

## Indication of Message Composition for Instant Messaging

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### Abstract

In instant messaging (IM) systems, it is useful to know during an IM conversation whether the other party is composing a message; e.g., typing or recording an audio message. This document defines a new status message content type and XML namespace that conveys information about a message being composed. The status message can indicate the composition of a message of any type, including text, voice, or video. The status messages are delivered to the instant messaging recipient in the same manner as the instant messages themselves.

## Table of Contents

1.	Introduction . . . . .	2
2.	Terminology and Conventions . . . . .	3
3.	Description . . . . .	3
3.1.	Overview . . . . .	3
3.2.	Message Composer Behavior . . . . .	4
3.3.	Status Message Receiver Behavior . . . . .	5
3.4.	Message Content . . . . .	6
3.5.	Additional Status Information . . . . .	6
4.	Using the Status Message . . . . .	7
5.	Examples . . . . .	8
6.	XML Document Format . . . . .	8
6.1.	XML Schema . . . . .	9
7.	Security Considerations . . . . .	9
8.	IANA Considerations . . . . .	10
8.1.	Content-Type Registration for 'application/im-iscomposing+xml' . . . . .	10
8.2.	URN Sub-Namespace Registration for 'urn:ietf:params:xml:ns:im-iscomposing' . . . . .	11
8.3.	Schema Registration . . . . .	11
9.	Acknowledgements . . . . .	11
10.	References . . . . .	12
10.1.	Normative References . . . . .	12
10.2.	Informative References . . . . .	12
	Author's Address . . . . .	12
	Full Copyright Statement . . . . .	13

## 1. Introduction

By definition, instant messaging (IM) is message based: A user composes a message by, for example, typing, speaking, or recording a video clip. This message is then sent to one or more recipients. Unlike email, instant messaging is often conversational, so the other party is waiting for a response. If no response is forthcoming, a participant in an instant messaging conversation may erroneously assume either that the communication partner has left or that it is her turn to type again, leading to two messages "crossing on the wire".

To avoid this uncertainty, a number of commercial instant messaging systems feature an "is-typing" indication sent as soon as one party starts typing a message. In this document, we describe a generalized version of this indication, called the isComposing status message. As described in Section 3 in more detail, a status message is delivered to the instant message recipient in the same manner as are the messages themselves. The isComposing status messages can announce the composition of any media type, not just text. For

example, it might be used if somebody is recording an audio or video clip. In addition, it can be extended to convey other instant messaging user states in the future. Below, we will call these messages "status messages" for brevity.

The status messages are carried as XML, as instances of the XML schema defined in Section 6, and labeled as an application/im-iscomposing+xml content type.

These status messages can be considered somewhat analogous to the comfort noise packets that are transmitted in silence-suppressed interactive voice conversations.

Events and extensions to presence, such as PIDF [6], were also considered but have a number of disadvantages. They add more overhead, as an explicit and periodic subscription is required. For page-mode delivery, subscribing to the right user agent and set of messages may not be easy. An in-band, message-based mechanism is also easier to translate across heterogeneous instant messaging systems.

The mechanism described here aims to satisfy the requirements in [7].

## 2. Terminology and Conventions

This memo makes use of the vocabulary defined in the IMPP Model document [1]. In this memo, terms such as CLOSED, INSTANT MESSAGE, OPEN, PRESENCE SERVICE, PRESENTITY, WATCHER, and WATCHER USER AGENT are used with the same meaning defined therein. The key words MUST, MUST NOT, REQUIRED, SHOULD, SHOULD NOT, RECOMMENDED, MAY, and OPTIONAL in this document are to be interpreted as described in BCP 14, RFC 2119 [2].

This document discusses two kinds of messages; namely, the instant message (IM) conveying actual content between two or more users engaged in an instant messaging conversation, and the status message, described in this document, which indicates the current composing status to the other participants in a conversation. We use the terms "content message" and "status message" for these two message types.

## 3. Description

### 3.1. Overview

We model the user of an instant messaging system as being in one of several states, in this document limited to "idle" and "active". By default, the user is in "idle" state, both before starting to compose a message and after sending it.

### 3.2. Message Composer Behavior

Only the instant messaging user agent actively composing a content message generates status messages indicating the current state. When the user starts composing a content message (the actual instant message), the state becomes "active", and an isComposing status message containing a <state> element indicating "active" is sent to the recipient of the content message being composed. As long as the user continues to produce instant message content, the user remains in state "active".

There are two sender timers: the active-state refresh interval, and the idle time-out interval.

The active-state refresh interval determines how often "active" state messages are sent while the composer remains in "active" state. The interval is chosen by the composing user and indicated in the <refresh> element in the status message, expressed in integer seconds. Each transmission of the isComposing message resets the timer. The interval SHOULD be no shorter than 60 seconds. A message composer MAY decide not to send active-state refresh messages at all. This is indicated by omitting the refresh interval; this will cause the receiver to assume that it has gone idle after 120 seconds. (In most cases, the content message will have been sent by then.) No refresh messages are sent in "idle" state.

The active-state refresh mechanism deals with the case in which the user logs off or the application crashes before the content message is completed.

If the user stops composing for more than a configured time interval, the idle timeout, the state transitions to "idle", and an "idle" status message is sent. If the user starts composing again while in "idle" state, the state transitions to "active", and the corresponding status message is sent. Unless otherwise configured by the user, the idle timeout SHOULD have a default value of 15 seconds.

If a content message is sent before the idle threshold expires, no "idle" state indication is needed. Thus, in most cases, only one status message is generated for each content message. In any event, the message rate is limited to one status message per refresh threshold interval.

The state transitions are shown in Figure 1.

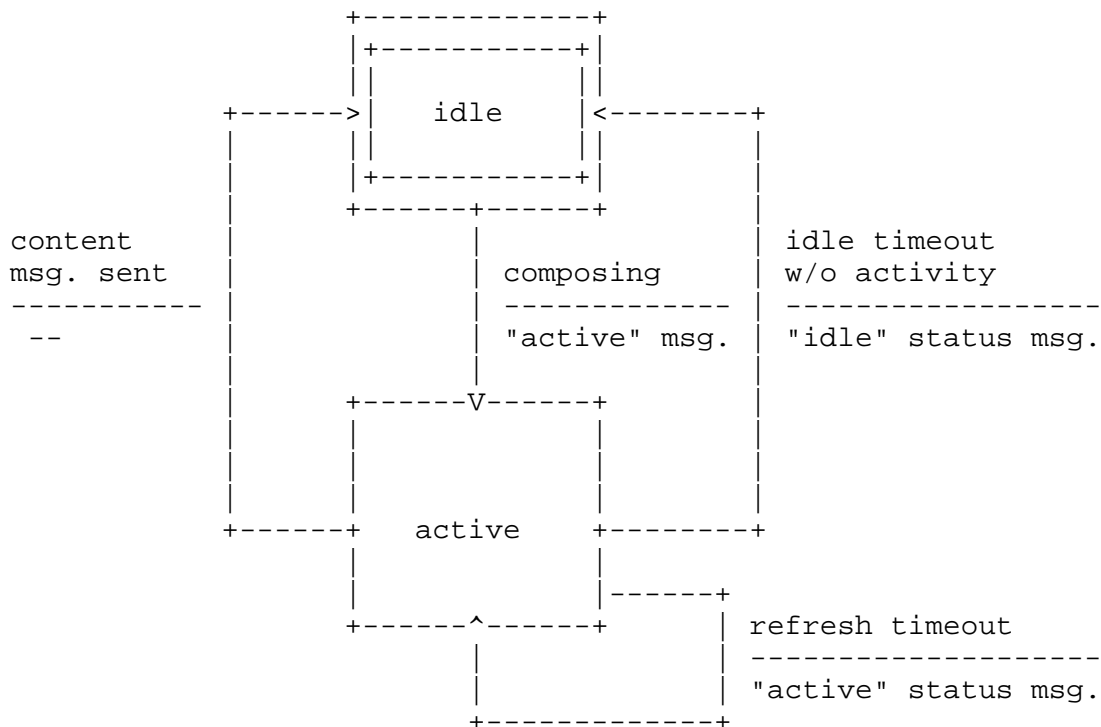


Figure 1. Sender State Diagram

### 3.3. Status Message Receiver Behavior

The status message receiver uses the status messages to determine the state of the content message sender. If the most recent "active" status message contained a <refresh> value, the refresh time-out is set to that value; otherwise, it is 120 seconds. The state at the receiver transitions from "active" to "idle" under three conditions:

1. A status message with status "idle" is received.
2. A content message is received.
3. The refresh interval expires.

Receivers MUST be able to handle multiple consecutive isComposing messages with "active" state, regardless of the refresh interval.

The state transitions are shown in Figure 2.

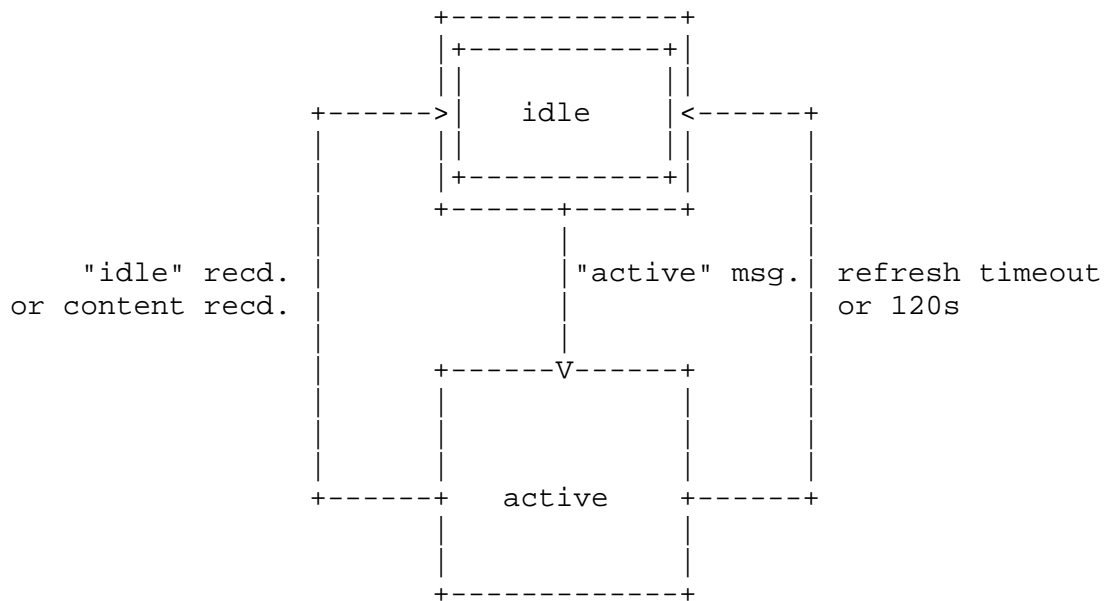


Figure 2. Receiver State Diagram

### 3.4. Message Content

We briefly describe the message content to summarize the discussion above. This description is non-normative. The schema (Section 6) should be consulted for the normative message format.

The message consists of an `<isComposing>` element, with a mandatory `<state>` element indicating the composer state; i.e., idle or active. In addition, there are three optional elements: `<lastactive>`, indicating the time of last activity; `<contenttype>`, the type of message being created; and `<refresh>`, the time interval after which the receiver can expect an update from the composer. Details are given in the following section.

### 3.5. Additional Status Information

The status message contains additional optional elements to provide further details on the composition activity. Any of these can appear in both "active" and "idle" state messages.

The optional <lastactive> element describes the absolute time when the user last added or edited content.

The optional <contenttype> element indicates the type of medium in which the messaging terminal is currently composing. It can contain either just a MIME media type, such as "audio" or "text", or a media type and subtype, such as "text/html". It is best understood as a hint to the user, not a guarantee, that the actual content message will indeed contain only the content indicated. It allows the human recipient to be prepared for the likely message format.

To further describe message composition, the XML schema or the set of allowable state names can be extended in future documents. Recipients of status messages implementing this specification without extensions MUST treat state tokens other than "idle" and "active" as "idle". Additional elements MUST use their own namespaces and MUST be designed so that receivers can safely ignore such extensions. Adding elements to the namespace defined in this document is not permitted.

The isComposing status message MAY be carried in CPIM messages [3].

Such a wrapper is particularly useful if messages are relayed by a conference server since the CPIM message maintains the identity of the original composer.

#### 4. Using the Status Message

The isComposing status message can be used with either page mode or session mode, although session mode is a more natural fit. In session mode, the status message is sent as part of the messaging stream. Its usage is negotiated just like any other media type in that stream, with details depending on the session mode protocol.

Sending the status messages within the session-mode messaging stream has at least three benefits. First, it ensures proper ordering and synchronization with the actual content messages being composed. In messaging systems that guarantee in-order delivery of messages, this approach avoids having an active indication appear at the receiver after the actual message has been delivered, due to message reordering across two delivery mechanisms.

Secondly, end-to-end security can be applied to the messages. Thirdly, session negotiation mechanisms can be used to turn it on and off at any time, and even to negotiate its use in a single direction at a time.

Usage with page mode is also straightforward: The status message is carried as the body of a page mode message. In SIP-based IM, The composer MUST cease transmitting status messages if the receiver returned a 415 status code (Unsupported Media Type) in response to a MESSAGE request containing the status indication.

The sender cannot be assured that the status message is delivered before the actual content being composed arrives. However, SIP page mode is limited to one unacknowledged message, so out-of-order delivery is unlikely, albeit still possible if proxies are involved.

## 5. Examples

```
<?xml version="1.0" encoding="UTF-8"?>
<isComposing xmlns="urn:ietf:params:xml:ns:im-iscomposing"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="urn:ietf:params:xml:ns:im-composing
iscomposing.xsd">
  <state>active</state>
  <contenttype>text/plain</contenttype>
  <refresh>90</refresh>
</isComposing>
```

```
<?xml version="1.0" encoding="UTF-8"?>
<isComposing xmlns="urn:ietf:params:xml:ns:im-iscomposing"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="urn:ietf:params:xml:ns:im-composing
iscomposing.xsd">
  <state>idle</state>
  <lastactive>2003-01-27T10:43:00Z</lastactive>
  <contenttype>audio</contenttype>
</isComposing>
```

## 6. XML Document Format

An isComposing document is an XML document that MUST be well formed and SHOULD be valid. isComposing documents MUST be based on XML 1.0 and MUST be encoded by using UTF-8. This specification makes use of XML namespaces for identifying isComposing documents. The namespace URI for elements defined for this purpose is a URN using the namespace identifier 'ietf'. This URN is:

urn:ietf:params:xml:ns:im-iscomposing



### 6.1. XML Schema

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema targetNamespace="urn:ietf:params:xml:ns:im-iscomposing"
  elementFormDefault="qualified"
  attributeFormDefault="unqualified"
  xmlns:xs="http://www.w3.org/2001/XMLSchema"
  xmlns:tns="urn:ietf:params:xml:ns:im-iscomposing">
  <xs:element name="isComposing">
    <xs:complexType>
      <xs:sequence>
        <xs:element name="state" type="xs:string"/>
        <xs:element name="lastactive" type="xs:dateTime"
          minOccurs="0"/>
        <xs:element name="contenttype" type="xs:string"
          minOccurs="0"/>
        <xs:element name="refresh" type="xs:positiveInteger"
          minOccurs="0"/>
        <xs:any namespace="##other" processContents="lax"
          minOccurs="0" maxOccurs="unbounded"/>
      </xs:sequence>
    </xs:complexType>
  </xs:element>
</xs:schema>
```

### 7. Security Considerations

The isComposing indication provides a fine-grained view of the activity of the entity composing and thus deserves particularly careful confidentiality protection so that only the intended recipient of the message will receive the isComposing indication.

Since the status messages are carried by using the IM protocol itself, all security considerations of the underlying IM protocol also apply to the isComposing status messages.

There are potential privacy issues in sending isComposing status messages before an actual conversation has been established between the communicating users. A status message may be sent even if the user later abandons the message. It is RECOMMENDED that isComposing indications in page mode are only sent when a message is being composed as a reply to an earlier message. This document does not prescribe how an implementation detects whether a message is in response to an earlier one in page mode, but elapsed time or user interface behavior might be used as hints.

## 8. IANA Considerations

### 8.1. Content-Type Registration for 'application/im-iscomposing+xml'

To: ietf-types@iana.org  
Subject: Registration of MIME media type application/  
im-iscomposing+xml  
MIME media type name: application  
MIME subtype name: im-iscomposing+xml  
Required parameters: (none)  
Optional parameters: charset; Indicates the character encoding of  
enclosed XML. Default is UTF-8.  
Encoding considerations: Uses XML, which can employ 8-bit characters,  
depending on the character encoding used. See RFC 3023 [4],  
section 3.2.  
Security considerations: This content type is designed to carry  
information about current user activity, which may be considered  
private information. Appropriate precautions should be adopted to  
limit disclosure of this information.  
Interoperability considerations: This content type provides a common  
format for exchange of composition activity information.  
Published specification: RFC 3994  
Applications which use this media type: Instant messaging systems.  
Additional information: none  
Person & email address to contact for further information: Henning  
Schulzrinne, hgs@cs.columbia.edu  
Intended usage: LIMITED USE  
Author/Change controller: This specification is a work item of the  
IETF SIMPLE working group, with the mailing list address  
simple@ietf.org.  
Other information: This media type is a specialization of  
application/xml RFC 3023 [4], and many of the considerations  
described there also apply to application/im-iscomposing+xml.

## 8.2. URN Sub-Namespace Registration for 'urn:ietf:params:xml:ns:im-iscomposing'

URI: urn:ietf:params:xml:ns:im-iscomposing

Description: This is the XML namespace for XML elements defined by RFC 3994 to describe composition activity by an instant messaging client using the application/im-iscomposing+xml content type.

Registrant Contact: IETF, SIMPLE working group, simple@ietf.org,  
Henning Schulzrinne, hgs@cs.columbia.edu

XML:

BEGIN

```
<?xml version="1.0"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML Basic 1.0//EN"
"http://www.w3.org/TR/xhtml-basic/xhtml-basic10.dtd">
<html xmlns="http://www.w3.org/1999/xhtml">
<head>
  <meta http-equiv="content-type"
    content="text/html; charset=iso-8859-1"/>
  <title>Is-composing Indication for Instant Messaging</title>
</head>
<body>
  <h1>Namespace for SIMPLE iscomposing extension</h1>
  <h2>urn:ietf:params:xml:ns:im-composing</h2>
  <p>See <a href="[URL of published RFC]">RFC3994</a>.</p>
</body>
</html>
```

END

## 8.3. Schema Registration

This section registers a new XML schema per the procedures in [5].

URI: urn:ietf:params:xml:schema:im-composing

Registrant Contact: IETF, SIMPLE working group, (simple@ietf.org),  
Henning Schulzrinne (hgs@cs.columbia.edu).

The XML for this schema can be found as the sole content of Section 6.1.

## 9. Acknowledgements

Ben Campbell, Miguel Garcia, Scott Hollenbeck, Christian Jansson, Cullen Jennings, Hisham Khartabil, Allison Mankin, Aki Niemi, Jonathan Rosenberg, and Xiaotao Wu provided helpful comments.

## 10. References

### 10.1. Normative References

- [1] Day, M., Rosenberg, J., and H. Sugano, "A Model for Presence and Instant Messaging", RFC 2778, February 2000.
- [2] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, March 1997.
- [3] Klyne, G. and D. Atkins, "Common Presence and Instant Messaging (CPIM): Message Format", RFC 3862, August 2004.
- [4] Murata, M., St. Laurent, S., and D. Kohn, "XML Media Types", RFC 3023, January 2001.
- [5] Mealling, M., "The IETF XML Registry", BCP 81, RFC 3688, January 2004.

### 10.2. Informative References

- [6] Sugano, H., Fujimoto, S., Klyne, G., Bateman, A., Carr, W., and J. Peterson, "Presence Information Data Format (PIDF)", RFC 3863, August 2004.
- [7] Rosenberg, J., "Advanced Instant Messaging Requirements for the Session Initiation Protocol (SIP)", Work in Progress, February 2004.

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