



# XMPP

## XEP-0199: XMPP Ping

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This specification defines an XMPP protocol extension for sending application-level pings over XML streams. Such pings can be sent from a client to a server, from one server to another, or end-to-end.

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## 1 Introduction

As specified in [XMPP Core](#)<sup>1</sup>, the XML streams used in XMPP are bound to TCP. Unfortunately, TCP connections can go down without the application (XMPP) layer knowing about it. The traditional approach to solving this issue has been to periodically send so-called "whitespace pings" over the XML stream. This document recommends a more XML-friendly approach, which can be used over more than one hop in the communication path (e.g., from one client to another) and can also be used with other bindings such as the [BOSH \(XEP-0124\)](#)<sup>2</sup> method for which [XMPP Over BOSH \(XEP-0206\)](#)<sup>3</sup> is the XMPP profile.

## 2 Requirements

This specification addresses the following requirements:

1. Determining the viability of an XML stream (i.e., its underlying binding) between a client and a server, or between two servers.
2. Determining end-to-end connectivity between any two XMPP entities (e.g., two clients).

The number of "hops" for which the ping tests connectivity depends on how far the pinged entity is from the pinging entity, as shown in the following use cases. However, this specification does not provide per-hop information similar to that provided by the traceroute protocol ([RFC 1393](#)<sup>4</sup>); a future specification may define such functionality for XMPP.

## 3 Protocol

The XMPP ping protocol is extremely simple:

1. The pinging entity sends an IQ-get containing a <ping/> element qualified by the 'urn:xmpp:ping' namespace.
2. The pinged entity returns either an IQ-result (if it supports the namespace) or an IQ-error (if it does not).

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<sup>1</sup>RFC 6120: Extensible Messaging and Presence Protocol (XMPP): Core <<http://tools.ietf.org/html/rfc6120>>.

<sup>2</sup>XEP-0124: Bidirectional-streams Over Synchronous HTTP <<https://xmpp.org/extensions/xep-0124.html>>.

<sup>3</sup>XEP-0206: XMPP Over BOSH <<https://xmpp.org/extensions/xep-0206.html>>.

<sup>4</sup>RFC 1393: Traceroute Using an IP Option <<http://tools.ietf.org/html/rfc1393>>.

## 4 Use Cases

### 4.1 Server-To-Client Pings

One popular usage is for a server to test the viability of the underlying stream connection by pinging a connected client. This is done by sending an <iq/> get over the stream from the server to the client.

Listing 1: Ping

```
<iq from='capulet.lit' to='juliet@capulet.lit/balcony' id='s2c1' type='get'>
  <ping xmlns='urn:xmpp:ping' />
</iq>
```

If the client supports the ping namespace, it MUST return an IQ-result, which functions as a "pong":

Listing 2: Pong

```
<iq from='juliet@capulet.lit/balcony' to='capulet.lit' id='s2c1' type='result' />
```

If the client does not support the ping namespace, it MUST return a <service-unavailable/> error:

Listing 3: Ping Not Supported

```
<iq from='juliet@capulet.lit/balcony' to='capulet.lit' id='s2c1' type='error'>
  <ping xmlns='urn:xmpp:ping' />
  <error type='cancel'>
    <service-unavailable xmlns='urn:ietf:params:xml:ns:xmpp-stanzas' />
  </error>
</iq>
```

The other error conditions defined in RFC 6120 could also be returned if appropriate.

### 4.2 Client-To-Server Pings

A client may also ping its server by sending an IQ-get over the stream between the two entities.

Listing 4: Ping

```
<iq from='juliet@capulet.lit/balcony' to='capulet.lit' id='c2s1' type='get'>
  <ping xmlns='urn:xmpp:ping' />
</iq>
```

Note: The client MAY include a 'to' address of the client's bare JID <localpart@domain.tld>, in this instance "juliet@capulet.lit" or MAY include no 'to' address (this signifies that the stanza shall be handled by the server on behalf of the connected user's bare JID, which in the case of <iq/> stanzas is equivalent to directing the IQ-get to the server itself).

If the server supports the ping namespace, it MUST return an IQ-result:

Listing 5: Pong

```
<iq from='capulet.lit' to='juliet@capulet.lit/balcony' id='c2s1' type='result' />
```

If the server does not support the ping namespace, it MUST return a <service-unavailable/> error:

Listing 6: Ping Not Supported

```
<iq from='capulet.lit' to='juliet@capulet.lit/balcony' id='c2s1' type='error'>
  <ping xmlns='urn:xmpp:ping' />
  <error type='cancel'>
    <service-unavailable xmlns='urn:ietf:params:xml:ns:xmpp-stanzas' />
  </error>
</iq>
```

The other error conditions defined in RFC 6120 could also be returned if appropriate.

### 4.3 Server-To-Server Pings

Pings can also be used to test a server-to-server connection. This is done by sending an IQ-get over the stream from one server to another.

Listing 7: Ping

```
<iq from='capulet.lit' to='montague.lit' id='s2s1' type='get'>
  <ping xmlns='urn:xmpp:ping' />
</iq>
```

If the other party to the stream supports the ping namespace, it MUST return an IQ-result:

Listing 8: Pong

```
<iq from='montague.lit' to='capulet.lit' id='s2s1' type='result' />
```

If the other party to the stream does not support the ping namespace, it MUST return a <service-unavailable/> error:

Listing 9: Ping Not Supported

```
<iq from='montague.lit' to='capulet.lit' id='s2s1' type='error'>
  <ping xmlns='urn:xmpp:ping' />
  <error type='cancel'>
    <service-unavailable xmlns='urn:ietf:params:xml:ns:xmpp-stanzas' />
  </error>
</iq>
```

The other error conditions defined in RFC 6120 could also be returned if appropriate.

#### 4.4 Client-to-Client Pings

Pings can also be used for client-to-client (i.e., end-to-end) pings.

Listing 10: Ping

```
<iq from='romeo@montague.lit/home'
  to='juliet@capulet.lit/chamber'
  type='get'
  id='e2e1'>
  <ping xmlns='urn:xmpp:ping' />
</iq>
```

Note: The 'to' address should be a full JID <localpart@domain.tld/resource>, since a ping sent to a bare JID <localpart@domain.tld> will be handled by the server on behalf of the client. If the pinged entity supports the ping namespace, it SHOULD return an IQ-result:

Listing 11: Pong

```
<iq from='juliet@capulet.lit/chamber'
  to='romeo@montague.lit/home'
  id='e2e1'
  type='result' />
```

If the pinged entity does not support the ping namespace, it MUST return a <service-unavailable/> error:

Listing 12: Ping Not Supported

```
<iq from='juliet@capulet.lit/chamber'
  to='romeo@montague.lit/home'
  id='e2e1'
  type='error'>
  <ping xmlns='urn:xmpp:ping' />
  <error type='cancel'>
    <service-unavailable xmlns='urn:ietf:params:xml:ns:xmpp-stanzas' />
  </error>
```

```
</iq>
```

The other error conditions defined in RFC 6120 could also be returned if appropriate.

#### 4.5 Component-to-Client Pings

Pings can also be used for component-to-client pings, for example from a [Multi-User Chat \(XEP-0045\)](#)<sup>5</sup> component to a client.

Listing 13: Ping

```
<iq from='chat.shakespeare.lit'
  to='juliet@capulet.lit/chamber'
  type='get'
  id='comp1'>
  <ping xmlns='urn:xmpp:ping' />
</iq>
```

Note: The 'to' address should be a full JID <localpart@domain.tld/resource>, since a ping sent to a bare JID <localpart@domain.tld> will be handled by the server on behalf of the client. If the pinged entity supports the ping namespace, it SHOULD return an IQ-result:

Listing 14: Pong

```
<iq from='juliet@capulet.lit/chamber'
  to='chat.shakespeare.lit'
  id='comp1'
  type='result' />
```

If the pinged entity does not support the ping namespace, RFC 6120 requires it to return a <service-unavailable/> error:

Listing 15: Ping Not Supported

```
<iq from='juliet@capulet.lit/chamber'
  to='chat.shakespeare.lit'
  id='comp1'
  type='error'>
  <ping xmlns='urn:xmpp:ping' />
  <error type='cancel'>
    <service-unavailable xmlns='urn:ietf:params:xml:ns:xmpp-stanzas' />
  </error>
</iq>
```

The other error conditions defined in RFC 6120 could also be returned if appropriate.

---

<sup>5</sup>XEP-0045: Multi-User Chat <<https://xmpp.org/extensions/xep-0045.html>>.



## 5 Determining Support

If an entity supports the XMPP Ping protocol, it MUST report that fact by including a service discovery feature of "urn:xmpp:ping" in response to a [Service Discovery \(XEP-0030\)](#)<sup>6</sup> information request:

Listing 16: Service Discovery information request

```
<iq type='get'
  from='juliet@capulet.lit/balcony'
  to='capulet.lit'
  id='disco1'>
  <query xmlns='http://jabber.org/protocol/disco#info' />
</iq>
```

Listing 17: Service Discovery information response

```
<iq type='result'
  from='capulet.lit'
  to='juliet@capulet.lit/balcony'
  id='disco1'>
  <query xmlns='http://jabber.org/protocol/disco#info'>
    ...
    <feature var='urn:xmpp:ping' />
    ...
  </query>
</iq>
```

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 \(XEP-0115\)](#)<sup>7</sup>. However, if an application has not received entity capabilities information from an entity, it SHOULD use explicit service discovery instead.

## 6 Implementation Notes

Some XMPP clients do not respond to IQ stanzas containing unsupported payloads. Although this is in violation of [XMPP Core](#)<sup>8</sup>, this behavior can result in disconnection of clients that are in fact actively connected to the server.

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

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

<sup>8</sup>RFC 6120: Extensible Messaging and Presence Protocol (XMPP): Core <<http://tools.ietf.org/html/rfc6120>>.

## 7 Security Considerations

If a server receives a ping request directed to a full JID `<localpart@domain.tld/resource>` associated with a registered account but there is no connected resource matching the 'to' address, RFC 6120 requires it to reply with a `<service-unavailable/>` error and set the 'from' address of the IQ-error to the full JID provided in the 'to' address of the ping request. If a connected resource receives a ping request but it does not want to reveal its network availability to the sender for any reason (e.g., because the sender is not authorized to know the connected resource's availability), then it too MUST reply with a `<service-unavailable/>` error. This consistency between the server response and the client response helps to prevent presence leaks.

## 8 IANA Considerations

No interaction with the [Internet Assigned Numbers Authority \(IANA\)](https://www.iana.org/)<sup>9</sup> is necessary as a result of this document.

## 9 XMPP Registrar Considerations

### 9.1 Protocol Namespaces

The [XMPP Registrar](https://xmpp.org/registrar/)<sup>10</sup> includes "urn:xmpp:ping" in its registry of protocol namespaces (see [<https://xmpp.org/registrar/namespaces.html>](https://xmpp.org/registrar/namespaces.html)).

## 10 XML Schema

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

<xs:schema
  xmlns:xs='http://www.w3.org/2001/XMLSchema'
  targetNamespace='urn:xmpp:ping'
  xmlns='urn:xmpp:ping'
  elementFormDefault='qualified'>

  <xs:annotation>
```

---

<sup>9</sup>The 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/>.

<sup>10</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/>.

```
<xs:documentation>
  The protocol documented by this schema is defined in
  XEP-0199: http://www.xmpp.org/extensions/xep-0199.html
</xs:documentation>
</xs:annotation>

<xs:element name='ping' type='empty' />

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