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**Indicating Exclusive Support of RTP/RTCP Multiplexing using SDP**  
**draft-ietf-mmusic-mux-exclusive-12.txt**

Abstract

This document defines a new SDP media-level attribute, 'rtcp-mux-only', that can be used by an endpoint to indicate exclusive support of RTP/RTCP multiplexing. The document also updates [RFC 5761](#), by clarifying that an offerer can use a mechanism to indicate that it is not able to send and receive RTCP on separate ports.

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## [1.](#) Introduction

[RFC5761] defines how to multiplex RTP and RTCP on a single IP address and port, referred to as RTP/RTCP multiplexing. [[RFC5761](#)] also defines an Session Description Protocol (SDP) [[RFC4566](#)] attribute, 'rtcp-mux' that can be used by entities to indicate support, and negotiate usage of, RTP/RTCP multiplexing.

As defined in [[RFC5761](#)], if the peer endpoint does not support RTP/RTCP multiplexing, both endpoints should use separate ports for sending and receiving of RTCP (referred to as fallback to usage of separate ports for RTP and RTCP).

Some newer applications that do not require backward compatibility with peers that cannot multiplex RTCP might choose to not implement separation of RTP and RTCP. Examples of such applications are W3C WEBRTC [[W3C.WD-webrtc-20120209](#)] applications, that are not required to interoperate with non-WEBRTC clients. For such applications, this document defines an SDP attribute to signal intent to require multiplexing. The use of this attribute in SDP offers [[RFC3264](#)] by

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entities that ever need to interoperate with peers that do not support RTP/RTCP multiplexing may harm interoperability. Also, while the SDP answerer [[RFC3264](#)] might support, and prefer usage of, fallback to non-multiplex, the attribute indicates that fallback to non-multiplex cannot be enabled. One example of where non-multiplex is preferred is where an endpoint is connected to a radio interface, and wants to use different bearers (possibly with different quality characteristics) for RTP and RTCP. Another example is where the one endpoint is acting as a gateway to a network where RTP/RTCP multiplexing cannot be used. In such case there endpoint may prefer non-multiplexing also towards the other network. Otherwise the endpoint would have to perform de-multiplexing of RTP and RTCP.

This document defines a new SDP media-level attribute, 'rtcp-mux-only', that can be used by an endpoint to indicate exclusive support of RTP/RTCP multiplexing. The document also updates [[RFC5761](#)], by clarifying that an offerer can use a mechanism to indicate that it is not able to send and receive RTCP on separate ports.

The document also describes the Interactive Connectivity Establishment (ICE) [[RFC5245](#)] considerations when indicating exclusive support of RTP/RTCP multiplexing.

## **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. SDP rtcp-mux-only Attribute**

This section defines a new SDP media-level attribute, 'rtcp-mux-only'.



Name: rtcp-mux-only

Value: N/A

Usage Level: media

Charset Dependent: no

Syntax:

rtcp-mux-only

Example:

a=rtcp-mux-only

In an SDP offer, the offerer uses the SDP 'rtcp-mux-only' attribute to indicate exclusive support of RTP/RTCP multiplexing for the RTP-based media associated with the SDP media description ("m=" line).

In an SDP answer, the 'rtcp-mux' attribute [[RFC5761](#)] indicates that the answerer supports, and accepts usage of, RTP/RTCP multiplexing for the RTP-based media associated with the SDP media description ("m=" line).

The usage of the 'rtcp-mux-only' attribute in an SDP answer is forbidden.

The usage of the SDP 'rtcp-mux-only' attribute is only defined for RTP-based media.

The mux category [[I-D.ietf-mmusic-sdp-mux-attributes](#)] for the 'rtcp-mux-only' attribute is 'IDENTICAL', which means that the attribute, if used within a BUNDLE group [[I-D.ietf-mmusic-sdp-bundle-negotiation](#)], must be associated with all multiplexed RTP-based media descriptions within the BUNDLE group.

The 'rtcp-mux-only' attribute applies to the whole associated media description. The attribute MUST NOT be defined per source (using the SDP 'ssrc' attribute [[RFC5576](#)]).

The SDP offer/answer [[RFC3264](#)] procedures associated with the attribute are defined in [Section 4](#)



## **4. SDP Offer/Answer Procedures**

### **4.1. General**

This section defines the SDP offer/answer [[RFC3264](#)] procedures for indicating exclusive support of, and negotiating usage of, RTP/RTCP multiplexing.

The procedures in this section apply to individual RTP-based SDP media descriptions ("m=" lines).

### **4.2. Generating the Initial SDP Offer**

When an offerer sends the initial offer, if the offerer wants to indicate exclusive RTP/RTCP multiplexing for RTP-based media, the offerer **MUST** associate an SDP 'rtcp-mux-only' attribute with the associated SDP media description ("m=" line).

In addition, if the offerer associates an SDP 'rtcp-mux-only' attribute with an SDP media description ("m=" line), the offerer **MUST** also associate an SDP 'rtcp-mux' attribute with the same SDP media description ("m=" line), following the procedures in [[RFC5761](#)].

If the offerer associates an SDP 'rtcp' attribute [[RFC3605](#)] with an SDP media description ("m=" line), and if the offerer also associates an SDP 'rtcp-mux-only' attribute with the same SDP media description ("m=" line), the address and port values of the SDP 'rtcp' attribute **MUST** match the corresponding values for RTP.

NOTE: This specification does not mandate the usage of the SDP 'rtcp' attribute for RTP/RTCP multiplexing.

### **4.3. Generating the Answer**

When an answerer receives an offer that contains an SDP 'rtcp-mux-only' attribute, associated with an RTP-based SDP media description ("m=" line), if the answerer accepts the usage of RTP/RTCP multiplexing, the answerer **MUST** associate an SDP 'rtcp-mux' attribute with the corresponding SDP media description ("m=") in the associated answer, following the procedures in [[RFC5761](#)]. If the answerer does not accept the usage of RTP/RTCP multiplexing, the answerer **MUST** either reject the SDP media description ("m=") by setting the port value to zero in the associated answer, or reject the whole offer, following the procedures in [[RFC3264](#)].

The answerer **MUST NOT** associate an SDP 'rtcp-mux-only' attribute with an SDP media description ("m=" line) in the answer.



#### **4.4. Offerer Processing of the SDP Answer**

If an offerer associated an SDP 'rtcp-mux-only' attribute with an RTP-based SDP media description ("m=" line) in an offer, and if the corresponding SDP media description ("m=" line) in the associated answer contains an SDP 'rtcp-mux' attribute, the offerer **MUST** apply the RTP/RTCP multiplexing procedures [[RFC5761](#)] to the associated RTP-based media. If the corresponding SDP media description ("m=" line) in the associated answer does not contain an SDP 'rtcp-mux' attribute, the offerer **MUST** either take appropriate actions in order to disable the associated RTP-based media, e.g., send a new offer with a zero port value associated with the SDP media description ("m=" line), or send a new offer without associating an SDP 'rtcp-mux-only' attribute with the SDP media description ("m=" line).

NOTE: This document does not mandate specific actions on how to terminate the RTP media. The offerer might e.g. send a new offer where the port value of the SDP media description is set to zero in order to terminate the RTP media.

#### **4.5. Modifying the Session**

When an offerer sends a subsequent offer, if the offerer and answerer have previously negotiated usage of exclusive RTP/RTCP multiplexing for the media associated with an RTP-based SDP media description ("m=" line), the offerer **SHOULD** associate an SDP 'rtcp-mux-only' with the corresponding SDP media description ("m=" line).

In addition, if the offerer associates an SDP 'rtcp-mux-only' attribute with an SDP media description ("m=" line), the offerer **MUST** also associate an SDP 'rtcp-mux' attribute with the same SDP media description ("m=" line), following the procedures in [[RFC5761](#)].

If the offerer does not associate the attributes with the corresponding SDP media description ("m=" line) it is an indication that the offerer no longer wants to use RTP/RTCP multiplexing, and instead **MUST** fallback to usage of separate ports for RTP and RTCP once the offer has been accepted by the answerer.

When an offerer sends a subsequent offer, if the offerer and answerer have not previously negotiated usage of RTP/RTCP multiplexing for the media associated with an RTP-based SDP media description ("m=" line), the offerer **MAY** indicate exclusive support of RTP/RTCP multiplexing, following the procedures in [Section 4.2](#). The offerer **MUST** process the associated answer following the procedures in [Section 4.4](#).



It is RECOMMENDED to not switch between usage of RTP/RTCP multiplexing and usage of separate ports for RTP and RTCP in a subsequent offer, unless there is a use-case that mandates it.

## **5. Update to [RFC 5761](#)**

### **[5.1.](#) General**

This section updates sections [5.1.1](#) and [5.1.3](#) of [[RFC5761](#)], by clarifying that an offerer can use a mechanism to indicate that it is not able to send and receive RTCP on separate ports, and that the offerer shall terminate the affected streams if the answerer does not indicate support of RTP/RTCP multiplexing. It also clarifies that, when the offerer is not able to send and receive RTCP on separate ports, the offerer will not provide an SDP 'candidate' attribute for RTCP, nor will the offerer provide a fallback port for RTCP (using the SDP 'rtcp' attribute).

### **[5.2.](#) Update to 4th paragraph of [section 5.1.1](#)**

NOTE: [[RFC8035](#)] also updates [section 5.1.1](#) of [[RFC5761](#)]. While the paragraph updated in this document is not updated by [[RFC8035](#)], the location of the paragraph within [section 5.1.1](#) is moved.



## OLD TEXT:

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.

## NEW TEXT:

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 signaled 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. However, if the offerer indicated in the offer that it is not able to send and receive RTCP on a separate port, the offerer MUST disable the media streams associated with the attribute. The mechanism for indicating that the offerer is not able to send and receive RTCP on a separate port is outside the scope of this specification.

**5.3. Update to 2nd paragraph of [section 5.1.3](#)**



**OLD TEXT:**

If it is desired to use both ICE and multiplexed RTP and RTCP, the initial offer MUST contain an "a=rtcp-mux" attribute to indicate that RTP and RTCP multiplexing is desired and MUST contain "a=candidate:" lines for both RTP and RTCP along with an "a=rtcp:" line indicating a fallback port for RTCP in the case that the answerer does not support RTP and RTCP multiplexing. This MUST be done for each media where RTP and RTCP multiplexing is desired.

**NEW TEXT:**

If it is desired to use both ICE and multiplexed RTP and RTCP, the initial offer MUST contain an "a=rtcp-mux" attribute to indicate that RTP and RTCP multiplexing is desired and MUST contain "a=candidate:" lines for both RTP and RTCP along with an "a=rtcp:" line indicating a fallback port for RTCP in the case that the answerer does not support RTP and RTCP multiplexing. This MUST be done for each media where RTP and RTCP multiplexing is desired. However, if the offerer indicates in the offer that it is not able to send and receive RTCP on a separate port, the offerer MUST NOT include "a=candidate:" lines for RTCP, and the offerer MUST NOT provide a fallback port for RTCP using the "a=rtcp:" line.

**6. ICE Considerations**

As defined in [[RFC5245](#)], if an entity is aware that the remote peer supports, and is willing to use, RTP/RTCP multiplexing, the entity will only provide RTP candidates (component ID 1). However, only providing RTP candidates does not as such imply exclusive support of RTP/RTCP multiplexing. RTCP candidates would not be provided also in cases where RTCP is not supported at all. Therefore, additional information is needed in order to indicate support of exclusive RTP/RTCP multiplexing. This document defines such mechanism using the SDP 'rtcp-mux-only' attributes.

**7. Security Considerations**

This document does not introduce new security considerations in additions to those specified in [[RFC3605](#)] and [[RFC5761](#)].

**8. IANA Considerations**

This document updates the "Session Description Protocol Parameters" registry as specified in [Section 8.2.2 of \[RFC4566\]](#). Specifically,



it adds the SDP 'rtcp-mux-only' attribute to the table for SDP media level attributes.

Attribute name: rtcp-mux-only  
Type of attribute: media-level  
Subject to charset: no  
Purpose: Indicate exclusive support of RTP/RTCP multiplexing  
Appropriate Values: N/A  
Contact name: Christer Holmberg (christer.holmberg@ericsson.com)  
Mux Category: IDENTICAL

## **9. Acknowledgments**

Thanks to Roman Shpount, Paul Kyzivat, Ari Keranen, Bo Burman, Tomas Frankkila and Martin Thomson for their comments and input on the document. Thanks to Francis Dupont for the genart review.

## **10. Change Log**

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

Changes from [draft-ietf-mmusic-rtcp-mux-exclusive-11](#)

- o Clarification note added to RFF 5761 update section.

Changes from [draft-ietf-mmusic-rtcp-mux-exclusive-10](#)

- o Changes based on comments from Ekr:
- o - 'rtcp-mux-only' attribute only defined for SDP offers

Changes from [draft-ietf-mmusic-rtcp-mux-exclusive-09](#)

- o Changes based on IESG review comments from Alexey Melnikov and Mirja Kuhlewind:
- o - References to [draft-mux-attributes](#) and [draft-sdp-bundle](#) made normative.
- o - Text added regarding cases where entities might want to use non-multiplexed RTP and RTCP.

Changes from [draft-ietf-mmusic-rtcp-mux-exclusive-08](#)

- o Editorial changes based on genart comments from Francis Dupont.



Changes from [draft-ietf-mmusic-rtcp-mux-exclusive-07](#)

- o Comments from Ben Campbell.
- o - Additional text regarding applications for which the mechanism is suitable.
- o - Removal of pre-RFC5378 disclaimer.
- o - Editorial fixes.

Changes from [draft-ietf-mmusic-rtcp-mux-exclusive-06](#)

- o - Editorial fix.
- o - Addition of pre-RFC5378 disclaimer.

Changes from [draft-ietf-mmusic-rtcp-mux-exclusive-05](#)

- o Editorial fix.

Changes from [draft-ietf-mmusic-rtcp-mux-exclusive-04](#)

- o Changes based on comments from Flemming Andreassen.
- o - Attribute mux category changed to IDENTICAL.
- o - Reference to [draft-5245bis](#) changed to [RFC 5245](#).

Changes from [draft-ietf-mmusic-rtcp-mux-exclusive-03](#)

- o Editorial changes based on comments from Martin Thomson.
- o Change of attribute name.
- o [RFC 5761](#) updates added.

Changes from [draft-ietf-mmusic-rtcp-mux-exclusive-02](#)

- o Minor editorial fix.

Changes from [draft-ietf-mmusic-rtcp-mux-exclusive-01](#)

- o Mux category and source-specific applicability added.

Changes from [draft-ietf-mmusic-rtcp-mux-exclusive-00](#)

- o Defined new SDP attribute for indicating rtcp-mux-exclusive.



- o Updates to [RFC 5761](#) removed.
- o IANA considerations added.

Changes from [draft-holmberg-mmusic-rtcp-mux-exclusive-03](#)

- o Submitted as [draft-ietf-mmusic-rtcp-mux-exclusive-00](#).

Changes from [draft-holmberg-mmusic-rtcp-mux-exclusive-02](#)

- o Intended status changed to "Standards track".

Changes from [draft-holmberg-mmusic-rtcp-mux-exclusive-01](#)

- o Clarified that the SDP rtcp attribute may contain the optional IP address part.

Changes from [draft-holmberg-mmusic-rtcp-mux-exclusive-00](#)

- o Additional updates to [Section 5.1.1 of RFC 5761](#).
- o ICE considerations added.

## **[11. References](#)**

### **[11.1. 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>>.
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- [RFC5245] Rosenberg, J., "Interactive Connectivity Establishment (ICE): A Protocol for Network Address Translator (NAT) Traversal for Offer/Answer Protocols", [RFC 5245](#), DOI 10.17487/RFC5245, April 2010, <<http://www.rfc-editor.org/info/rfc5245>>.



- [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>>.
- [RFC8035] Holmberg, C., "Session Description Protocol (SDP) Offer/Answer Clarifications for RTP/RTCP Multiplexing", [RFC 8035](#), DOI 10.17487/RFC8035, November 2016, <<http://www.rfc-editor.org/info/rfc8035>>.
- [I-D.ietf-mmusic-sdp-mux-attributes] Nandakumar, S., "A Framework for SDP Attributes when Multiplexing", [draft-ietf-mmusic-sdp-mux-attributes-16](#) (work in progress), December 2016.
- [I-D.ietf-mmusic-sdp-bundle-negotiation] Holmberg, C., Alvestrand, H., and C. Jennings, "Negotiating Media Multiplexing Using the Session Description Protocol (SDP)", [draft-ietf-mmusic-sdp-bundle-negotiation-36](#) (work in progress), October 2016.

## **11.2. Informative References**

- [RFC3605] Huitema, C., "Real Time Control Protocol (RTCP) attribute in Session Description Protocol (SDP)", [RFC 3605](#), DOI 10.17487/RFC3605, October 2003, <<http://www.rfc-editor.org/info/rfc3605>>.
- [RFC5576] Lennox, J., Ott, J., and T. Schierl, "Source-Specific Media Attributes in the Session Description Protocol (SDP)", [RFC 5576](#), DOI 10.17487/RFC5576, June 2009, <<http://www.rfc-editor.org/info/rfc5576>>.
- [W3C.WD-webrtc-20120209] Bergkvist, A., Burnett, D., Jennings, C., and A. Narayanan, "WebRTC 1.0: Real-time Communication Between Browsers", World Wide Web Consortium WD WD-webrtc-20120209, February 2012, <<http://www.w3.org/TR/2012/WD-webrtc-20120209>>.

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