



XMPP

XEP-0374: OpenPGP for XMPP Instant Messaging

Florian Schmaus

<mailto:flo@geekplace.eu>

<xmpp:flo@geekplace.eu>

Dominik Schürmann

<mailto:dominik@dominikscherermann.de>

<xmpp:dominik@dominikscherermann.de>

Vincent Breitmoser

<mailto:look@my.amazin.horse>

<xmpp:valodim@stratum0.org>

2018-01-25

Version 0.2.0

Status	Type	Short Name
Deferred	Standards Track	oxim

Specifies a OpenPGP for XMPP (XEP-0373) profile for the Instant Messaging (IM) use case.

Legal

Copyright

This XMPP Extension Protocol is copyright © 1999 – 2018 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	OX Instant Messaging Profile	1
2.1	Discovering Support	1
2.2	OpenPGP Secured Instant Messaging	2
2.3	OpenPGP Key Handling	2
2.3.1	Choosing Public Keys	2
2.3.2	OpenPGP Secret Key Synchronization	3
3	Business Rules	3
3.1	Always Use <signcrypt/>	3
3.2	Provide Hints	3
4	IANA Considerations	3
5	XMPP Registrar Considerations	4
5.1	Protocol Namespaces	4
6	XML Schema	4
7	Acknowledgements	4

1 Introduction

This XMPP extension protocol specifies a profile of [OpenPGP for XMPP \(XEP-0373\)](#)¹ for OpenPGP secured Instant Messaging (IM).

Unlike similar XEPs, e.g., [OMEMO Encryption \(XEP-0384\)](#)², this XEP *does not* provide Forward Secrecy (FS), but as an advantage in return, allows users to read their archived conversations (respectively their encrypted data) later on. Of course, only as long as they still possess the according secret key. FS and being able to decrypt archived messages are mutually exclusive, i.e., one can not have both. The authors therefore consider this XEP complementary to similar ones which also provide end-to-end encryption but with a different feature set.

2 OX Instant Messaging Profile

2.1 Discovering Support

If an entity supports exchanging OpenPGP encrypted and signed instant messages over XMPP, i.e., what is specified herein, it **MUST** advertise that fact by announcing a [Service Discovery \(XEP-0030\)](#)³ feature of 'urn:xmpp:openpgp:im:0'. It thus includes this feature in response to a service discovery request.

Listing 1: Service Discovery information request

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

Listing 2: Service Discovery information response

```
<iq type='result'
  from='romeo@example.org/orchard'
  to='juliet@example.org/balcony'
  id='disco1'>
  <query xmlns='http://jabber.org/protocol/disco#info'>
    ...
    <feature var='urn:xmpp:openpgp:im:0' />
    ...
  </query>
</iq>
```

¹XEP-0373: OpenPGP for XMPP <<https://xmpp.org/extensions/xep-0373.html>>.

²XEP-0384: OMEMO Encryption <<https://xmpp.org/extensions/xep-0384.html>>.

³XEP-0030: Service Discovery <<https://xmpp.org/extensions/xep-0030.html>>.

Because of possible downgrade attacks, users should be given an option to force the usage of the protocol defined herein no matter if the remote announces support or not.

2.2 OpenPGP Secured Instant Messaging

In order to establish an OpenPGP secured IM communication, IM clients first need to determine the public key of their interlocutor(s). OpenPGP historically provides public keyservers which can be used for key retrieval. Additionally there are methods to store OpenPGP key information in the Domain Name System (DNS). This specification does not restrict the mechanism of key discovery and retrieval, but compliant clients MUST support the public key announcement as described in XEP-0373 § 4.

After the required public keys have been discovered, XMPP clients engage in an OpenPGP secured IM conversation by exchanging `<openpgp/>` extension elements. They MUST use the `<signcrypt/>` OpenPGP content element specified in XEP-0373 § 3.1.

The child elements of the OpenPGP content element's `<payload/>` can be seen as stanza extension elements which are encrypted and signed. After the `<openpgp/>` element and the including `<signcrypt/>`, element was verified, they SHOULD be processed similar as if they had been direct extension elements of the stanza. For example, direct child elements found in `<payload/>` in the context of IM could be:

- Message bodies (RFC 6121⁴ § 5.2.3): `<body xmlns='jabber:client'/>`
- Chat State Notifications (XEP-0085)⁵: `<active xmlns='http://jabber.org/protocol/chatstates'/>`
- XHTML-IM (XEP-0071)⁶: `<html xmlns='http://jabber.org/protocol/xhtml-im'/>`

But just as with stanza extension elements, child elements of `<payload/>` can be any extension element. The example above uses the `<body/>` element as defined in RFC 6121. Note that it uses 'jabber:client' as namespace, but since the same `<body/>` element is also defined in the 'jabber:server' namespace, recipients MUST accept both.

2.3 OpenPGP Key Handling

2.3.1 Choosing Public Keys

Clients MUST expect multiple public keys to be announced for a single remote entity. In this case all keys MUST be used for encryption.

⁴RFC 6121: Extensible Messaging and Presence Protocol (XMPP): Instant Messaging and Presence <http://tools.ietf.org/html/rfc6121>.

⁵XEP-0085: Chat State Notifications <https://xmpp.org/extensions/xep-0085.html>.

⁶XEP-0071: XHTML-IM <https://xmpp.org/extensions/xep-0071.html>.

2.3.2 OpenPGP Secret Key Synchronization

Clients MAY want to use the mechanism in XEP-0373 § 5 to synchronize their secret key(s) over multiple devices. Thus, they should query the user's PEP service for an eventually stored encrypted secret key.

3 Business Rules

3.1 Always Use <signcrypt/>

Only <signcrypt/> MUST be used for the IM use case. Encrypted but unsigned messages (<crypt/>) do not provide an advantage over unencrypted ones since the sender can not be verified. As result of this rule, the user interface of IM clients implementing the protocol defined herein MUST NOT provide an option for the user to select between sign+crypt, sign or crypt. This also increases the usability.

3.2 Provide Hints

In the IM use case every <message/> equipped with <openpgp/> SHOULD include an unencrypted <body/> explaining that the actual message is encrypted. Furthermore the message SHOULD contain a 'store' hint as defined in [Message Processing Hints \(XEP-0334\)](#)⁷ § 4.4 and a "this message contains an encrypted body text" hint in form of an <encryption/> extension element as specified by [Explicit Message Encryption \(XEP-0380\)](#)⁸.

Listing 3: An encrypted and signed message with hints.

```
<message to='juliet@example.org'>
  <body>This message is encrypted using OpenPGP.</body>
  <store xmlns='urn:xmpp:hints' />
  <encryption xmlns='urn:xmpp:eme:0' namespace='urn:xmpp:openpgp:0' />
  <openpgp xmlns='urn:xmpp:openpgp:0'>
    BASE64_OPENPGP_MESSAGE_CONTAINING_CONTENT_ELEMENT
  </openpgp>
</message>
```

4 IANA Considerations

This document requires no interaction with the [Internet Assigned Numbers Authority \(IANA\)](#)⁹.

⁷XEP-0334: Message Processing Hints <<https://xmpp.org/extensions/xep-0334.html>>.

⁸XEP-0380: Explicit Message Encryption <<https://xmpp.org/extensions/xep-0380.html>>.

⁹The 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

5 XMPP Registrar Considerations

5.1 Protocol Namespaces

The [XMPP Registrar](#) ¹⁰ includes 'urn:xmpp:openpgp:0' in its registry of protocol namespaces (see <https://xmpp.org/registrar/namespaces.html>).

6 XML Schema

This XEP does not define a Schema, since it exclusively uses elements from XEP-0373 and other XEPs.

7 Acknowledgements

Please refer to the [Acknowledgements section](#) of XEP-0373 since the two XEPs were designed together.

<http://www.iana.org/>.

¹⁰The 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/>.