



# XMPP

## XEP-0293: Jingle RTP Feedback Negotiation

Olivier Crête

<mailto:olivier.crete@collabora.co.uk>

<xmpp:olivier.crete@collabora.co.uk>

2018-11-03

Version 1.0.1

Status	Type	Short Name
Draft	Standards Track	NOT_YET_ASSIGNED

This specification defines an XMPP extension to negotiate the use of the Extended RTP Profile for Real-time Transport Control Protocol (RTCP)-Based Feedback (RTP/AVPF) with Jingle RTP sessions

# Legal

## Copyright

This XMPP Extension Protocol is copyright © 1999 – 2020 by the [XMPP Standards Foundation](#) (XSF).

## Permissions

Permission is hereby granted, free of charge, to any person obtaining a copy of this specification (the "Specification"), to make use of the Specification without restriction, including without limitation the rights to implement the Specification in a software program, deploy the Specification in a network service, and copy, modify, merge, publish, translate, distribute, sublicense, or sell copies of the Specification, and to permit persons to whom the Specification is furnished to do so, subject to the condition that the foregoing copyright notice and this permission notice shall be included in all copies or substantial portions of the Specification. Unless separate permission is granted, modified works that are redistributed shall not contain misleading information regarding the authors, title, number, or publisher of the Specification, and shall not claim endorsement of the modified works by the authors, any organization or project to which the authors belong, or the XMPP Standards Foundation.

## Warranty

## NOTE WELL: This Specification is provided on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, express or implied, including, without limitation, any warranties or conditions of TITLE, NON-INFRINGEMENT, MERCHANTABILITY, or FITNESS FOR A PARTICULAR PURPOSE. ##

## Liability

In no event and under no legal theory, whether in tort (including negligence), contract, or otherwise, unless required by applicable law (such as deliberate and grossly negligent acts) or agreed to in writing, shall the XMPP Standards Foundation or any author of this Specification be liable for damages, including any direct, indirect, special, incidental, or consequential damages of any character arising from, out of, or in connection with the Specification or the implementation, deployment, or other use of the Specification (including but not limited to damages for loss of goodwill, work stoppage, computer failure or malfunction, or any and all other commercial damages or losses), even if the XMPP Standards Foundation or such author has been advised of the possibility of such damages.

## Conformance

This XMPP Extension Protocol has been contributed in full conformance with the XSF's Intellectual Property Rights Policy (a copy of which can be found at <https://xmpp.org/about/xsf/ipr-policy>) or obtained by writing to XMPP Standards Foundation, P.O. Box 787, Parker, CO 80134 USA).

## Contents

<b>1</b>	<b>Introduction</b>	<b>1</b>
<b>2</b>	<b>Requirements</b>	<b>1</b>
<b>3</b>	<b>New elements</b>	<b>1</b>
<b>4</b>	<b>Negotiation</b>	<b>2</b>
<b>5</b>	<b>Mapping to Session Description Protocol</b>	<b>3</b>
<b>6</b>	<b>Determining support</b>	<b>5</b>
<b>7</b>	<b>IANA Considerations</b>	<b>6</b>
<b>8</b>	<b>XMPP Registrar Considerations</b>	<b>6</b>
	8.1 Protocol Namespaces . . . . .	6
	8.2 Namespace Versioning . . . . .	6
<b>9</b>	<b>XML Schemas</b>	<b>6</b>
<b>10</b>	<b>Acknowledgements</b>	<b>8</b>

## 1 Introduction

This document specifies how to negotiate the use of the Extended RTP Profile for Real-time Transport Control Protocol (RTCP)-Based Feedback (RTP/AVPF) with Jingle RTP sessions.

## 2 Requirements

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

1. Enable negotiations of the required parameters for the transmissions of RTP Feedback messages as defined in [RFC 4585](#)<sup>1</sup>.
2. Map these parameters to Session Description Protocol (SDP; see [RFC 4566](#)<sup>2</sup>) to enable interoperability.

## 3 New elements

This specification defines two new elements, `<rtcp-fb/>` and `<rtcp-fb-trr-int/>`, that can be inserted in the `<description/>` or the `<payload-type/>` elements of [Jingle RTP Sessions \(XEP-0167\)](#)<sup>3</sup>. The presence of any of these elements in a content's description means that the RTP/AVPF profile should be used for the whole content. If any of these elements are inside the `<payload-type/>` element, the parameters specified apply only to that payload type, if they are directly inside the `<description/>` tag, then the specified parameters apply to the whole content.

The attributes of the `<rtcp-fb/>` element are:

Attribute	Description	Inclusion	Possible values
type	The type of feedback	REQUIRED	ack, nack, ccm, app, etc..
subtype	The subtype (depends on the type)	OPTIONAL (possibly REQUIRED depending on the type)	ack: rpsi, app; nack: sli, pli, rpsi, app, rai; ccm: fir, tmmbr, tstr, vbcm; app: depends on the application;

---

<sup>1</sup>RFC 4585: Extended RTP Profile for Real-time Transport Control Protocol (RTCP)-Based Feedback (RTP/AVPF) <<http://tools.ietf.org/html/rfc4585>>.

<sup>2</sup>RFC 4566: SDP: Session Description Protocol <<http://tools.ietf.org/html/rfc4566>>.

<sup>3</sup>XEP-0167: Jingle RTP Sessions <<https://xmpp.org/extensions/xep-0167.html>>.

Any type or subtype of feedback message that requires extra parameters in the a=b form can use the <parameter/> element to describe it. Any other form of parameter can be stored as the 'key' attribute in a parameter element with an empty value.

Note: this overlaps with the subtype attribute. If there is only one parameter, use the subtype. The only known example where this is required is ccm.

The element <rtcp-fb-trr-int/> is used to specify the minimum interval between two Regular (full compound) RTCP packets in milliseconds for this media session. It corresponds to the "a=rtcp-fb:\* trr-int" line in SDP. The attributes of the <rtcp-fb-trr-int/> element are:

Attribute	Description	Inclusion	Possible values
value	Number of milliseconds between regular RTCP reports	REQUIRED	0 to MAXUINT (default to 0)

## 4 Negotiation

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

To conform with the negotiation rules outlined in RFC 4585 Section 4, the responder MUST send any <rtcp-fb/> element as-is if it accepts it. It MUST NOT change any parameter. It MUST NOT add any <rtcp-fb/> element that was not offered by the initiator. It MUST NOT modify the 'value' of any <rtcp-fb-trr-int/> element. It can only remove the <rtcp-fb-trr-int/> element or reject the content. If all the feedback messages are removed but the responder wants to stay in the RTP/AVPF profile, it MUST put a <rtcp-fb-trr-int/> element with the same 'value' that it received from the initiator, if the initiator did not provide a <rtcp-fb-trr-int/> element, then this value is "0".

Example negotiation where the initiator requests Packet Loss Indications (pli) as defined in RFC 4585 on both H.263 and H.264, but also requests Slice Loss Indications for H.264 with a minimum interval between regular full compound RTCP packets of 100 milliseconds.

Listing 1: Initiator sends description inside session-initiate

```
<description xmlns='urn:xmpp:jingle:apps:rtp:1' media='video'>
  <rtcp-fb xmlns='urn:xmpp:jingle:apps:rtp:rtcp-fb:0' type='nack'
    subtype='pli' />
  <payload-type id='96' name='H264' clockrate='90000'>
```

```

<rtcp-fb-trr-int xmlns='urn:xmpp:jingle:apps:rtp:rtcp-fb:0' value=
  '100' />
<rtcp-fb xmlns='urn:xmpp:jingle:apps:rtp:rtcp-fb:0' type='nack'
  subtype='sli' />
</payload-type>
<payload-type id='34' name='H263' clockrate='90000' />
</description>

```

Example reply where the responder rejects the "sli" but accepts the "pli".

Listing 2: Responder sends description inside session-accept

```

<description xmlns='urn:xmpp:jingle:apps:rtp:1' media='video'>
  <rtcp-fb xmlns='urn:xmpp:jingle:apps:rtp:rtcp-fb:0' type='nack'
    subtype='pli' />
  <payload-type id='96' name='H264' clockrate='90000'>
    <rtcp-fb-trr-int xmlns='urn:xmpp:jingle:apps:rtp:rtcp-fb:0' value=
      '100' />
  </payload-type>
  <payload-type id='34' name='H263' clockrate='90000' />
</description>

```

Another reply to the same request where the responder wishes to stay in the AVPF profile but rejects all specific feedback messages by using the <rtcp-fb-trr-int/> with the default value.

Listing 3: Responder sends description inside session-accept without any feedback message

```

<description xmlns='urn:xmpp:jingle:apps:rtp:1' media='video'>
  <rtcp-fb-trr-int xmlns='urn:xmpp:jingle:apps:rtp:rtcp-fb:0' value='0'
    />
  <payload-type id='96' name='H264' clockrate='90000' />
  <payload-type id='34' name='H263' clockrate='90000' />
</description>

```

## 5 Mapping to Session Description Protocol

The <rtcp-fb/> element maps to the a:rtcp-fb= SDP line with the exception of the 'trr-int' parameter which is mapped into its own element (<rtcp-fb-trr-int/>) in XMPP. The payload types are also not explicitly written in the <rtcp-fb/> and <rtcp-fb-trr-int/> elements. Instead, each payload type has its own set of <rtcp-fb/> and <rtcp-fb-trr-int/> elements if they do not apply to the whole content.

Example conversion of a sample fragment of a SDP containing an audio session using the RTP/AVP profile for audio and the RTP/AVPF profile for video:

Listing 4: SDP fragment

```
v=0
o=remeo 3203093520 3203093520 IN IP4 host.example.com
s=Video call with feedback
t=3203130148 3203137348
m=audio 49170 RTP/AVP 0
c=IN IP4 10.0.1.1
a=rtpmap:0 PCMU/8000
m=video 59172 RTP/AVPF 98 99
c=IN IP4 10.0.1.1
a=rtpmap:98 H263-1998/90000
a=rtpmap:99 H261/90000
a=rtcp-fb:* nack
a=rtcp-fb:98 nack rpsi
a=rtcp-fb:98 trr-int 100
```

Listing 5: The same description in XMPP format

```
<iq from='romeo@montague.lit/orchard'
  id='ph37a419'
  to='juliet@capulet.lit/balcony'
  type='set'>
  <jingle xmlns='urn:xmpp:jingle:1'>
    action='session-initiate'
    initiator='romeo@montague.lit/orchard'
    sid='a73sjjvkl37jfea'>
    <content creator='initiator' name='voice'>
      <description xmlns='urn:xmpp:jingle:apps:rtp:1' media='audio'>
        <payload-type id='0' name='PCMU' />
      </description>
      <transport xmlns='urn:xmpp:jingle:transports:raw-udp:1'>
        <candidate component='1'
          generation='0'
          id='a9j3mnbu1'
          ip='10.0.1.1'
          port='49170' />
        <candidate component='2'
          generation='0'
          id='a9j3mnbu1'
          ip='10.0.1.1'
          port='49171' />
      </transport>
    </content>
    <content creator='initiator' name='face'>
      <description xmlns='urn:xmpp:jingle:apps:rtp:1' media='video'>
        <rtcp-fb xmlns='urn:xmpp:jingle:apps:rtp:rtcp-fb:0' type='nack' />
        <payload-type id='98' name='H263-1998'>
          <rtcp-fb xmlns='urn:xmpp:jingle:apps:rtp:rtcp-fb:0' type='nack'
            subtype='rpsi' />
        </payload-type>
      </description>
    </content>
  </jingle>
</iq>
```

```

        <rtcp-fb-trr-int xmlns='urn:xmpp:jingle:apps:rtp:rtcp-fb:0'
            value='100' />
    </payload-type>
    <payload-type id='99' name='H264' />
</description>
<transport xmlns='urn:xmpp:jingle:transports:raw-udp:1'>
    <candidate component='1'
        generation='0'
        id='a9j3mnbtu1'
        ip='10.0.1.1'
        port='49172' />
    <candidate component='2'
        generation='0'
        id='a9j3mnbtu1'
        ip='10.0.1.1'
        port='49173' />
</transport>
</content>
</jingle>
</iq>

```

## 6 Determining support

To advertise its support for Extended RTCP Feedback in Jingle RTP Sessions and a minimum interval between regular RTCP packets, when replying to [Service Discovery \(XEP-0030\)](#)<sup>4</sup> 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:rtcp-fb: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'

```

<sup>4</sup>XEP-0030: Service Discovery <<https://xmpp.org/extensions/xep-0030.html>>.



```
    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:rtcp-fb:0' />  
  </query>  
</iq>
```

## 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:rtcp-fb:0

The [XMPP Registrar](https://xmpp.org/registrar/namespaces.html) <sup>5</sup> includes the foregoing namespaces in its registry at [<https://xmpp.org/registrar/namespaces.html>](https://xmpp.org/registrar/namespaces.html), as governed by [XMPP Registrar Function \(XEP-0053\)](https://xmpp.org/extensions/xep-0053.html) <sup>6</sup>.

### 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

---

<sup>5</sup>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/>](https://xmpp.org/registrar/).

<sup>6</sup>XEP-0053: XMPP Registrar Function [<https://xmpp.org/extensions/xep-0053.html>](https://xmpp.org/extensions/xep-0053.html).

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

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

  <xs:annotation>
    <xs:documentation>
      The protocol documented by this schema is defined in
      XEP-0293: http://www.xmpp.org/extensions/xep-0293.html
    </xs:documentation>
  </xs:annotation>

  <xs:element name='rtcp-fb'>
    <xs:complexType>
      <xs:sequence>
        <xs:element name='parameter'
          type='parameterElementType'
          minOccurs='0'
          maxOccurs='unbounded' />
      </xs:sequence>
      <xs:attribute name='type' type='xs:string' use='required' />
      <xs:attribute name='subtype' type='xs:string' use='optional' />
    </xs:complexType>
  </xs:element>

  <xs:element name='rtcp-fb-trr-int'>
    <xs:complexType>
      <xs:simpleContent>
        <xs:extension base='empty'>
          <xs:attribute name='value' type='xs:positiveInteger' use='
            required' />
        </xs:extension>
      </xs:simpleContent>
    </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**

Thanks to Youness Alaoui for his feedback.