           Session Description Protocol (SDP) Offer/Answer Clarifications
                          for RTP/RTCP Multiplexing

Abstract

   This document updates RFC 5761 by clarifying the SDP offer/answer
   negotiation of RTP and RTP Control Protocol (RTCP) multiplexing. It
   makes it clear that an answerer can only include an "a=rtcp-mux"
   attribute in a Session Description Protocol (SDP) answer if the
   associated SDP offer contained the attribute.

Status of This Memo

   This is an Internet Standards Track document.

   This document is a product of the Internet Engineering Task Force
   (IETF). It represents the consensus of the IETF community. It has
   received public review and has been approved for publication by the
   Internet Engineering Steering Group (IESG). Further information on
   Internet Standards is available in Section 2 of RFC 7841.

   Information about the current status of this document, any errata,
   and how to provide feedback on it may be obtained at
   http://www.rfc-editor.org/info/rfc8035.

Table of Contents

1. Introduction

   RFC 5761 [RFC5761] specifies how to multiplex RTP data packets and
   RTP Control Protocol (RTCP) packets on a single UDP port, and how to
   negotiate usage of such multiplexing using the SDP offer/answer
   mechanism [RFC3264] with an "a=rtcp-mux" attribute. However, the
   text is unclear on whether an answerer is allowed to include the
   attribute in an answer even if the associated offer did not contain
   an attribute.

   This document updates RFC 5761 [RFC5761] by clarifying that an
   answerer can only include an "a=rtcp-mux" attribute in an answer if
   the associated offer contained the attribute. It also clarifies that
   the negotiation of RTP and RTCP multiplexing is for usage in both
   directions.

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 [RFC2119].

3. Update to RFC 5761

   This section updates Section 5.1.1 of RFC 5761 by clarifying that an
   answerer can only include an "a=rtcp-mux" attribute in an answer if
   the associated offer contained the attribute, and by clarifying that
   the negotiation of RTP and RTCP multiplexing is for usage in both
   directions.

3.1. Update to Section 5.1.1

   In this section, any references to Sections 4 and 8 are to those
   sections in [RFC5761].

   OLD TEXT:

   When the Session Description Protocol (SDP) [8] is used to negotiate
   RTP sessions following the offer/answer model [9], the "a=rtcp-mux"
   attribute (see Section 8) indicates the desire to multiplex RTP and
   RTCP onto a single port. The initial SDP offer MUST include this
   attribute at the media level to request multiplexing of RTP and RTCP
   on a single port. For example:

      v=0
      o=csp 1153134164 1153134164 IN IP6 2001:DB8::211:24ff:fea3:7a2e
      s=-
      c=IN IP6 2001:DB8::211:24ff:fea3:7a2e
      t=1153134164 1153137764
      m=audio 49170 RTP/AVP 97
      a=rtpmap:97 iLBC/8000
      a=rtcp-mux

   This offer denotes a unicast voice-over-IP session using the RTP/AVP
   profile with iLBC coding. The answerer is requested to send both RTP
   and RTCP to port 49170 on IPv6 address 2001:DB8::211:24ff:fea3:7a2e.

   If the answerer wishes to multiplex RTP and RTCP onto a single port,
   it MUST include a media-level "a=rtcp-mux" attribute in the answer.
   The RTP payload types used in the answer MUST conform to the rules in
   Section 4.

   If the answer does not contain an "a=rtcp-mux" attribute, the offerer
   MUST NOT multiplex RTP and RTCP packets on a single port. Instead,
   it should send and receive RTCP on a port allocated according to the
   usual port-selection rules (either the port pair, or a signalled port
   if the "a=rtcp:" attribute [10] is also included). This will occur
   when talking to a peer that does not understand the "a=rtcp-mux"
   attribute.

   When SDP is used in a declarative manner, the presence of an
   "a=rtcp-mux" attribute signals that the sender will multiplex RTP and
   RTCP on the same port. The receiver MUST be prepared to receive RTCP
   packets on the RTP port, and any resource reservation needs to be
   made including the RTCP bandwidth.

NEW TEXT:

When the Session Description Protocol (SDP) [8] is used to negotiate
RTP sessions following the offer/answer model [9], the "a=rtcp-mux"
attribute (see Section 8) indicates the desire to multiplex RTP and
RTCP onto a single port, and the usage is always negotiated for both
directions.

If the offerer wishes to multiplex RTP and RTCP onto a single port,
the initial SDP offer MUST include the attribute at the media level
to request multiplexing of RTP and RTCP on a single port. For
example:

```
v=0
o=csp 1153134164 1153134164 IN IP6 2001:DB8::211:24ff:fea3:7a2e
s=-
c=IN IP6 2001:DB8::211:24ff:fea3:7a2e
t=1153134164 1153137764
m=audio 49170 RTP/AVP 97
a=rtpmap:97 iLBC/8000
a=rtcp-mux
```

This offer denotes a unicast voice-over-IP session using the RTP/AVP
profile with Internet Low Bit Rate Codec (iLBC) coding. The answerer
is requested to send both RTP and RTCP to port 49170 on IPv6 address
2001:DB8::211:24ff:fea3:7a2e.

If the offer contains the "a=rtcp-mux" attribute, and if the answerer
wishes to multiplex RTP and RTCP onto a single port, it MUST include
a media-level "a=rtcp-mux" attribute in the answer. The RTP payload
types used in the answer MUST conform to the rules in Section 4. If
the offer does not contain the "a=rtcp-mux" attribute, the answerer
MUST NOT include an "a=rtcp-mux" attribute in the answer, and the
answerer MUST NOT multiplex RTP and RTCP packets on a single port.

If the answer contains an "a=rtcp-mux" attribute, the offerer and
answerer MUST multiplex RTP and RTCP packets on a single port.

If the answer does not contain an "a=rtcp-mux" attribute, the offerer
and answerer MUST NOT multiplex RTP and RTCP packets on a single
port. Instead, they should send and receive RTCP on a port allocated
according to the usual port-selection rules (either the port pair, or
a signalled port if the "a=rtcp:" attribute [10] is also included).
This will occur when talking to a peer that does not understand the
"a=rtcp-mux" attribute.

When SDP is used in a declarative manner, the presence of an "a=rtcp-mux" attribute signals that the sender will multiplex RTP and RTCP on the same port. The receiver MUST be prepared to receive RTCP packets on the RTP port, and any resource reservation needs to be made including the RTCP bandwidth.

4. Security Considerations

   The security considerations for RTP and RTCP multiplexing are described in RFC 5761. This specification does not impact those security considerations.

5. IANA Considerations

   IANA has added a reference to this document for the att-field (media level only) registration "rtcp-mux" in the "Session Description Protocol (SDP) Parameters" registry.

6. Normative References

   [RFC2119] Bradner, S., "Key words for use in RFCs to Indicate
              Requirement Levels", BCP 14, RFC 2119,
              DOI 10.17487/RFC2119, March 1997,
              <http://www.rfc-editor.org/info/rfc2119>.

   [RFC3264] Rosenberg, J. and H. Schulzrinne, "An Offer/Answer Model
              with Session Description Protocol (SDP)", RFC 3264,
              DOI 10.17487/RFC3264, June 2002,
              <http://www.rfc-editor.org/info/rfc3264>.

   [RFC5761] Perkins, C. and M. Westerlund, "Multiplexing RTP Data and
              Control Packets on a Single Port", RFC 5761,
              DOI 10.17487/RFC5761, April 2010,
              <http://www.rfc-editor.org/info/rfc5761>.

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Author's Address

    Christer Holmberg
    Ericsson
    Hirsalantie 11
    Jorvas 02420
    Finland

    Email: christer.holmberg@ericsson.com