



XMPP

XEP-0181: Jingle DTMF

Peter Saint-Andre
<mailto:peter@andyet.net>
<xmpp:stpeter@stpeter.im>
<https://stpeter.im/>

Sean Egan
<mailto:seanegan@google.com>
<xmpp:seanegan@google.com>

2009-10-02
Version 0.12

Status	Type	Short Name
Deferred	Standards Track	NOT_YET_ASSIGNED

This specification defines an XML format for encapsulating Dual Tone Multi-Frequency (DTMF) events in informational messages sent within the context of Jingle audio sessions, e.g. to be used in the context of Interactive Voice Response (IVR) systems. Note well that this format is not to be used in the context of RTP sessions, where native RTP methods are to be used instead.

Legal

Copyright

This XMPP Extension Protocol is copyright © 1999 – 2017 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

1	Introduction	1
2	Format	1
3	Determining Support	4
4	Security Considerations	5
5	IANA Considerations	5
6	XMPP Registrar Considerations	5
6.1	Protocol Namespaces	5
6.2	Protocol Versioning	5
7	XML Schema	5
8	Acknowledgements	7

1 Introduction

Traditional telephony systems such as the public switched telephone network (PSTN) use Dual Tone Multi-Frequency (DTMF) events for dialing and to issue commands such as those used in interactive voice response (IVR) applications. Internet telephony systems also use DTMF tones, usually for interoperability with the PSTN but sometimes also in native Internet services.

XMPP applications that use [Jingle \(XEP-0166\)](#)¹ and the Real-time Transport Protocol ([RFC 3550](#)²) for voice chat as described in [Jingle RTP Sessions \(XEP-0167\)](#)³ MUST support and prefer native RTP methods of communicating DTMF information, in particular the "audio/telephone-event" and "audio/tone" media types. Such applications SHOULD NOT use the protocol described herein for communicating DTMF information with RTP-aware endpoints.

However, XMPP applications MAY support and use the protocol described herein for communicating DTMF information with endpoints that are not RTP-aware, such as gateways to the PSTN.

2 Format

The format for the representation of DTMF events over XMPP is as follows (see [Namespace Versioning](#) regarding the possibility of incrementing the version number):

```
<dtmf xmlns='urn:xmpp:jingle:dtmf:0'  
  code='0-9,#,*,A-D'  
  duration='milliseconds'  
  volume='0-63' />
```

The <dtmf/> element MUST be empty.

The attributes of the <dtmf/> element are as follows.

¹XEP-0166: Jingle <<https://xmpp.org/extensions/xep-0166.html>>.

²RFC 3550: RTP: A Transport Protocol for Real-Time Applications <<http://tools.ietf.org/html/rfc3550>>.

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

Attribute	Definition	Example	Inclusion
code	A single-character code that identifies the tone to be generated. The value of the 'code' attribute SHOULD be one and only one the following characters: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, #, and * (however, the characters A, B, C, and D MAY be sent as well. Although A, B, C, and D were originally defined as part of DTMF, they were never deployed to telephony consumers and were used only for control purposes at private branch exchanges (PBXs) and central office operator stations; however, they are used in certain non-telephony applications of DTMF, such as ham radio.).	#	REQUIRED
duration	The duration of the event, in milliseconds, expressed as a non-negative integer. The receiver SHOULD ignore the event if the value is zero. The default value is 100 (i.e., 100ms).	400	RECOMMENDED
volume	The power level of the tone, expressed in dBm0 after dropping the sign. Power levels range from 0 to -63 dBm0. Thus, a larger value denotes a lower volume.	37	OPTIONAL

The <dtmf> element SHOULD be sent as the payload of a Jingle session-info message as illustrated in the following example.

Listing 1: Entity sends DTMF message

```
<iq from='juliet@capulet.com/balcony'
  id='dtmf1'
  to='ivr.shakespeare.lit'
  type='set'>
  <jingle xmlns='urn:xmpp:jingle:0'
    action='session-info'
    initiator='juliet@capulet.com/balcony'
    sid='a73sjjvkl37jfea'>
    <dtmf xmlns='urn:xmpp:jingle:dtmf:0'
      code='7'
      duration='400'
      volume='42' />
  </jingle>
</iq>
```

The receiving entity MUST send an IQ result if it can process the DTMF:

Listing 2: Receiving entity acknowledges DTMF message

```
<iq from='ivr.shakespeare.lit'
  id='dtmf1'
  to='juliet@capulet.com/balcony'
  type='result' />
```

If the receiving entity does not support this protocol, it MUST return a <service-unavailable/> stanza error.

Listing 3: Receiving entity does not support DTMF protocol

```
<iq from='ivr.shakespeare.lit'
  id='dtmf1'
  to='juliet@capulet.com/balcony'
  type='error'>
  <error type='cancel'>
    <service-unavailable
      xmlns='urn:ietf:params:xml:ns:xmpp-stanzas' />
  </error>
</iq>
```

If the receiving entity supports this protocol but does not understand the specified code, it MUST return a <feature-not-implemented/> stanza error.

Listing 4: Receiving entity does not understand code

```
<iq from='ivr.shakespeare.lit'
  id='dtmf1'
  to='juliet@capulet.com/balcony'
  type='error'>
  <error type='cancel'>
    <feature-not-implemented
      xmlns='urn:ietf:params:xml:ns:xmpp-stanzas' />
  </error>
</iq>
```

If the receiving entity is using or wishes to use a different method for exchanging DTMF events (e.g., the methods specified in RFC 2833⁴ or its successor RFC 4733⁵), it MUST return a <not-acceptable/> stanza error.

Listing 5: Receiving prefers non-XMPP DTMF method

```
<iq from='ivr.shakespeare.lit'
  id='dtmf1'
  to='juliet@capulet.com/balcony'
  type='error'>
  <error type='cancel'>
    <not-acceptable
      xmlns='urn:ietf:params:xml:ns:xmpp-stanzas' />
  </error>
</iq>
```

3 Determining Support

If an entity supports sending of DTMF in the XMPP signalling channel as specified herein, it MUST return a [Service Discovery \(XEP-0030\)](#)⁶ feature of "urn:xmpp:jingle:dtmf:0" in response to service discovery information requests.

In order for an application to determine whether an entity supports this protocol, where possible it SHOULD use the dynamic, presence-based profile of service discovery defined in [Entity Capabilities \(XEP-0115\)](#)⁷. However, if an application has not received entity capabilities information from an entity, it SHOULD use explicit service discovery instead.

⁴RFC 2833: RTP Payload for DTMF Digits, Telephony Tones and Telephony Signals <<http://tools.ietf.org/html/rfc2833>>.

⁵RFC 4733: RTP Payload for DTMF Digits, Telephony Tones, and Telephony Signals <<http://tools.ietf.org/html/rfc4733>>.

⁶XEP-0030: Service Discovery <<https://xmpp.org/extensions/xep-0030.html>>.

⁷XEP-0115: Entity Capabilities <<https://xmpp.org/extensions/xep-0115.html>>.

4 Security Considerations

This document introduces no known security vulnerabilities.

5 IANA Considerations

This document requires no interaction with the [Internet Assigned Numbers Authority \(IANA\)](#)⁸.

6 XMPP Registrar Considerations

6.1 Protocol Namespaces

This specification defines the following XML namespace:

- `urn:xmpp:jingle:dtmf:0`

Upon advancement of this specification from a status of Experimental to a status of Draft, the [XMPP Registrar](#)⁹ shall add the foregoing namespace to the registry located at <https://xmpp.org/registrar/namespaces.html>, as described in Section 4 of [XMPP Registrar Function \(XEP-0053\)](#)¹⁰.

6.2 Protocol 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.

7 XML Schema

⁸The Internet Assigned Numbers Authority (IANA) is the central coordinator for the assignment of unique parameter values for Internet protocols, such as port numbers and URI schemes. For further information, see <http://www.iana.org/>.

⁹The 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/>.

¹⁰XEP-0053: XMPP Registrar Function <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:dtmf:0'
  xmlns='urn:xmpp:jingle:dtmf:0'
  elementFormDefault='qualified'>

  <xs:element name='dtmf'>
    <xs:complexType>
      <xs:simpleContent>
        <xs:extension base='empty'>
          <xs:attribute name='code'
            type='DTMFString'
            use='required' />
          <xs:attribute name='duration'
            type='xs:nonNegativeInteger'
            use='optional'
            default='100' />
          <xs:attribute name='volume'
            type='VolumeDigit'
            use='optional' />
        </xs:extension>
      </xs:simpleContent>
    </xs:complexType>
  </xs:element>

  <xs:simpleType name="DTMFString">
    <xs:restriction base="xs:string">
      <xs:pattern value="(#[\*|0|1|2|3|4|5|6|7|8|9|A|B|C|D)" />
    </xs:restriction>
  </xs:simpleType>

  <xs:simpleType name="VolumeDigit">
    <xs:restriction base="xs:integer">
      <xs:minInclusive value="0"/>
      <xs:maxInclusive value="63"/>
    </xs:restriction>
  </xs:simpleType>

  <xs:simpleType name='empty'>
    <xs:restriction base='xs:string'>
      <xs:enumeration value='' />
    </xs:restriction>
  </xs:simpleType>

</xs:schema>
```

8 Acknowledgements

Thanks to Diana Cionoiu, Olivier Crête, Robert McQueen, and Paul Witty for their feedback. Several sentences were borrowed from RFC 4733.