Media Descriptions [RFC4566]. "anymedia" does not refer to a
specific media type, but allows multiple media types (audio, video
etc) to be associated with a single SDP Media Description. All media
associated with a "anymedia" SDP Media Description will share the
same IP address+port, protocol (e.g. RTP/AVP) and other information
(e.g. ICE candidates) associated with the SDP Media Description. It
allows, if both endpoints support the mechanism, multiple media typex
to be multiplexed on a single 5-tuple. PT (Payload Type) values will
be listed in a normal fashion in the format list of the SDP Media
Description. The SDP rtpmap attribute [RFC4566] will be used in a
normal fashion to map each PT to a codec, and the SDP mmtype
attribute will be used to map each PT to a specific media type (e.g.
audio, video, etc).

Within a "anymedia" SDP Media Description, each PT value SHOULD be
described using an "rtpmap" SDP Attribute [RFC4566], even if the PT
value is static. In addition, as it might not always be possible to
retreive the media type from the "rtpmap" SDP Attribute value, each
PT value MUST be mapped to a specific media type, using the "mmtype"
SDP Attribute.

6.2. SDP Extensions

OPEN ISSUE: Which, if any, SDP Extensions shall we require support
of?

6.3. SDP Attributes

In a normal fashion, any media level SDP Attribute (e.g. the
directionality attributes) associated with the "anymedia" SDP Media
Description applies to all media associated with the SDP Media
Description.

NOTE: Additional extensions are needed in order to specify SDP
Attribute values for individual media types, or individual media

sources, associated with the "anymedia" SDP Media Description.

6.4. Bandwidth

The SDP bandwidth parameter, b=, is used in a normal fashion, as
described in [RFC4566]

NOTE: Additional extensions are needed in order to specify SDP
Bandwidth values for individual media types, and for a specific media
direction.

6.5. ICE Usage

ICE [RFC5245], if supported, will be used in a normal fashion, and
the ICE Candidate information will apply to all media types
associated with the "anymedia" SDP Media Description.

6.6. RTP Sessions

By default, all media associated with a "anymedia" SDP Media
Description is considered to be part of a single RTP Session
[RFC3550].

7. mmtype SDP attribute

7.1. General

This section defines a new SDP media level attribute [RFC4566],
"mmtype" (Multiplexed Media Type). The attribute is used within
"anymedia" SDP Media Descriptions to indicate the media type
associated with a specific PT value.

7.2. Syntax

a=mmtype: format media

format and media as defined in [RFC4566].

7.3. Usage

7.3.1. General

The attribute is used within "anymedia" SDP Media Descriptions to
indicate the media type associated with a specific PT value. This
specification does not define the usage of the attribute within other
types of SDP Media Descriptions.

For each instance of the "mmtype" attribute, the associated PT value
MUST also be listed in the format list of the associated SDP m- line.
Within a given SDP Media Description, there MUST only be one 'mmtype'
attribute associated with a given PT value. An entity MUST either
reject or discard an SDP Media Description that contains 'mmtype'
attributes with PT values not listed in the associated m- line. An
entity MUST either reject or discard an SDP Media Description that
contains multiple 'mmtype' attributes for the same PT value.

7.3.2. SDP Offer/Answer Usage

There are no SDP Offer/Answer specific procedures defined for the
"mmtype" SDP attribute.

8. Security Considerations

TBA

9. Example

The example below shows an SDP Offer, where multiplexed media types
is offered. The example also shows two SDP Answer alternatives: one
where multiplexed media types is accepted, and one where multiplexed
media types is rejected (or, not even supported) by the SDP Answerer.

SDP Offer (multiplexed media types offered)

```
v=0
o=alice 2890844526 2890844526 IN IP4 host.atlanta.com
s=
c=IN IP4 host.atlanta.com
t=0 0
a=group:MMT foo bar zoe
m=audio 10000 RTP/AVP 0 8 97
a=mid:foo
b=AS:200
a=rtpmap:0 PCMU/8000
a=rtpmap:8 PCMA/8000
a=rtpmap:97 iLBC/8000
m=video 20000 RTP/AVP 31 32
a=mid:bar
b=AS:1000
a=rtpmap:31 H261/90000
a=rtpmap:32 MPV/90000
m=anymedia 30000 RTP/AVP 0 8 97 31 32
a=mid:zoe
```

```
        a=rtpmap:0 PCMU/8000
        a=rtpmap:8 PCMA/8000
        a=rtpmap:97 iLBC/8000
        a=rtpmap:31 H261/90000
        a=rtpmap:32 MPV/90000
        a=mmtype: 0 audio
        a=mmtype: 8 audio
        a=mmtype: 97 audio
        a=mmtype: 31 video
        a=mmtype: 32 video

   SDP Answer (multiplexed media types accepted)

        v=0
        o=bob 2808844564 2808844564 IN IP4 host.biloxi.com
        s=
        c=IN IP4 host.biloxi.com
        t=0 0
        a=group:MMT foo bar
        m=audio 0 RTP/AVP 0
        a=mid:foo
        a=rtpmap:0 PCMU/8000
        m=video 0 RTP/AVP 32
        a=mid:bar
        a=rtpmap:32 MPV/90000
        m=anymedia 60000 RTP/AVP 0 32
        a=mid:zoe
        a=rtpmap:0 PCMU/8000
        a=rtpmap:32 MPV/90000
        a=mmtype: 0 audio
        a=mmtype: 32 video


   SDP Answer (multiplexed media types not accepted)

        v=0
        o=bob 2808844564 2808844564 IN IP4 host.biloxi.com
        s=
        c=IN IP4 host.biloxi.com
        t=0 0
        a=group:MMT foo bar
        m=audio 40000 RTP/AVP 0
        a=mid:foo
        a=rtpmap:0 PCMU/8000
        m=video 50000 RTP/AVP 32
        a=mid:bar
        a=rtpmap:32 MPV/90000
        m=anymedia 0 RTP/AVP 0 32
```

```
     a=mid:zoe


SDP Offer with ICE (multiplexed media types offered)

     v=0
     o=alice 2890844526 2890844526 IN IP4 host.atlanta.com
     s=
     c=IN IP4 host.atlanta.com
     t=0 0
     a=group:MMT foo bar zoe
     m=audio 10000 RTP/AVP 0 8 97
     a=mid:foo
     b=AS:200
     a=rtpmap:0 PCMU/8000
     a=rtpmap:8 PCMA/8000
     a=rtpmap:97 iLBC/8000
     a=candidate:1 1 UDP 1694498815 host.atlanta.com 10000 typ host
     m=video 20000 RTP/AVP 31 32
     a=mid:bar
     b=AS:1000
     a=rtpmap:31 H261/90000
     a=rtpmap:32 MPV/90000
     a=candidate:1 1 UDP 1694498815 host.atlanta.com 20000 typ host
     m=anymedia 30000 RTP/AVP 0 8 97 31 32
     a=mid:zoe
     a=rtpmap:0 PCMU/8000
     a=rtpmap:8 PCMA/8000
     a=rtpmap:97 iLBC/8000
     a=rtpmap:31 H261/90000
     a=rtpmap:32 MPV/9000
     a=mmtype: 0 audio
     a=mmtype: 8 audio
     a=mmtype: 97 audio
     a=mmtype: 31 video
     a=mmtype: 32 video
     a=candidate:1 1 UDP 1694498815 host.atlanta.com 30000 typ host
```

[10]. IANA Considerations

This document requests IANA to register the new SDP Grouping semantic
extension called MMT.

11. Acknowledgements

The usage of the SDP grouping mechanism is based on a similar
alternative proposed by Harald Alvestrand. The SDP examples are also
modified versions from the ones in the Alvestrand proposal.

The usage of a dedicated SDP media type to described multiplexed
media types types is based on input from Jonathan Lennox.

12. Change Log

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

Changes from draft-holmberg-mmusic-sdp-mmt-negotiation-xx
o Add change.

13. References

13.1. Normative References

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