



# XMPP

## XEP-0401: Ad-hoc Account Invitation Generation

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This document defines a protocol and URI scheme for user invitation in order to allow a third party to register on a server. The goal of this is to make onboarding for XMPP IM newcomers as easy as possible.

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## 1 Introduction

Romeo is an active XMPP IM (Instant Messaging) user or the operator of an XMPP server. He convinces Juliet (who may not have an XMPP account yet) to install a client but she may still need to choose an XMPP server, create an account, and add Romeo as a contact. This specification defines two ways for Romeo to simplify this process for Juliet:

### 1.1 User Invitation

If Romeo is an XMPP user, he can create an out-of-band link (URI) which allows Juliet to:

1. Download an XMPP client (if needed).
2. Optionally register an account with Romeo's server (if permitted by the server rules), or with a public server.
3. Establish a mutual presence subscription between Romeo and Juliet.

The process is designed to automatically skip steps that Juliet already completed, to make the overall experience as smooth as possible.

### 1.2 Account Creation

If Romeo is an administrator of an XMPP server, he can create an out-of-band link (URI) which allows Juliet to:

1. Download an XMPP client (if needed).
2. Register an account on Romeo's server (with a user name pre-defined by Romeo or chosen by Juliet, and a password not known to Romeo).
3. Establish a mutual presence subscription between Romeo and Juliet.

## 2 Requirements

This specification makes use of XMPP URIs. The basic URI scheme for XMPP is defined in [RFC 5122](#)<sup>1</sup> and extended in [XMPP URI Query Components \(XEP-0147\)](#)<sup>2</sup> and [Pre-Authenticated Roster Subscription \(XEP-0379\)](#)<sup>3</sup>. Furthermore, this heavily builds upon the blocks provided

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<sup>1</sup>RFC 5122: Internationalized Resource Identifiers (IRIs) and Uniform Resource Identifiers (URIs) for the Extensible Messaging and Presence Protocol (XMPP) <<http://tools.ietf.org/html/rfc5122>>.

<sup>2</sup>XEP-0147: XMPP URI Query Components <<https://xmpp.org/extensions/xep-0147.html>>.

<sup>3</sup>XEP-0379: Pre-Authenticated Roster Subscription <<https://xmpp.org/extensions/xep-0379.html>>.

in XEP-0379 for landing page and roster subscription.

To create out-of-band invitation links, Romeo's server needs to implement the [Ad-Hoc Commands \(XEP-0050\)](#)<sup>4</sup> commands specified in the following section, and his client must be able to execute them.

Furthermore, Romeo's server SHOULD provide a HTTPS service hosting the landing page.

Romeo's server MUST support at least one [Pre-Authenticated In-Band Registration](#) mechanism.

### 3 Discovery

Romeo can query his server for the availability of "User Invitation" and "Account Creation" commands:

Listing 1: Discover available ad-hoc commands

```
<iq type='get' from='romeo@example.com' to='example.com' id='disco'>
  <query xmlns='http://jabber.org/protocol/disco#items'
        node='http://jabber.org/protocol/commands' />
</iq>
```

TODO: use appropriate node namespace.

Listing 2: Discovery result for available ad-hoc commands

```
<iq type='result' to='romeo@example.com' from='example.com' id='disco'
  >
  <query xmlns='http://jabber.org/protocol/disco#items'
        node='http://jabber.org/protocol/commands'>
    <item jid='example.com'
          node='urn:xmpp:invite#invite'
          name='Invite_user' />
    <item jid='example.com'
          node='urn:xmpp:invite#create-account'
          name='Create_account' />
  </query>
</iq>
```

### 4 Glossary

OPTIONAL.

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<sup>4</sup>XEP-0050: Ad-Hoc Commands <<https://xmpp.org/extensions/xep-0050.html>>.

## 5 Use Cases

### 5.1 Creating a User Invitation

A user can execute the 'invite' command to obtain a new invitation link with a unique invitation token.

Listing 3: Execute user invitation command

```
<iq type='set' from='romeo@example.com' to='example.com' id='exec1'>
  <command xmlns='http://jabber.org/protocol/commands'
    node='urn:xmpp:invite#invite'
    action='execute' />
</iq>
```

Listing 4: User invitation finished

```
<iq type='result' to='romeo@example.com' from='example.com' id='exec2'
>
  <command xmlns='http://jabber.org/protocol/commands'
    node='urn:xmpp:invite#invite'
    status='completed'>
    <x xmlns='jabber:x:data' type='result'>
      <item>
        <field var='uri'>
          <value>xmpp:inviter@example.com?roster;preauth=TOKEN;ibr=y</
            value>
          </field>
          <field var='landing-url'>
            <value>https://example.com/invite/#TOKEN</value>
          </field>
          <field var='expire'>
            <value>2017-11-06T02:56:15Z</value>
          </field>
        </item>
      </x>
    </command>
  </iq>
```

The token should be unique, sufficiently long and generated by a strong random number generator.

A server MUST provide the **uri** field which contains an XMPP URI of the following format:

```
xmpp:inviter@example.com?roster;preauth=TOKEN;ibr=y
```

The **ibr** query component in the XMPP URI indicates that the invitee is allowed to create an account on Romeo's server, using the 'preauth' token. If the server does not support or allow in-band registration for invited users, the server MUST omit the **ibr** query component.

Additionally, the server SHOULD provide the **landing-url** field which contains an HTTPS URL of a web-based landing page as described in [Pre-Authenticated Roster Subscription \(XEP-0379\)](#)<sup>5</sup> § 3.3. The URL format may differ from the example shown here depending on where the landing page is hosted.

If the server omits the **landing-page** field, Romeo's client SHOULD generate an appropriate landing page URL hosted by the client developer or a trusted third party.

A server MAY provide a field which provides the expiration date of the generated token. The expiration date MUST conform to the DateTime profile specified in [XMPP Date and Time Profiles \(XEP-0082\)](#)<sup>6</sup>. If the field is not provided, the token does not expire.

Romeo's client should provide adequate means to export the **landing-page** URL, possibly accompanied with a short description and the **expire** information, so that Romeo can share it with Juliet by other means than XMPP, like e-mail or a QR code.

## 5.2 Landing Page

The landing page that the generated URL points to should correspond to the format described in XEP-0379 §3.3, and it needs to convey the following information:

- A short text that this is an XMPP invitation from Romeo.
- A client recommendation (based on the detected web browser/OS) with download links.
- A prominent button that activates the encoded **xmpp:** link.

If the landing page is hosted by Romeo's server, the server MAY display additional information based on the supplied TOKEN value, like the name of the inviter or validity information.

## 5.3 Redeeming a User Invitation

If Juliet does not have an XMPP client installed, she will not be able to open the **xmpp:** link from the invitation page. For this case, the landing page needs to indicate that a client must be installed first, and that the link will not work as intended without. The automatic installation of an appropriate IM client when a user clicks on an **xmpp:** is outside of the scope of this document.

With an XMPP client installed, Juliet can open the **xmpp:** link and have the client process it appropriately, as follows:

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<sup>5</sup>XEP-0379: Pre-Authenticated Roster Subscription <<https://xmpp.org/extensions/xep-0379.html>>.

<sup>6</sup>XEP-0082: XMPP Date and Time Profiles <<https://xmpp.org/extensions/xep-0082.html>>.

### 5.3.1 Pre-Configured Account

If Juliet's client is already configured with an account, the default action for the presented `xmpp:inviter@example.com?roster;...` URI is to add the inviter to Juliet's roster. This should be performed as described in §3.4 of XEP-0379, by sending a presence subscription request containing the 'preauth' token.

If Juliet already has Romeo in her roster, her client should open the appropriate chat interface instead.

### 5.3.2 No Configured Account

If Juliet's client does not have an XMPP account configured, she needs to login or register an account first. Therefore, the client should provide an interface with the following options:

- Login with an existing XMPP account.
- Register an account with Romeo's server (if the URI contains a `ibr=y` parameter).
- Register an account with a public or client-endorsed server.

If the `xmpp:` URI provided by Romeo contains the `ibr=y` parameter, it indicates that the server supports the [Pre-Authenticated In-Band Registration](#) defined in this document. If Juliet chooses this approach, the server will ensure that after the registration, Romeo is added to her roster with a full presence subscription.

If Juliet chooses to login or register with a different server, her client must complete the respective process and issue a subscription request as described in §3.4 of XEP-0379.

## 5.4 Initiating Account Creation

If Romeo is the administrator of an XMPP server, he might want to ensure that Juliet obtains an account on this server, with a username defined either by Romeo or by Juliet, and in a way that does not require the out-of-band communication of user passwords.

TODO: description of overall process steps, design motivation.

Listing 5: Execute account creation command

```
<iq type='set' from='romeo@example.com' to='example.com' id='exec1'>
  <command xmlns='http://jabber.org/protocol/commands'
    node='urn:xmpp:invite#create-account'
    action='execute' />
</iq>
```



Listing 6: Service returns form for account creation

```

<iq type='result' to='romeo@example.com' from='example.com' id='exec1'
>
  <command xmlns='http://jabber.org/protocol/commands'
    sessionid='config:20020923T213616Z-700'
    node='urn:xmpp:invite#create-account'
    status='executing'>
    <actions execute='complete'>
      <complete/>
    </actions>
    <x xmlns='jabber:x:data' type='form'>
      <field var='username' label='Username' type='text-single'/>
      <field var='roster-subscription' label='Roster_subscription'
        type='boolean'/>
    </x>
  </command>
</iq>

```

A server MAY require a username to be specified for account creation. In this case, the server MUST add the <required/> element to the username field. The username MUST be a valid localpart as defined in RFC 6122<sup>7</sup> §2.3.

Listing 7: Account creation with specified username

```

<iq type='set' from='romeo@example.com' to='example.com' id='exec2'>
  <command xmlns='http://jabber.org/protocol/commands'
    sessionid='config:20020923T213616Z-700'
    node='urn:xmpp:invite#create-account'>
    <x xmlns='jabber:x:data' type='submit'>
      <field var='username'>
        <value>juliet</value>
      </field>
    </x>
  </command>
</iq>

```

Listing 8: Account creation finished

```

<iq type='result' to='romeo@example.com' from='example.com' id='exec2'
>
  <command xmlns='http://jabber.org/protocol/commands'
    sessionid='config:20020923T213616Z-700'
    node='urn:xmpp:invite#create-account'
    status='completed'>
    <x xmlns='jabber:x:data' type='result'>
      <item>

```

<sup>7</sup>RFC 6122: Extensible Messaging and Presence Protocol (XMPP): Address Format <<http://tools.ietf.org/html/rfc6122>>.

```

    <field var='uri'>
      <value>xmpp:juliet@example.com?register;preauth=TOKEN</value>
    </field>
    <field var='landing-url'>
      <value>https://example.com/invite/#TOKEN</value>
    </field>
    <field var='expire'>
      <value>2017-11-06T02:56:15Z</value>
    </field>
  </item>
</x>
</command>
</iq>

```

The server's response for account creation is the same as for user invitation except for the format of the **uri** field which contains an XMPP URI of the following format:

```
xmpp:juliet@example.com?register;preauth=TOKEN
```

If no username was specified during the account creation process, the local part of the JID in the XMPP URI is omitted by the server which results in the following format:

```
xmpp:example.com?register;preauth=TOKEN
```

TODO: note about sensitivity of TOKEN

## 5.5 Pre-Authenticated In-Band Registration

In order to allow invited users to register on a server, the server must support pre-authenticated in-band registration based on one of the following specifications:

- [Pre-Authenticated In-Band Registration \(XEP-0445\)](#)<sup>8</sup>
- TODO: define a mechanism based on [Extensible In-Band Registration \(XEP-0389\)](#)<sup>9</sup>

The invited user's client needs to connect to the server, check which of the above mechanisms are supported, and continue as specified in the respective document.

After the invitee has successfully registered on the inviter's server and roster subscription is enabled for account creation, the server MUST use roster pushes as defined in [RFC 6121](#)<sup>10</sup> §2.1.6 in order to inform the inviter about the invitee's new account without the need to

<sup>8</sup>XEP-0445: Pre-Authenticated In-Band Registration <<https://xmpp.org/extensions/xep-0445.html>>.

<sup>9</sup>XEP-0389: Extensible In-Band Registration <<https://xmpp.org/extensions/xep-0389.html>>.

<sup>10</sup>RFC 6121: Extensible Messaging and Presence Protocol (XMPP): Instant Messaging and Presence <<http://tools.ietf.org/html/rfc6121>>.

reconnect.

Listing 9: Push roster item of invitee to inviter

```
<iq type='set' from='romeo@example.com' id='push'>
  <query xmlns='jabber:iq:roster'>
    <item subscription='both' jid='juliet@example.com' />
  </query>
</iq>
```

## 6 Business Rules

### 6.1 Fallback to Client-Side PARS

If the inviter's server does not support user invitation, the client application SHOULD silently fall back to [Pre-Authenticated Roster Subscription \(XEP-0379\)](#)<sup>11</sup> for a good user experience.

### 6.2 Account Creation

If a username was specified during the account creation process, the server SHOULD NOT create an account on the server until the invitee actually registers it with the corresponding token. The server MUST reserve the username at least until the corresponding token expires.

## 7 Implementation Notes

### 7.1 XMPP Server Suggestion for Invitees

If the invitee opens an invitation URI with **ibr=y** and chooses to create a new account, the client SHOULD pre-fill the inviter JID's domain part as the new account's domain. The client MAY provide a mechanism to enter or choose a different server, though.

## 8 Accessibility Considerations

OPTIONAL.

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<sup>11</sup>XEP-0379: Pre-Authenticated Roster Subscription <<https://xmpp.org/extensions/xep-0379.html>>.

## 9 Internationalization Considerations

OPTIONAL.

## 10 Security Considerations

See security considerations in [Pre-Authenticated Roster Subscription \(XEP-0379\)](#) <sup>12</sup>.

## 11 IANA Considerations

This document requires no interaction with the [Internet Assigned Numbers Authority \(IANA\)](#) <sup>13</sup>.

## 12 XMPP Registrar Considerations

As authorized by [XMPP URI Query Components \(XEP-0147\)](#) <sup>14</sup>, the XMPP Registrar maintains a registry of queries and key-value pairs for use in XMPP URIs (see <https://xmpp.org/registrar/querytypes.html>).

The key-value parameter **preauth** is added to the **register** query action as defined in [In-Band Registration \(XEP-0077\)](#) <sup>15</sup>

```
<querytype>
  <name>register</name>
  ...
  <key>
    <name>preauth</name>
    <desc>the token used to allow one-time in-band registration on
      the inviter's s_server</desc>
  </key>
</querytype>
```

In addition to the **preauth** key-value parameter define in [Pre-Authenticated Roster Subscription \(XEP-0379\)](#) <sup>16</sup>, the **ibr** parameter is added to the **roster** query action.

<sup>12</sup>XEP-0379: Pre-Authenticated Roster Subscription <https://xmpp.org/extensions/xep-0379.html>.

<sup>13</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>14</sup>XEP-0147: XMPP URI Query Components <https://xmpp.org/extensions/xep-0147.html>.

<sup>15</sup>XEP-0077: In-Band Registration <https://xmpp.org/extensions/xep-0077.html>.

<sup>16</sup>XEP-0379: Pre-Authenticated Roster Subscription <https://xmpp.org/extensions/xep-0379.html>.

```
<querytype>
  <name>roster</name>
  ...
  <key>
    <name>ibr</name>
    <value>y</value>
    <desc>the parameter to indicate that the token allows the
      invitee to create an account on the inviter's_server_via_in-
      band_registration</desc>
  </key>
</querytype>
```

## 13 XML Schema

REQUIRED for protocol specifications.