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        **Interworking between the Session Initiation Protocol (SIP) and the
        Extensible Messaging and Presence Protocol (XMPP): Instant Messaging
                        draft-saintandre-sip-xmpp-im-02**

Abstract

   This document defines a bi-directional protocol mapping for the
   exchange of single instant messages between the Session Initiation
   Protocol (SIP) and the Extensible Messaging and Presence Protocol
   (XMPP).

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   This Internet-Draft is submitted in full conformance with the
   provisions of BCP 78 and BCP 79.

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   material or to cite them other than as "work in progress."

   This Internet-Draft will expire on April 18, 2013.

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1. Introduction

In order to help ensure interworking between instant messaging
systems that conform to the instant messaging / presence requirements
[RFC2779], it is important to clearly define protocol mappings
between such systems. Within the IETF, work has proceeded on two
instant messaging technologies:

o Various extensions to the Session Initiation Protocol ([RFC3261])
   for instant messaging, as developed within the SIP for Instant
   Messaging and Presence Leveraging Extensions (SIMPLE) Working
   Group; the relevant specification for instant messaging is
   [RFC3428]
o The Extensible Messaging and Presence Protocol (XMPP), which
   consists of a formalization of the core XML streaming protocols
   developed originally by the Jabber open-source community; the
   relevant specifications are [RFC6120] for the XML streaming layer
   and [RFC6121] for basic presence and instant messaging extensions

One approach to helping ensure interworking between these protocols
is to map each protocol to the abstract semantics described in
[RFC3860]; that is the approach taken by
[I-D.ietf-simple-cpim-mapping] and [RFC3922]. The approach taken in
this document is to directly map semantics from one protocol to
another (i.e., from SIP/SIMPLE to XMPP and vice-versa).

The architectural assumptions underlying such direct mappings are
provided in [I-D.saintandre-sip-xmpp-core], including mapping of
addresses and error condisions. The mappings specified in this
document cover basic instant messaging functionality, i.e., the
exchange of a single instant message between a SIP user and an XMPP
user in either direction. Mapping of more advanced functionality is
out of scope for this document, but other documents in this "series"
cover such topics.

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. Instant Messages

[3.1](#). **Overview**

   Both XMPP and IM-aware SIP systems enable entities (often but not
   necessarily human users) to send "instant messages" to other
   entities. The term "instant message" usually refers to messages sent
   between two entities for delivery in close to real time (rather than
   messages that are stored and forwarded to the intended recipient upon
   request). Generally there are three kinds of instant message:

   o Single messages, which are sent from the sender to the recipient
      outside the context of any one-to-one chat session or multi-user
      text conference.
   o Chat messages, which are sent from the sender to the recipient in
      the context of a "messaging session" between the two entities.
   o Groupchat messages, which are sent from a sender to multiple
      recipients in the context of a text conference.

   This document covers single messages only, since they form the
   "lowest common denominator" for instant messaging on the Internet.
   It is likely that future documents will address one-to-one chat
   sessions and multi-user chat.

   Instant messaging using XMPP message stanzas of type "normal" is
   specified in [RFC6121]. Instant messaging using SIP requests of type
   MESSAGE (often called "page-mode" messaging) is specified in
   [RFC3428].

   As described in [RFC6121], a single instant message is an XML
   stanza of type "normal" sent over an XML stream (since
   "normal" is the default for the 'type' attribute of the
   stanza, the attribute is often omitted). In this document we will
   assume that such a message is sent from an XMPP client to an XMPP
   server over an XML stream negotiated between the client and the
   server, and that the client is controlled by a human user (this is a
   simplifying assumption introduced for explanatory purposes only; the
   XMPP sender could be a bot-controlled client, a component such as a
   workflow application, a server, etc.). Continuing the tradition of
   Shakespeare examples in XMPP documentation, we will say that the XMPP
   user has an XMPP address of <juliet@example.com>.

   As described in [RFC3428], a single instant message is a SIP MESSAGE
   request sent from a SIP user agent to an intended recipient who is
   most generally referenced by an Instant Message URI of the form
   <im:user@domain> but who may be referenced by a SIP or SIPS URI of
   the form <sip:user@domain> or <sips:user@domain> Here again we
   introduce the simplifying assumption that the user agent is
   controlled by a human user, whom we shall dub <romeo@example.net>.

3.2. XMPP to SIP

   When Juliet wants to send an instant message to Romeo, she interacts
   with her XMPP client, which generates an XMPP <message/> stanza. The
   syntax of the <message/> stanza, including required and optional
   elements and attributes, is defined in [RFC6121]. The following is
   an example of such a stanza:

   Example: XMPP user sends message:

   | <message from='juliet@example.com/balcony'
   | to='romeo@example.net'>
   | <body>Art thou not Romeo, and a Montague?</body>
   | </message>

   Upon receiving such a stanza, the XMPP server to which Juliet has
   connected either delivers it to a local recipient (if the hostname in
   the 'to' attribute matches one of the hostnames serviced by the XMPP
   server) or attempts to route it to the foreign domain that services
   the hostname in the 'to' attribute. Naturally, in this document we
   assume that the hostname in the 'to' attribute is an IM-aware SIP
   service hosted by a separate server. As specified in [RFC6121], the
   XMPP server needs to determine the identity of the foreign domain,
   which it does by performing one or more DNS SRV lookups [RFC2782].
   For message stanzas, the order of lookups recommended by [RFC6121] is
   to first try the "_xmpp-server" service as specified in [RFC6120] and
   to then try the "_im" service as specified in [RFC3861]. Here we
   assume that the first lookup will fail but that the second lookup
   will succeed and return a resolution "_im._simple.example.net.",
   since we have already assumed that the example.net hostname is
   running a SIP instant messaging service. (Note: The XMPP server may
   have previously determined that the foreign domain is a SIMPLE
   server, in which case it would not need to perform the SRV lookups;
   the caching of such information is a matter of implementation and
   local service policy, and is therefore out of scope for this
   document.)

   Once the XMPP server has determined that the foreign domain is
   serviced by a SIMPLE server, it must determine how to proceed. We
   here assume that the XMPP server contains or has available to it an
   XMPP-SIMPLE gateway. The XMPP server would then deliver the message
   stanza to the XMPP-SIMPLE gateway.

   The XMPP-SIMPLE gateway is then responsible for translating the XMPP
   message stanza into a SIP MESSAGE request from the XMPP user to the
   SIP user:

Example: XMPP user sends message (SIP transformation):

```
| MESSAGE sip:romeo@example.net SIP/2.0
| Via: SIP/2.0/TCP x2s.example.com;branch=z9hG4bK776sgdkse
| Max-Forwards: 70
| From: sip:juliet@example.com;tag=49583
| To: sip:romeo@example.net
| Call-ID: Hr0zny9l3@example.com
| CSeq: 1 MESSAGE
| Content-Type: text/plain
| Content-Length: 35
|
| Art thou not Romeo, and a Montague?
```

The mapping of XMPP syntax elements to SIP syntax elements SHOULD be
as shown in the following table. (Mappings for elements not
mentioned are undefined.)

Table 4: Message syntax mapping from XMPP to SIP

```
+----------------------------+--------------------------+
| XMPP Element or Attribute  | SIP Header or Contents   |
+----------------------------+--------------------------+
| <body/>                    | body of MESSAGE          |
| <subject/>                 | Subject                  |
| <thread/>                  | Call-ID                  |
| from                       | From                     |
| id                         | (no mapping)             |
| to                         | To                       |
| type                       | (no mapping)             |
| xml:lang                   | Content-Language         |
+----------------------------+--------------------------+
```

3.3. SIP to XMPP

When Romeo wants to send an instant message to Juliet, he interacts
with his SIP user agent, which generates a SIP MESSAGE request. The
syntax of the MESSAGE request is defined in [RFC3428]. The following
is an example of such a request:

Example: SIP user sends message:

```
|  MESSAGE sip:juliet@example.com SIP/2.0
|  Via: SIP/2.0/TCP s2x.example.net;branch=z9hG4bKeskdgs677
|  Max-Forwards: 70
|  From: sip:romeo@example.net;tag=38594
|  To: sip:juliet@example.com
|  Call-ID: M4spr4vdu@example.net
|  CSeq: 1 MESSAGE
|  Content-Type: text/plain
|  Content-Length: 44
|
|  Neither, fair saint, if either thee dislike.
```

Section 5 of [RFC3428] stipulates that a SIP User Agent presented
with an im: URI should resolve it to a sip: or sips: URI. Therefore
we assume that the To header of a request received by a SIMPLE-XMPP
gateway will contain a sip: or sips: URI. The gateway SHOULD resolve
that address to an im: URI for SIP MESSAGE requests, then follow the
rules in [RFC3861] regarding the "_im" SRV service for the target
domain contained in the To header. If SRV address resolution fails
for the "_im" service, the gateway MAY attempt a lookup for the
"_xmpp-server" service as specified in [RFC6120] or MAY return an
error to the sender (the SIP "502 Bad Gateway" error seems most
appropriate; see [I-D.saintandre-sip-xmpp-core] for details). If SRV
address resolution succeeds, the gateway is responsible for
translating the request into an XMPP message stanza from the SIP user
to the XMPP user and returning a SIP "200 OK" message to the sender:

Example: SIP user sends message (XMPP transformation):

```
|  <message from='romeo@example.net'
|           to='juliet@example.com'>
|    <body>Neither, fair saint, if either thee dislike.</body>
|  </message>
```

The mapping of SIP syntax elements to XMPP syntax elements SHOULD be
as shown in the following table. (Mappings for elements not
mentioned in the foregoing table are undefined.)

Table 5: Message syntax mapping from SIP to XMPP

```
+--------------------------+----------------------------+
|  SIP Header or Contents  |  XMPP Element or Attribute  |
+--------------------------+----------------------------+
|  Call-ID                 |  <thread/>                  |
|  Content-Language        |  xml:lang                   |
|  CSeq                    |  (no mapping)               |
|  From                    |  from                       |
|  Subject                 |  <subject/>                 |
|  To                      |  to                         |
|  body of MESSAGE         |  <body/>                    |
+--------------------------+----------------------------+
```

Note: When transforming SIP page-mode messages, a SIMPLE-XMPP gateway
SHOULD specify no XMPP 'type' attribute or a 'type' attribute whose
value is "normal" (alternatively, the value of the 'type' attribute
MAY be "chat", although it SHOULD NOT be "headline" and MUST NOT be
"groupchat").

Note: See the Content Types (Section 4) of this document regarding
handling of SIP message bodies that contain content types other than
plain text.

4. Content Types

SIP requests of type MESSAGE may contain essentially any content
type. The recommended procedures for SIMPLE-to-XMPP gateways to use
in handling these content types are as follows.

A SIMPLE-to-XMPP gateway MUST process SIP messages that contain
message bodies of type "text/plain" and MUST encapsulate such message
bodies as the XML character data of the XMPP <body/> element.

A SIMPLE-to-XMPP gateway SHOULD process SIP messages that contain
message bodies of type "text/html"; if so, a gateway MUST transform
the "text/html" content into XHTML content that conforms to the XHTML
1.0 Integration Set specified in [XEP-0071].

A SIMPLE-to-XMPP gateway MAY process SIP messages that contain
message bodies of types other than "text/plain" and "text/html" but
handling of such content types is a matter of implementation.

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
information 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.

[RFC2779] requires that conformant technologies shall include methods
for blocking communications from unwanted addresses. Such blocking
is the responsibility of conformant technology (e.g., XMPP or SIP)
and is out of scope for this memo.

6. IANA Considerations

This document requests no actions of IANA.

7. References

7.1. Normative References

[I-D.saintandre-sip-xmpp-core]
          Saint-Andre, P., Houri, A., and J. Hildebrand,
          "Interworking between the Session Initiation Protocol
          (SIP) and the Extensible Messaging and Presence Protocol
          (XMPP): Core", draft-saintandre-sip-xmpp-core-02 (work in
          progress), October 2012.

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate
          Requirement Levels", BCP 14, RFC 2119, March 1997.

[RFC2782] Gulbrandsen, A., Vixie, P., and L. Esibov, "A DNS RR for
          specifying the location of services (DNS SRV)", RFC 2782,
          February 2000.

[RFC3261] Rosenberg, J., Schulzrinne, H., Camarillo, G., Johnston,
          A., Peterson, J., Sparks, R., Handley, M., and E.

                    Schooler, "SIP: Session Initiation Protocol", RFC 3261,
                    June 2002.

   [RFC3428] Campbell, B., Rosenberg, J., Schulzrinne, H., Huitema, C.,
              and D. Gurle, "Session Initiation Protocol (SIP) Extension
              for Instant Messaging", RFC 3428, December 2002.

   [RFC3861] Peterson, J., "Address Resolution for Instant Messaging
              and Presence", RFC 3861, August 2004.

   [RFC6120] Saint-Andre, P., "Extensible Messaging and Presence
              Protocol (XMPP): Core", RFC 6120, March 2011.

   [RFC6121] Saint-Andre, P., "Extensible Messaging and Presence
              Protocol (XMPP): Instant Messaging and Presence",
              RFC 6121, March 2011.

7.2. Informative References

   [I-D.ietf-simple-cpim-mapping]
              Rosenberg, J. and B. Campbell, "CPIM Mapping of SIMPLE
              Presence and Instant Messaging",
              draft-ietf-simple-cpim-mapping-01 (work in progress),
              June 2002.

   [RFC2779] Day, M., Aggarwal, S., and J. Vincent, "Instant Messaging
              / Presence Protocol Requirements", RFC 2779,
              February 2000.

   [RFC3860] Peterson, J., "Common Profile for Instant Messaging
              (CPIM)", RFC 3860, August 2004.

   [RFC3862] Klyne, G. and D. Atkins, "Common Presence and Instant
              Messaging (CPIM): Message Format", RFC 3862, August 2004.

   [RFC3922] Saint-Andre, P., "Mapping the Extensible Messaging and
              Presence Protocol (XMPP) to Common Presence and Instant
              Messaging (CPIM)", RFC 3922, October 2004.

   [XEP-0071]
              Saint-Andre, P., "XHTML-IM", XSF XEP 0071, January 2006.

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