Multiplexing Negotiation Using Session Description Protocol (SDP) Port Numbers
draft-holmberg-mmusic-sdp-multiplex-negotiation-00.txt

Abstract

This document defines how to use the Session Description Protocol (SDP) in order to negotiate the usage of multiplexed media.

Status of this Memo

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<u>1.</u> Introduction

In the IETF RTCWEB WG, a need for media multiplexing has been
identified. In order to be able to establish media sessions with
entities that do not support multiplexing, there needs to be a
mechanism to negotiate whether multiplexing will be used or not.
This document defines a mechanism to negotiate the usage of
multiplexing using the Session Description Protocol (SDP) <u>[RFC4566]</u>, by
indicating identical "m=" line port number values to every media stream
that would be part of a multiplex.
As defined in RFC 4566, the semantics of multiple "m=" lines using the
same transport address are undefined, and there is no grouping defined
by such means. Instead, an explicit grouping mechanism needs to be used
to express the intended semantics. Therefore, this specification
defines an SDP grouping framework <u>[RFC5888]</u> extension, MULTIPLEX, which
is used to group media that is part of a multiplex.
The mechanism is backward compatible. Entities that do not support the
MULTIPLEX grouping extension, or do not want to enable multiplexing
within the session associated with the SDP offer, are expected to
generate a "normal" SDP answer, are expected to generate a "normal" SDP
answer, using different port numbers for each "m=" line, to the SDP
offer. The offerer will still use a single port for each media, but as
the answerer will use separate ports there will be no multiplexing of
media between the endpoints.

2. 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].

3. Applicability Statement

The mechanism in this specification only applies to SDP, when used together with the SDP offer/answer media negotiation mechanism [RFC3264].

4. SDP Grouping Framework MULTIPLEX Extension Semantics

This section defines a new SDP Grouping Framework extension, MULTIPLEX. The MULTIPEX extension can be indicated using an SDP session-level "a=group" attribute. Every "m=" line that is grouped together, using an SDP media-level "a=mid" attribute, is part of a specific multiplex. OPEN ISSUE: We need a reference to the specification defining the actual multiplexing mechanism.

5. SDP Offer/Answer Procedures

5.1. General

This section defines the SDP offer/answer procedures for negotiating the usage of multiplexing.

5.2. SDP Offerer Procedures

When an SDP offerer wants to offer multiplexed media, it inserts the same port number value for each "m=" line that is part of the offered multiplex. In addition, the SDP offerer inserts an SDP session-level "a=group" attribute, with a "MULTIPLEX" value, and assigns an SDP media-level "a=mid" attribute value for each "m=" line that is part of the offered multiplex.
NOTE: If the SDP offerer wants to disable a specific stream within a multiplex, it will use a zero port number value for the "m=" line associated with the stream.
If the associated SDP answer includes the session-level "a=group" attribute, with a "MULTIPLEX" value, and associated "m=" lines with identical port number values, the SDP offerer can enable media multiplexing between the entities.
If the associated SDP does not include the session-level "a=group" attribute, with a "MULTIPLEX" value, the SDP offerer MUST NUT enable media multiplexing between the entities, even if two or more "m=" lines in the SDP answer contain identical port number values.
If the SDP answer indicates that multiplexing will not be enabled, the offerer will still receive multiple media on the single port that it

included in the SDP offer, and it normally will be able to separate
each individual media. The default mechanism for doing this is by using
a 5-tuple based mapping for each individual media. If the offerer is
aware of the SSRC values that the remote peer will use in the media it
sends, and the values will be unique for each media, the offerer can
also separate media based on the SSRC values.
NOTE: Assuming symmetric media is used, the offerer can use the port
information from the SDP answer in order to create the 5-tuple mapping
for each media.
If the offerer is not able to separate multiple media on a single port,
it MUST send a new SDP offer, without using the "MULTIPLEX" grouping,
where each media (m= line) is given a different port number value.
NOTE: If the SDP offer is rejected, and the SDP offerer has reasons to
believe that the rejection is due to the fact that the SDP offer
contained identical "m=" line port number values, the SDP offerer might
send a new SDP offer, without offered multiplex (and with separate port
number values for each "m=" line).

5.3. SDP Answer Procedures

When an SDP answerer receives an SDP offer, offering multiplexing, if
the SDP answerer accepts the offered multiplexing, it MUST include a
session-level "a=group" attribute, with a "MULTIPLEX" value, in the SDP
answer. In addition, the SDP answerer assigns an SDP media-level
"a=mid" attribute value for each "m=" line that is part of the
multiplex.
If the SDP answerer does not accept the offered multiplex, it MUST NOT
include a session-evel "a=group" attribute, with a "MULTIPLEX" value,
in the SDP answer. In addition, it MUST assign separate port number
values for each "m=" line in the SDP answer.
NOTE: If the SDP answerer wants to disable a specific stream within a
multiplex, it will use a zero port number value for the "m=" line
associated with the stream.

6. Usage With ICE

When an entity that supports the Interactive Connectivity Establishment
(ICE) mechanism [RFC5245] sends an SDP offer, it MUST include ICE
candidates for each "m=" line of the SDP offer, even if it offers
multiplexing and the SDP "m=" line port value numbers are identical.
This is true also for subsequent SDP offers, when the usage of
multiplexing has previously been negotiated.
When an entity that supports ICE and multiplexing receives an SDP
offer, offering multiplexing and ICE, if it accepts the multiplex, and
ICE, it MUST include ICE candidates for each "m=" line of the SDP
answer, even if the SDP "m=" line port value numbers are identical.
The candidate information inserted in an SDP offer or answer MUST be
identical for each "m=" line associated with a specific MULTIPLEX SDP
group.

Once the usage of multiplexing has been negotiated, ICE connectivity checks and keep-alives only needs to be performed for the whole multiplex, represented by a MULTIPLEX SDP group, instead of for individual m= lines associated with the multiplex.

7. Security Considerations

TBA

8. Example

The example below shows an SDP offer, where multiplexing is offered. The example also shows two SDP answer alternatives: one where multiplexing is accepted, and one where multiplexing is rejected (or, not even supported) by the SDP answerer.

```
SDP Offer (Multiplexing offered)

    v=0
    o=alice 2890844526 2890844526 IN IP4 host.atlanta.com
    s=
    c=IN IP4 host.atlanta.com
    t=0 0
    a=group:MULTIPLEX foo bar
    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 10000 RTP/AVP 31 32
    a=mid:bar
    b=AS:1000
    a=rtpmap:31 H261/90000
    a=rtpmap:32 MPV/90000


SDP Answer (Multiplexing accepted)

    v=0
    o=bob 2808844564 2808844564 IN IP4 host.biloxi.com
    s=
    c=IN IP4 host.biloxi.com
    t=0 0
    a=group:MULTIPLEX foo bar
    m=audio 20000 RTP/AVP 0
    a=mid:foo
    b=AS:200
    a=rtpmap:0 PCMU/8000
    m=video 20000 RTP/AVP 32
    a=mid:bar
    b=AS:1000
    a=rtpmap:32 MPV/90000


SDP Answer (Multiplexing not accepted)

    v=0
    o=bob 2808844564 2808844564 IN IP4 host.biloxi.com
    s=
    c=IN IP4 host.biloxi.com
    t=0 0
    m=audio 20000 RTP/AVP 0
    b=AS:200
    a=rtpmap:0 PCMU/8000
```

```
   m=video 30000 RTP/AVP 32
   b=AS:1000
   a=rtpmap:32 MPV/90000
```

SDP Offer with ICE (Multiplexing offered)

```
   v=0
   o=alice 2890844526 2890844526 IN IP4 host.atlanta.com
   s=
   c=IN IP4 host.atlanta.com
   t=0 0
   a=group:MULTIPLEX foo bar
   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 10000 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 10000 typ host
```

9. IANA Considerations

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

10. 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.

11. Change Log

[RFC EDITOR NOTE: Please remove this section when publishing]
Changes from draft-holmberg-mmusic-sdp-multiplex-negotiation-xx

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12. References

12.1. Normative References

[RFC2119]	Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, March 1997.
[RFC3261]	Rosenberg, J., Schulzrinne, H., Camarillo, G., Johnston, A., Peterson, J., Sparks, R., Handley, M. and E. Schooler, "SIP: Session Initiation Protocol", RFC 3261, June 2002.
[RFC3264]	Rosenberg, J. and H. Schulzrinne, "An Offer/Answer Model with Session Description Protocol (SDP)", RFC 3264, June 2002.
[RFC4566]	Handley, M., Jacobson, V. and C. Perkins, "SDP: Session Description Protocol", RFC 4566, July 2006.
[RFC5888]	Camarillo, G. and H. Schulzrinne, "The Session Description Protocol (SDP) Grouping Framework", RFC 5888, June 2010.

12.2. Informative References

[RFC5245]	Rosenberg, J., "Interactive Connectivity Establishment (ICE): A Protocol for Network Address Translator (NAT) Traversal for Offer/Answer Protocols", RFC 5245, April 2010.

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