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Interworking between the Session Initiation Protocol (SIP) and the  
Extensible Messaging and Presence Protocol (XMPP): One-to-One Text Chat  
draft-ietf-stox-chat-00

#### Abstract

This document defines a bidirectional protocol mapping for the exchange of instant messages in the context of a one-to-one chat session between a user of the Session Initiation Protocol (SIP) and a user of the Extensible Messaging and Presence Protocol (XMPP). Specifically for SIP text chat, this document specifies a mapping to the Message Session Relay Protocol (MSRP).

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## 1. Introduction

Both the Session Initiation Protocol [RFC3261] and the Extensible Messaging and Presence Protocol [RFC6120] can be used for the purpose of one-to-one text chat over the Internet. To ensure interworking between these technologies, it is important to define bidirectional protocol mappings.

The architectural assumptions underlying such protocol mappings are provided in [I-D.ietf-stox-core], including mapping of addresses and error conditions. This document specifies mappings for one-to-one text chat sessions (sometimes called "session-mode" messaging); in particular, this document specifies mappings between XMPP messages of type "chat" and the Message Session Relay Protocol [RFC4975]. Mappings for single instant messages and groupchat are provided in separate documents.

The approach taken here is to directly map syntax and semantics from one protocol to another. The mapping described herein depends on the protocols defined in the following specifications:

- o XMPP chat sessions using message stanzas of type "chat" are specified in [RFC6121].
- o SIP-based chat sessions using the SIP INVITE and SEND request types are specified in [RFC4975].

In SIMPLE, a chat session is formally negotiated just as any other session type is using SIP. By contrast, a one-to-one chat "session" in XMPP is an informal construct and is not formally negotiated: a user simply sends a message of type "chat" to a contact, the contact then replies to the message, and the sum total of such messages exchanged during a defined period of time is considered to be a chat session. To overcome the disparity between these approaches, a gateway that wishes to map between SIP and XMPP for one-to-one chat sessions needs to maintain some additional state, as described below.

The discussion venue for this document is the mailing list of the STOX WG; visit <https://www.ietf.org/mailman/listinfo/stox> for subscription information and discussion archives.

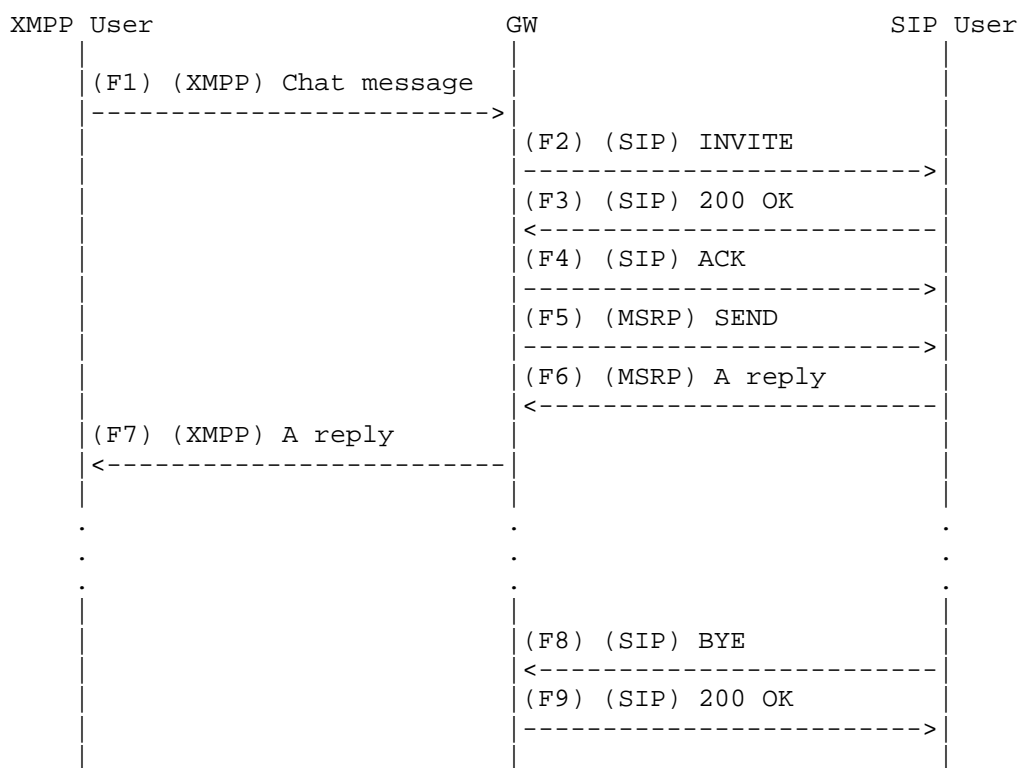
## 2. Terminology

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [RFC2119].

### 3. XMPP to MSRP

In XMPP, the "informal session" approach is to simply send someone a <message/> of type "chat" without starting any session negotiation ahead of time (as described in [RFC6121]). The XMPP "informal session" approach maps very well into a SIP MESSAGE request, as described in [I-D.ietf-stox-core]. However, the XMPP informal session approach can also be mapped to MSRP if the XMPP-to-SIP gateway maintains additional state.

The order of events is as follows.



First the XMPP user would generate an XMPP chat message.

Example: (F1) Juliet sends an XMPP message

```
<message from='juliet@example.com/balcony'
  to='romeo@example.net'
  type='chat'>
  <thread>711609sa</thread>
  <body>Art thou not Romeo, and a Montague?</body>
</message>
```

The local SIP-to-XMPP gateway at the SIMPLE server would then determine if Romeo supports MSRP. If so, the SIP-to-XMPP gateway would initiate an MSRP session with Romeo on Juliet's behalf.

Example: (F2) Gateway starts a formal session on behalf of Juliet

```
INVITE sip:romeo@example.net SIP/2.0
To: <sip:romeo@example.net>
From: <sip:juliet@example.com>
Contact: <sip:juliet@example.com>;gr=balcony
Subject: Open chat with Juliet?
Call-ID: 711609sa
Content-Type: application/sdp
```

```
c=IN IP4 x2s.example.com
m=message 7654 TCP/MSRP *
a=accept-types:text/plain
a=lang:en
a=lang:it
a=path:msrp://x2s.example.com:7654/jshA7weztas/tcp
```

Here we assume that Romeo accepts the MSRP session request.

Example: (F3) Romeo accepts the request

```
SIP/2.0 200 OK
To: <sip:juliet@example.com>;gr=balcony
From: <sip:romeo@example.net>
Contact: <sip:romeo@example.net>;gr=orchard
Call-ID: 711609sa
Content-Type: application/sdp
```

```
c=IN IP4 s2x.example.net
m=message 12763 TCP/MSRP *
a=accept-types:text/plain
a=lang:it
a=path:msrp://s2x.example.net:12763/kjhd37s2s20w2a/tcp
```

The XMPP-to-SIP gateway then acknowledges the session acceptance on

behalf of Romeo.

Example: (F4) Gateway sends ACK to Romeo's UA

```
ACK sip:juliet@example.com SIP/2.0
To: <sip:romeo@example.net>;gr=orchard
From: <sip:juliet@example.com>
Contact: <sip:juliet@example.com>;gr=balcony
Call-ID: 711609sa
```

The XMPP-to-SIP gateway then transforms the original XMPP chat message into MSRP.

Example: (F5) Gateway transforms XMPP message to MSRP

```
MSRP a786hjs2 SEND
From-Path: msrp:///x2s.example.com:7654/jshA7weztas/tcp
To-Path: msrp:///s2x.example.net:12763/kjhd37s2s20w2a/tcp
Message-ID: 87652491
Byte-Range: 1-25/25
Content-Type: text/plain
```

```
Art thou not Romeo, and a Montague?
-----a786hjs2$
```

Romeo can then send a reply using his MSRP user agent.

Example: (F6) Romeo sends a reply

```
MSRP a786hjs2 SEND
To-Path: msrp:///x2s.example.com:7654/jshA7weztas/tcp
From-Path: msrp:///s2x.example.net:12763/kjhd37s2s20w2a/tcp
Message-ID: 87652491
Byte-Range: 1-25/25
Failure-Report: no
Content-Type: text/plain
```

```
Neither, fair saint, if either thee dislike.
-----a786hjs2$
```

The SIP-to-XMPP gateway would then transform that message into appropriate XMPP syntax for routing to the intended recipient.

Example: (F7) Gateway transforms MSRP message to XMPP

```
<message from='romeo@example.net/orchard'
  to='juliet@example.com/balcony'
  type='chat'>
  <thread>711609sa</thread>
  <body>Neither, fair saint, if either thee dislike.</body>
</message>
```

When the MSRP user wishes to end the chat session, the user's MSRP client sends a SIP BYE.

Example: (F8) Romeo terminates the chat session

```
BYE juliet@example.com sip: SIP/2.0
Max-Forwards: 70
From: <sip:romeo@example.net>;tag=087js
To: <sip:juliet@example.com>;tag=786
Call-ID: 711609sa
Cseq: 1 BYE
Content-Length: 0
```

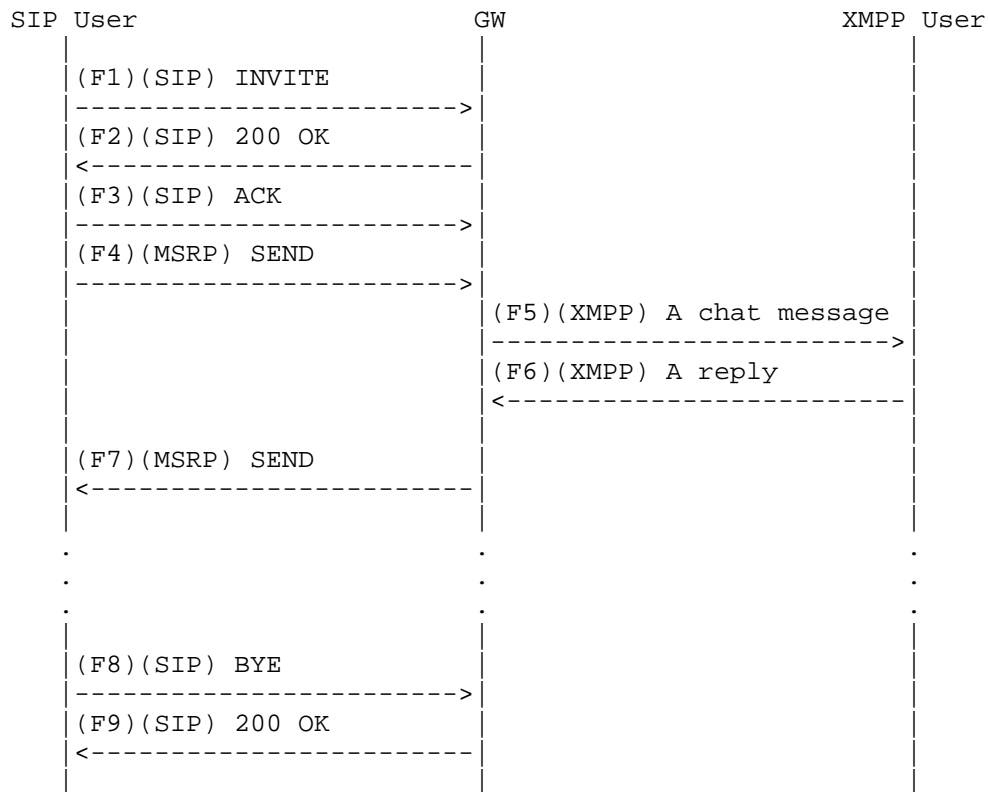
The BYE is then acknowledged by the XMPP-to-SIP gateway.

Example: (F9) Gateway acknowledges termination

```
SIP/2.0 200 OK
From: <sip:juliet@example.com>;tag=786
To: <sip:romeo@example.net>;tag=087js
Call-ID: 711609sa
CSeq: 1 BYE
Content-Length: 0
```

#### 4. MSRP to XMPP

When an MSRP client sends messages through a gateway to an XMPP client that does not support formal sessions, the order of events is as follows.



Example: (F1) SIP user starts the session

```

INVITE sip:juliet@example.com SIP/2.0
To: <sip:juliet@example.com>
From: <sip:romeo@example.net>
Contact: <sip:romeo@example.net>;gr=orchard
Subject: Open chat with Romeo?
Call-ID: 742507no
Content-Type: application/sdp

c=IN IP4 s2x.example.net
m=message 7313 TCP/MSRP *
a=accept-types:text/plain
a=lang:en
a=lang:it
a=path:msrp://s2x.example.net:7313/ansp71weztas;tcp
  
```



Example: (F2) Gateway accepts session on Juliet's behalf

```
SIP/2.0 200 OK
To: <sip:romeo@example.net>;gr=orchard
From: <sip:juliet@example.com>
Contact: <sip:juliet@example.com>;gr=balcony
Call-ID: 742507no
Content-Type: application/sdp
```

```
c=IN IP4 x2s.example.com
m=message 8763 TCP/MSRP *
a=accept-types:text/plain
a=lang:it
a=path:msrp://x2s.example.com:8763/lkj37s2s20w2a;tcp
```

Example: (F3) Romeo sends ACK

```
ACK sip:juliet@example.com SIP/2.0
To: <sip:juliet@example.com>;gr=balcony
From: <sip:romeo@example.net>
Contact: <sip:romeo@example.net>;gr=orchard
Call-ID: 742507no
```

Example: (F4) Romeo sends a message

```
MSRP ad49kswow SEND
To-Path: msrp://x2s.example.com:8763/lkj37s2s20w2a;tcp
From-Path: msrp://s2x.example.net:7313/ansp7lweztas;tcp
Message-ID: 44921zaqwsx
Byte-Range: 1-32/32
Failure-Report: no
Content-Type: text/plain
```

```
I take thee at thy word ...
-----ad49kswow$
```

Example: (F5) Romeo sends a message (XMPP translation)

```
<message from='romeo@example.net'
  to='juliet@example.com'
  type='chat'>
  <thread>742507no</thread>
  <body>I take thee at thy word ...</body>
</message>
```

Example: (F6) Juliet sends a reply

```
<message from='juliet@example.com'
  to='romeo@example.net'
  type='chat'>
  <thread>711609sa</thread>
  <body>What man art thou ...?</body>
</message>
```

Example: (F8) Gateway transforms XMPP message to MSRP

```
MSRP a786hjs2 SEND
To-Path: msrp://s2x.example.net:7313/jshA7weztas;tcp
From-Path: msrp://x2s.example.com:8763/lkj37s2s20w2a;tcp
Message-ID: 87652491
Byte-Range: 1-25/25
Failure-Report: no
Content-Type: text/plain
```

```
What man art thou ...?
-----a786hjs2$
```

Example: (F9) Romeo terminates the session

```
BYE juliet@example.com sip: SIP/2.0
Max-Forwards: 70
To: <sip:juliet@example.com>;gr=balcony
From: <sip:romeo@example.net>
Contact: <sip:romeo@example.net>;gr=orchard
Call-ID: 742507no
Cseq: 1 BYE
Content-Length: 0
```

Example: (F10) Gateway acknowledges the termination of the session on behalf of XMPP user

```
SIP/2.0 200 OK
To: <sip:juliet@example.com>;gr=balcony
From: <sip:romeo@example.net>
Contact: <sip:romeo@example.net>;gr=orchard
Call-ID: 742507no
CSeq: 1 BYE
```

## 5. Security Considerations

Detailed security considerations for instant messaging protocols are given in [RFC2779], for SIP-based instant messaging in [RFC3428] (see

also [RFC3261]), and for XMPP-based instant messaging in [RFC6121] (see also [RFC6120]).

This document specifies methods for exchanging instant messages through a gateway that translates between SIP and XMPP. Such a gateway MUST be compliant with the minimum security requirements of the instant messaging protocols for which it translates (i.e., SIP and XMPP). The addition of gateways to the security model of instant messaging specified in [RFC2779] introduces some new risks. In particular, end-to-end security properties (especially confidentiality and integrity) between instant messaging user agents that interface through a SIMPLE-XMPP gateway can be provided only if common formats are supported. Specification of those common formats is out of scope for this document, although it is recommended to use [RFC3862] for instant messages.

## 6. IANA Considerations

This document requests no actions of IANA.

## 7. References

### 7.1. Normative References

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## 7.2. Informative References

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## Appendix A. Acknowledgements

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