



XMPP

XEP-0396: Jingle Encrypted Transports - OMEMO

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Extension for JET introducing OMEMO End-to-End Encrypted Jingle Transports.

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1 Introduction

Jingle Encrypted Transports (XEP-0391) ¹ can be used to utilize different end-to-end encryption methods to secure Jingle Transports, eg. in the context of Jingle File Transfer (XEP-0234) ². This document aims to extend Jingle Encrypted Transports (XEP-0391) ³ to allow the use of OMEMO encryption with Jingle transports. To achieve this goal, this protocol extension makes use of OMEMOs `KeyTransportElements`.

2 Mappings

Conveniently the OMEMO protocol already provides a way to transport key material to another entity. So called `KeyTransportElements` are basically normal OMEMO `MessageElements`, but without a payload, so the contained key can be used for something else (see Section 4.6 of OMEMO Encryption (XEP-0384) ⁴). This extension uses the key encrypted in the `KeyTransportMessages` `<key>` attribute and initialization vector from the `<iv>` attribute to secure Jingle Transports. The key corresponds to the Transport Key of XEP-0391, while the iv corresponds to the Initialization Vector. The `KeyTransportMessage` is the equivalent to the Envelope Element. Note that within the Envelope Element, the Transport Key is encrypted with the OMEMO ratchet.

3 Limitations

Unfortunately OMEMO Encryption (XEP-0384) ⁵ determines the type of the transported key to be AES-128-GCM-NoPadding, so no other configuration can be used in the context of this extension.

Since OMEMO `deviceIds` are not bound to XMPP resources, the initiator MUST encrypt the Transport Key for every device of the recipient.

4 Key Transport

In order to transport a key to the responder, the initiator creates a fresh AES-128-GCM-NoPadding Transport Key and Initialization Vector and generates an OMEMO `KeyTransportElement` from it as described in OMEMO Encryption (XEP-0384) ⁶. This is then added as

¹XEP-0391: Jingle Encrypted Transports <<https://xmpp.org/extensions/xep-0391.html>>.

²XEP-0234: Jingle File Transfer <<https://xmpp.org/extensions/xep-0234.html>>.

³XEP-0391: Jingle Encrypted Transports <<https://xmpp.org/extensions/xep-0391.html>>.

⁴XEP-0384: OMEMO Encryption <<https://xmpp.org/extensions/xep-0384.html>>.

⁵XEP-0384: OMEMO Encryption <<https://xmpp.org/extensions/xep-0384.html>>.

⁶XEP-0384: OMEMO Encryption <<https://xmpp.org/extensions/xep-0384.html>>.

a child of the JET <security> element. The 'cipher' attribute MUST be set to 'aes-128-gcm-nopadding:0' (see the [ciphers](#) section of XEP-0391). The value of the 'type' attribute must be set to the namespace of the used version of XEP-0384 (see Namespace Versioning regarding the possibility of incrementing the version number).

Listing 1: Romeo initiates an OMEMO encrypted file offer

```
<iq from='romeo@montague.example/dr4hcr0st3lup4c'
  id='nzu25s8'
  to='juliet@capulet.example/yn0cl4bnw0yr3vym'
  type='set'>
  <jingle xmlns='urn:xmpp:jingle:1'
    action='session-initiate'
    initiator='romeo@montague.example/dr4hcr0st3lup4c'
    sid='851ba2'>
    <content creator='initiator' name='a-file-offer' senders='
      initiator'>
      <description xmlns='urn:xmpp:jingle:apps:file-transfer:5'>
      <file>
        <date>1969-07-21T02:56:15Z</date>
        <desc>This is a test. If this were a real file...</desc>
        <media-type>text/plain</media-type>
        <name>test.txt</name>
        <range/>
        <size>6144</size>
        <hash xmlns='urn:xmpp:hashes:2'
          algo='sha-1'>w0mcJylzCn+AfvuGdqky2+KP48=</hash>
        </file>
      </description>
      <transport xmlns='urn:xmpp:jingle:transports:s5b:1'
        mode='tcp'
        sid='vj3hs98y'>
        <candidate cid='hft54dgy'
          host='192.168.4.1'
          jid='romeo@montague.example/dr4hcr0st3lup4c'
          port='5086'
          priority='8257636'
          type='direct'>
        </transport>
      <security xmlns='urn:xmpp:jingle:jet:0'
        name='a-file-offer'
        cipher='urn:xmpp:ciphers:aes-128-gcm-nopadding'
        type='eu.siacs.conversations.axolotl'>
      <encrypted xmlns='eu.siacs.conversations.axolotl'>
        <header sid='27183'>
          <key rid='31415'>BASE64ENCODED...</key>
          <key prekey="true" rid='12321'>BASE64ENCODED...</key>
          <!--{}- ... -{}-->
        </header>
      </encrypted>
    </content>
  </jingle>
</iq>
```

```

        <iv>BASE64ENCODED... </iv>
    </header>
</encrypted>
</security>
</content>
</jingle>
</iq>

```

The recipient decrypts the OMEMO KeyTransportElement to retrieve the Transport Secret. Transport Key and Initialization Vector are later used to encrypt/decrypt data as described in [Jingle Encrypted Transports \(XEP-0391\)](#)⁷.

5 Determining Support

To advertise its support for JET-OMEMO, when replying to service discovery information ("disco#info") requests an entity MUST return URNs for any version of this extension, as well as of the JET extension that the entity supports -- e.g., "urn:xmpp:jingle:jet-omemo:0" for this version, or "urn:xmpp:jingle:jet:0" for [Jingle Encrypted Transports \(XEP-0391\)](#)⁸ (see Namespace Versioning regarding the possibility of incrementing the version number).

Listing 2: Service discovery information request

```

<iq from='romeo@montague.example/dr4hcr0st3lup4c'
  id='uw72g176'
  to='juliet@capulet.example/yn0cl4bnw0yr3vym'
  type='get'>
  <query xmlns='http://jabber.org/protocol/disco#info' />
</iq>

```

Listing 3: Service discovery information response

```

<iq from='juliet@capulet.example/yn0cl4bnw0yr3vym'
  id='uw72g176'
  to='romeo@montague.example/dr4hcr0st3lup4c'
  type='result'>
  <query xmlns='http://jabber.org/protocol/disco#info'>
    <feature var='urn:xmpp:jingle:jet:0' />
    <feature var='urn:xmpp:jingle:jet-omemo:0' />
  </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 \(XEP-0115\)](#)⁹. However, if an application has not received entity capabilities

⁷XEP-0391: Jingle Encrypted Transports <<https://xmpp.org/extensions/xep-0391.html>>.

⁸XEP-0391: Jingle Encrypted Transports <<https://xmpp.org/extensions/xep-0391.html>>.

⁹XEP-0115: Entity Capabilities <<https://xmpp.org/extensions/xep-0115.html>>.

information from an entity, it SHOULD use explicit service discovery instead.