



# XMPP

## XEP-0444: Message Reactions

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2024-04-15  
Version 0.2.1

Status	Type	Short Name
Experimental	Standards Track	reactions

This specification defines a way for adding reactions to a message.

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## 1 Introduction

Message reactions allow to express an opinion or feeling towards a message in a quick and light-weight way. Reactions are described in the form of emojis and can enhance communication especially when chatting with multiple parties. Other possible uses include voting and checking to-do list items.

Reactions are typically displayed in a summarized fashion visually attached to the message they belong to.

Related work has been done in [Message Attaching \(XEP-0367\)](#)<sup>1</sup>. However, it can't be used for reactions, as it would cause difficulties with non-supporting clients, is not tailored to emojis and does not specify removal of reactions. To solve these issues, this XEP introduces a separate XML element for reactions.

## 2 Discovering support

### 2.1 Basic support

If a client implements message reactions, it **MUST** specify the 'urn:xmpp:reactions:0' feature in its service discovery information features as specified in [Service Discovery \(XEP-0030\)](#)<sup>2</sup> and the Entity Capabilities profile specified in [Entity Capabilities \(XEP-0115\)](#)<sup>3</sup>.

Listing 1: Client requests information about a chat partner's client

```
<iq type='get'
  to='romeo@montague.lit/orchard'
  from='juliet@capulet.lit/balcony'
  id='info1'>
  <query xmlns='http://jabber.org/protocol/disco#info' />
</iq>
```

Listing 2: Partner's client advertises support for reactions

```
<iq type='result'
  to='juliet@capulet.lit/balcony'
  from='romeo@montague.lit/orchard'
  id='info1'>
  <query xmlns='http://jabber.org/protocol/disco#info'>
  ...
    <feature var='urn:xmpp:reactions:0' />
  ...
  </query>
</iq>
```

---

<sup>1</sup>XEP-0367: Message Attaching <<https://xmpp.org/extensions/xep-0367.html>>.

<sup>2</sup>XEP-0030: Service Discovery <<https://xmpp.org/extensions/xep-0030.html>>.

<sup>3</sup>XEP-0115: Entity Capabilities <<https://xmpp.org/extensions/xep-0115.html>>.

## 2.2 Restricted reactions

In some cases, only a limited number and/or subset of emojis are allowed to react to a message. This is particularly useful in the context of gateways to other chat networks that are not as permissive about which and how many emojis can be used for message reactions. MUC components may also allow room admins to restrict the subset and/or number of emojis per message.

To allow clients to adapt their UIs, entities that have such restrictions in place SHOULD advertise it with [Service Discovery Extensions \(XEP-0128\)](#)<sup>4</sup> in a [Data Forms \(XEP-0004\)](#)<sup>5</sup> using the 'urn:xmpp:reactions:0:restrictions' namespace as FORM\_TYPE.

Listing 3: Entities advertises support for restricted reactions

```
<iq type='result'
  to='juliet@capulet.lit/balcony'
  from='romeo@montague.lit/orchard'
  id='info1'>
  <query xmlns='http://jabber.org/protocol/disco#info'>
    ...
    <feature var='urn:xmpp:reactions:0' />
    <x xmlns='jabber:x:data' type='result'>
      <field var='FORM_TYPE' type='hidden'>
        <value>urn:xmpp:reactions:0:restrictions</value>
      </field>
      <field var='max_reactions_per_user'>
        <value>1</value>
      </field>
      <field var='allowlist'>
        <value> </value>
        <value> </value>
        <value> </value>
      </field>
    </x>
    ...
  </query>
</iq>
```

## 3 Use Cases

### 3.1 Sending reactions to a message

When a user chooses to react to a message with a certain emoji, the client sends a <message> stanza containing a <reactions> element. The chosen emoji is included in a <reaction> element within the <reactions> element. The message is referred to by including its ID or in MUCs its

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<sup>4</sup>XEP-0128: Service Discovery Extensions <<https://xmpp.org/extensions/xep-0128.html>>.

<sup>5</sup>XEP-0004: Data Forms <<https://xmpp.org/extensions/xep-0004.html>>.

stanza-id as defined in [Unique and Stable Stanza IDs \(XEP-0359\)](#) <sup>6</sup> in the 'id' attribute of the <reactions> element.

Listing 4: Romeo sends a message

```
<message to='juliet@capulet.net/balcony' id='744f6e18-a57a-11e9-a656-4889e7820c76' type='chat'>
  <body>Hello, world!</body>
</message>
```

Listing 5: Juliet sends a 🍷 reaction to the message

```
<message to='romeo@capulet.net/orchard' id='7fdd29fa-a57a-11e9-b04a-4889e7820c76' type='chat'>
  <reactions id='744f6e18-a57a-11e9-a656-4889e7820c76' xmlns='urn:xmpp:reactions:0'>
    <reaction></reaction>
  </reactions>
  <store xmlns="urn:xmpp:hints"/>
</message>
```

### 3.2 Updating reactions to a message

If the user chooses to remove reactions from or add reactions to a message they have already reacted to, the client sends a <message> with all <reaction> elements that are (still or newly) applicable to that message.

Listing 6: Juliet adds a 🍷 reaction to the message

```
<message to='romeo@capulet.net/orchard' id='96d73204-a57a-11e9-88b8-4889e7820c76' type='chat'>
  <reactions id='744f6e18-a57a-11e9-a656-4889e7820c76' xmlns='urn:xmpp:reactions:0'>
    <reaction></reaction>
    <reaction></reaction>
  </reactions>
  <store xmlns="urn:xmpp:hints"/>
</message>
```

In order to remove all reactions from a message, an empty <reactions> element is sent.

Listing 7: Juliet removes all reactions from the message

```
<message to='romeo@capulet.net/orchard' id='973c9d2e-a57a-11e9-af82-4889e7820c76' type='chat'>
```

<sup>6</sup>XEP-0359: Unique and Stable Stanza IDs <<https://xmpp.org/extensions/xep-0359.html>>.

```
<reactions id='744f6e18-a57a-11e9-a656-4889e7820c76' xmlns='
  urn:xmpp:reactions:0' />
<store xmlns="urn:xmpp:hints" />
</message>
```

### 3.3 Rejecting a reaction

Entities implementing reaction restrictions MUST reply to invalid reactions payloads with a message type="error" containing a 'not-acceptable' error. The error payload SHOULD contain a human-readable text message explaining the reaction rules.

Listing 8: Romeo sends a message

```
<message from="romeo@legacy-love-network.capulet.net"
  to='juliet@capulet.net'
  id='restricted-reactions-1'
  type='chat'>
  <body>I shall only accept heart emojis as reactions</body>
</message>
```

Listing 9: Juliet reacts with both a 🍷 and a 🍷

```
<message from="juliet@capulet.net"
  to='romeo@legacy-love-network.capulet.net'
  id='will-be-rejected1'
  type='chat'>
  <reactions id='restricted-reactions-1' xmlns='urn:xmpp:reactions:0'>
    <reaction></reaction>
    <reaction></reaction>
  </reactions>
  <store xmlns="urn:xmpp:hints" />
</message>
```

Listing 10: Romeo rejects the reactions

```
<message from="romeo@legacy-love-network.capulet.net"
  to="juliet@capulet.net"
  type="error"
  id="will-be-rejected1">
  <error xmlns="jabber:client" type="modify">
    <not-acceptable xmlns="urn:ietf:params:xml:ns:xmpp-stanzas" />
    <text xmlns="urn:ietf:params:xml:ns:xmpp-stanzas">
      Only , and are allowed as reactions on this legacy IM
      network,
      and you can only use a single emoji at once.
    </text>
  </error>
</message>
```

When receiving this error message, the reaction-sending entity MUST revert the "message reactions" to its previous state in its user interface.

## 4 Business Rules

Messages MUST NOT contain more than one <reactions> element

A message containing a <reactions> element SHOULD be of type 'chat' or 'groupchat'.

A <reaction> element SHOULD only contain Unicode codepoints that can be displayed as a single emoji, as specified in the latest revision of the [Unicode® Technical Standard #51](#)<sup>7</sup>. Receiving entities MAY ignore <reaction> elements that do not comply with this specification. A receiving client SHOULD show reactions attached to the message they were in response to. Reactions MAY be displayed in a summarized fashion.

A <reactions> element MUST NOT contain the same reaction more than once. A receiving entity SHOULD ignore duplicate reactions inside a <reactions> element.

The sending entity SHOULD add a <store/> hint, as defined in [Message Processing Hints \(XEP-0334\)](#)<sup>8</sup>, if the message being reacted to does not carry a <no-store/> hint.

If a message is updated using [Last Message Correction \(XEP-0308\)](#)<sup>9</sup>, the 'id' attribute of the <reactions> element SHOULD reference the original message ID. A receiving entity SHOULD accept messages with a <reactions> element referencing a message correction and SHOULD handle such elements as if it was using the message ID of the original message.

### 4.1 Acceptable reactions

In direct conversations, a reaction MUST only be accepted if the sender's bare JID matches the bare JID of any of the two involved parties.

In MUCs and MUC PMs, the recipient SHOULD ensure that the real bare JID of the sending occupant did not already send a reaction to that message to accept it as a new reaction, e.g. by keeping track of leave/join presences since the message was sent. This implies that in semi-anonymous MUCs it MAY be impossible to attach reactions to a message received from the history. A reaction MAY still be a valid reaction update (as per the next paragraph) if it was not accepted as a new reaction.

A reaction MUST only be considered an update if it originates from the same sender as a previous reaction message. In direct conversations, this means the bare JID MUST match the original bare JID. In MUCs and MUC PMs, the sender's full JID MAY not match the original full JID, but the recipient MUST ensure that the real bare JID of the sending occupant is the same as the real bare JID of the previous reaction message, e.g. by keeping track of leave/join presences.

If a message containing a <reactions> element arrives delayed, which means it carries a

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<sup>7</sup>Unicode® Technical Standard #51 <<http://www.unicode.org/reports/tr51/>>.

<sup>8</sup>XEP-0334: Message Processing Hints <<https://xmpp.org/extensions/xep-0334.html>>.

<sup>9</sup>XEP-0308: Last Message Correction <<https://xmpp.org/extensions/xep-0308.html>>.



<delay/> element as defined in [Delayed Delivery \(XEP-0203\)](#)<sup>10</sup>, it SHOULD only be accepted if no newer reaction from the same sender was already accepted.

## 4.2 Using the correct ID

For messages of type 'groupchat', the stanza's 'id' attribute MUST NOT be used for reactions. Instead, in group chat situations, the ID assigned to the stanza by the group chat itself must be used. This is discovered in a <stanza-id> element with a 'by' attribute that matches the bare JID of the group chat, as defined in [Unique and Stable Stanza IDs \(XEP-0359\)](#)<sup>11</sup>.

This implies that group chat messages without a [Unique and Stable Stanza IDs \(XEP-0359\)](#)<sup>12</sup> stanza-id cannot be reacted to.

For other message types, the sender should use the 'id' from a [Unique and Stable Stanza IDs \(XEP-0359\)](#)<sup>13</sup> <origin-id> if present, or the value of the 'id' attribute on the <message> otherwise.

## 5 IANA Considerations

This document requires no interaction with the [Internet Assigned Numbers Authority \(IANA\)](#)<sup>14</sup>.

## 6 XMPP Registrar Considerations

### 6.1 Protocol Namespaces

The [XMPP Registrar](#)<sup>15</sup> includes 'urn:xmpp:reactions:0' in its registry of protocol namespaces (see <<https://xmpp.org/registrar/namespaces.html>>).

- urn:xmpp:reactions:0

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<sup>10</sup>XEP-0203: Delayed Delivery <<https://xmpp.org/extensions/xep-0203.html>>.

<sup>11</sup>XEP-0359: Unique and Stable Stanza IDs <<https://xmpp.org/extensions/xep-0359.html>>.

<sup>12</sup>XEP-0359: Unique and Stable Stanza IDs <<https://xmpp.org/extensions/xep-0359.html>>.

<sup>13</sup>XEP-0359: Unique and Stable Stanza IDs <<https://xmpp.org/extensions/xep-0359.html>>.

<sup>14</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>15</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/>>.

## 7 XML Schema

### 7.1 urn:xmpp:reactions:0

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

<xs:schema
  xmlns:xs='http://www.w3.org/2001/XMLSchema'
  targetNamespace='urn:xmpp:reactions:0'
  xmlns='urn:xmpp:reactions:0'
  elementFormDefault='qualified'>

  <xs:element name='reactions'>
    <xs:complexType>
      <xs:sequence minOccurs='0' maxOccurs='unbounded'>
        <xs:element name='reaction' type='xs:string'/>
      </xs:sequence>
      <xs:attribute name='id' type='xs:string' use='required'/>
    </xs:complexType>
  </xs:element>

</xs:schema>
```