XEP-0294: Jingle RTP Header Extensions Negotiation

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This specification defines an XMPP extension to negotiate the use of the use of RTP Header Extension as defined by RFC 8285 with Jingle RTP sessions

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Contents

1 Introduction

This documents specifies how to negotiate the use of the RTP Header Extensions as defined by RFC 8285 [1] with Jingle RTP sessions.

2 Requirements

The Jingle extension defined herein is designed to meet the following requirements:

1. Enable negotiations of the RTP Header extensions as defined in RFC 8285 [2].

2. Map these parameters to Session Description Protocol (SDP; see RFC 4566 [3]) to enable interoperability.

3 New elements

This specification defines a new element, <rtp-hdrext/>, that can be inserted in the <description/> element of a XEP-0167 RTP session.
The attributes of the <rtp-hdrext/> element are:

Attribute	Description	Inclusion	Possible values
id	The ID of the extensions	REQUIRED	1-256, 4096-4351
uri	The URI that defines the extension	REQUIRED	Any valid URI
senders	Which party is allowed to send the negotiated RTP Header Extensions	OPTIONAL (defaults to "both")	"initiator", "responder", and "both"

Any type of RTP Header Extension that requires extra parameters in the a=b form can embed <parameter/> elements to describe it. Any other form of parameter can be stored as the 'name' attribute in a parameter element with an empty value.
This specification defines a new element, <extmap-allow-mixed/>, that can be inserted in the <description/> element of a XEP-0167 RTP session. The element has no attributes.

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[1]RFC 8285: A General Mechanism for RTP Header Extensions <http://tools.ietf.org/html/rfc8285>.

[2]RFC 8285: A General Mechanism for RTP Header Extensions <http://tools.ietf.org/html/rfc8285>.

[3]RFC 4566: SDP: Session Description Protocol <http://tools.ietf.org/html/rfc4566>.

4 Negotiation

RTP header extensions are negotiated along the codecs. They follow the same Offer/Answer mechanism based on SDP Offer/Answer. The initiator signals which RTP header extensions it wants to send or receive in the the <session-initiate/> iq stanza. If the responder does not understand the type of header extensions, it MUST remove the element from the reply. If the responder does not wish to provide or receive some kind of RTP header extension, it MUST remove the relevant element from the reply. It MUST then send the remaining elements it wants to keep as-is without modifying them in the <session-accept/> iq stanza.

It MUST NOT add any <rtp-hdrext/> element that was not offered by the initiator. The responder MAY downgrade the senders field from "both" to "initator" or "responder", but MUST NOT modify it if it is "initiator" or "responder".

The usage of the <extmap-allow-mixed/> is governed by the SDP Offer/Answer mechanism as well.

Example negotiation where the initiator offers to use the timestamp offset header extension as defined in RFC 5450 [4] and also the requests synchronisation metadata header extension (RFC 6051 [5]) with either the 56-bit or the 64-bit format.

Listing 1: Initiator sends description inside session-initiate

```
<description xmlns='urn:xmpp:jingle:apps:rtp:1' media='video'>
  <rtp-hdrext xmlns='urn:xmpp:jingle:apps:rtp:rtp-hdrext:0'
              uri='urn:ietf:params:rtp-hdrext:toffset'
              id='1'/>
  <rtp-hdrext xmlns='urn:xmpp:jingle:apps:rtp:rtp-hdrext:0'
              uri='urn:ietf:params:rtp-hdrext:ntp-64'
              id='4907'/>
  <rtp-hdrext xmlns='urn:xmpp:jingle:apps:rtp:rtp-hdrext:0'
              uri='urn:ietf:params:rtp-hdrext:ntp-56'
              id='4907'/>
  <payload-type id='96' name='THEORA' clockrate='90000'/>
  <extmap-allow-mixed xmlns='urn:xmpp:jingle:apps:rtp:rtp-hdrext:0'/>
</description>
```

Example reply where the responder accepts the timestamp offset and the 56-bit synchronisation metadata header extensions as well as the <extmap-allow-mixed/>.

Listing 2: Reponder sends description inside session-accept

```
<description xmlns='urn:xmpp:jingle:apps:rtp:1' media='video'>
  <rtp-hdrext xmlns='urn:xmpp:jingle:apps:rtp:rtp-hdrext:0'
              uri='urn:ietf:params:rtp-hdrext:toffset'
              id='1'/>
  <rtp-hdrext xmlns='urn:xmpp:jingle:apps:rtp:rtp-hdrext:0'
```

---

[4]RFC 5450: Transmission Time Offsets in RTP Streams <http://tools.ietf.org/html/rfc5450>.

[5]RFC 6051: Rapid Synchronisation of RTP Flows <http://tools.ietf.org/html/rfc6051>.

```
                   uri='urn:ietf:params:rtp-hdrext:ntp-56'
                   id='2'/>
  <payload-type id='96' name='THEORA' clockrate='90000'/>
</description>
```

Another reply to the same request where the responder accepts only the synchronisation data header extension with the 64-bit format.

Listing 3: Responder sends description inside session-accept with only the synchronisation data accepted

```
<description xmlns='urn:xmpp:jingle:apps:rtp:1' media='video'>
  <rtp-hdrext xmlns='urn:xmpp:jingle:apps:rtp:rtp-hdrext:0'
              uri='urn:ietf:params:rtp-hdrext:ntp-64'
              id='2'/>
  <payload-type id='96' name='THEORA' clockrate='90000'/>
</description>
```

5 Mapping to Session Description Protocol

The <rtp-hdrext/> element maps to the "a:extmap=" SDP line defined in RFC 8285 [6]. The ID is mapped to the 'id' attribute, the direction to the 'senders' attribute and the URI to the 'uri' attribute.

The <extmap-allow-mixed/> element maps to the "a=extmap-allow-mixed" SDP line defined in RFC 8285 [7]. Note that a session-level line might need to be mapped to all <description/> elements.

Example conversion of an incomplete SDP sample fragment taken from RFC 8285 [8] section 7 into equivalent XMPP:

Listing 4: SDP fragment

```
m=video
a=sendrecv
a=extmap:1 URI-toffset
a=extmap:2/recvonly URI-gps-string
a=extmap:3 URI-frametype
a=extmap-allow-mixed
```

Listing 5: The same description in XMPP format

```
<description xmlns='urn:xmpp:jingle:apps:rtp:1' media='video'>
  <rtp-hdrext xmlns='urn:xmpp:jingle:apps:rtp:rtp-hdrext:0'
              id='1'
```

---

[6]RFC 8285: A General Mechanism for RTP Header Extensions <http://tools.ietf.org/html/rfc8285>.
[7]RFC 8285: A General Mechanism for RTP Header Extensions <http://tools.ietf.org/html/rfc8285>.
[8]RFC 8285: A General Mechanism for RTP Header Extensions <http://tools.ietf.org/html/rfc8285>.

```
                      uri='URI-toffset'/>
  <rtp-hdrext xmlns='urn:xmpp:jingle:apps:rtp:rtp-hdrext:0'
              id='2'
              uri='URI-gps-string'
              senders='initiator'/>
  <rtp-hdrext xmlns='urn:xmpp:jingle:apps:rtp:rtp-hdrext:0'
              id='3'
              uri='URI-frametype'/>
  <extmap-allow-mixed xmlns='urn:xmpp:jingle:apps:rtp:rtp-hdrext:0'/>
</description>
```

6 Determining support

To advertise its support for Generic Header extensions in Jingle RTP Sessions, when replying to Service Discovery (XEP-0030) [9] information requests an entity MUST return the following features:

1. URNs for any version of this protocol that the entity supports -- e.g., "urn:xmpp:jingle:apps:rtp:rtp-hdrext:0" for the current version

An example follows:

Listing 6: Service discovery information request

```
<iq from='romeo@montague.lit/orchard'
    id='bh3vd715'
    to='juliet@capulet.lit/balcony'
    type='get'>
  <query xmlns='http://jabber.org/protocol/disco#info'/>
</iq>
```

Listing 7: Service discovery information response

```
<iq from='juliet@capulet.lit/balcony'
    id='bh3vd715'
    to='romeo@montague.lit/orchard'
    type='result'>
  <query xmlns='http://jabber.org/protocol/disco#info'>
    <feature var='urn:xmpp:jingle:1'/>
    <feature var='urn:xmpp:jingle:apps:rtp:1'/>
    <feature var='urn:xmpp:jingle:apps:rtp:video'/>
    <feature var='urn:xmpp:jingle:apps:rtp:rtp-hdrext:0'/>
  </query>
</iq>
```

---

[9]XEP-0030: Service Discovery <https://xmpp.org/extensions/xep-0030.html>.

7 IANA Considerations

This document requires no interaction with the Internet Assigned Numbers Authority (IANA).

8 XMPP Registrar Considerations

8.1 Protocol Namespaces

This specification defines the following XML namespaces:

- urn:xmpp:jingle:apps:rtp:rtp-hdrext:0

The XMPP Registrar [10] includes the foregoing namespaces in its registry at <https://xmpp.org/registrar/namespaces.html>, as governed by XMPP Registrar Function (XEP-0053) [11].

8.2 Namespace Versioning

If the protocol defined in this specification undergoes a revision that is not fully backwards-compatible with an older version, the XMPP Registrar shall increment the protocol version number found at the end of the XML namespaces defined herein, as described in Section 4 of XEP-0053.

9 XML Schemas

```
<?xml version='1.0' encoding='UTF-8'?>

<xs:schema
    xmlns:xs='http://www.w3.org/2001/XMLSchema'
    targetNamespace='urn:xmpp:jingle:apps:rtp:rtp-hdrext:0'
    xmlns='urn:xmpp:jingle:apps:rtp:rtp-hdrext:0'
    elementFormDefault='qualified'>

  <xs:annotation>
    <xs:documentation>
      The protocol documented by this schema is defined in
      XEP-0294: http://www.xmpp.org/extensions/xep-0294.html
```

---

[10]The XMPP Registrar maintains a list of reserved protocol namespaces as well as registries of parameters used in the context of XMPP extension protocols approved by the XMPP Standards Foundation. For further information, see <https://xmpp.org/registrar/>.

[11]XEP-0053: XMPP Registrar Function <https://xmpp.org/extensions/xep-0053.html>.

```
      </xs:documentation>
    </xs:annotation>

    <xs:element name='rtp-hdrext'>
      <xs:complexType>
        <xs:sequence>
          <xs:element name='parameter'
                type='parameterElementType'
                minOccurs='0'
                maxOccurs='unbounded'/>
        </xs:sequence>
        <xs:attribute name='id' type='xs:unsignedShort' use='required'/>
        <xs:attribute name='uri' type='xs:string' use='required'/>
        <xs:attribute name='senders'
                   use='optional'
                   default='both'>
          <xs:simpleType>
            <xs:restriction base='xs:NCName'>
              <xs:enumeration value='both'/>
              <xs:enumeration value='initiator'/>
              <xs:enumeration value='none'/>
              <xs:enumeration value='responder'/>
            </xs:restriction>
          </xs:simpleType>
        </xs:attribute>
      </xs:complexType>
    </xs:element>

    <xs:complexType name='parameterElementType'>
      <xs:simpleContent>
        <xs:extension base='empty'>
          <xs:attribute name='name' type='xs:string' use='required'/>
          <xs:attribute name='value' type='xs:string' use='optional'/>
        </xs:extension>
      </xs:simpleContent>
    </xs:complexType>

</xs:schema>
```

10 Acknowledgements