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**Common Profile: Instant Messaging  
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## Abstract

Instant messaging is defined in [RFC2778](#) [12]. Today, numerous instant messaging protocols are in use, and little interoperability between services based on these protocols has been achieved. This specification defines common semantics and data formats for instant messaging to facilitate the creation of gateways between instant messaging services.

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## **1. Introduction**

Instant messaging is defined in [RFC2778](#) [[12](#)]. Today, numerous instant messaging protocols are in use, and little interoperability between services based on these protocols has been achieved. This specification defines semantics and data formats for common services of Instant Messaging to facilitate the creation of gateways between instant messaging services.

Service behavior is described abstractly in terms of operations invoked between the consumer and provider of a service. Accordingly, each IM service must specify how this behavior is mapped onto its own protocol interactions. The choice of strategy is a local matter, providing that there is a clear relation between the abstract behaviors of the service (as specified in this memo) and how it is faithfully realized by a particular instant messaging service.

The attributes for each operation are defined using an abstract syntax. Although the syntax specifies the range of possible data values, each IM service must specify how well-formed instances of the abstract representation are encoded as a concrete series of bits.

For example, one strategy might transmit an instant message as textual key/value pairs, another might use a compact binary representation, and a third might use nested containers. The choice of strategy is a local matter, providing that there is a clear relation between the abstract syntax (as specified in this memo) and how it is faithfully encoded by an particular instant messaging service.

In order to provide a means for the preservation of end-to-end features (especially security) to pass through instant messaging interoperability gateways, this specification also provides recommendations for instant messaging document formats that could be employed by presence protocols.

## **2. Terminology**

In this document, the key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY", and "OPTIONAL" are to be interpreted as described in [RFC2119](#) [[1](#)] and indicate requirement levels for compliant implementations.

This memos makes use of the vocabulary defined in [RFC 2778](#)[[9](#)]. Terms such as CLOSED, INSTANT INBOX, INSTANT MESSAGE, and OPEN are used in the same meaning as defined therein.



This document defines operations and attributes of an instant messaging service. In order for a protocol to interface with an instant messaging gateway, it must support all of the operations described in this document (i.e. the instant messaging protocol must have some message or capability that provides the function described by this operation). Similarly, the attributes defined for these operations must correspond to information available in the instant messaging protocol in order for the protocol to interface with gateways defined by this specification. Note that these attributes provide only the minimum possible information that needs to be specified for interoperability - the functions in an instant messaging protocol that correspond to the operations described in this document can contain additional information that will not be mapped by CPIM.

### **3. Abstract Instant Messaging Service**

#### **3.1 Overview of Instant Messaging Service**

When an application wants to send a message to an INSTANT INBOX, it invokes the message operation, e.g.,

```

+-----+               +-----+
|       |               |       |
| appl. | -- message ----> | IM   |
|       |               | svc.  |
+-----+               +-----+

```

The message operation has the following attributes: source, destination, and TransID. 'source' and 'destination' identify the originator and destination of an instant message, respectively, and consist of an INSTANT INBOX identifier (as described in [Section 3.2](#)). The TransID is a unique identifier used to correlate message operations to response operations.

The message operation also has some content, the instant message itself, which may be textual, or which may consist of other data. Some further information on content is provided in [Section 3.3](#).

Upon receiving a message operation, the service immediately responds by invoking the response operation containing the same transaction-identifier, e.g.,





```

+-----+               +-----+
|       |               |       |
| appl. | <----- response -- | IM   |
|       |               |   svc. |
+-----+               +-----+

```

The response operation contains the following attributes: TransID and status. The TransID is used to correlate the response to a particular instant message. Status indicates whether the delivery of the message succeeded or failed.

### **[3.2](#) Identification of INSTANT INBOXes**

An INSTANT INBOX is specified using an instant messaging URI with the 'im:' URI scheme. The full syntax of the IM URI scheme is given in [Appendix A](#). An example would be: "im:fred@example.com"

#### **[3.2.1](#) Address Resolution**

A client determines the address of an appropriate system running a server by resolving the destination domain name that is part of the identifier to either an intermediate relay system or a final target system.

Compliant implementations SHOULD follow the guidelines for dereferencing URIs given in [\[2\]](#).

### **[3.3](#) Format of Instant Messages**

This specification defines an abstract interoperability mechanism for instant messaging protocols; the message content definition given here pertains to semantics rather than syntax. However, some important properties for interoperability can only be provided if a common end-to-end format for instant messaging is employed by the interoperating instant messaging protocols. Implementations therefore SHOULD support the format defined in MSGFMT [\[9\]](#).

### **[3.4](#) The Messaging Service**

Note that the transaction-identifier parameters used with the instant messaging service are potentially long-lived. Accordingly, the values generated for this parameter should be unique across a significant duration of time.

#### **[3.4.1](#) The Message Operation**

When an application wants to send an INSTANT MESSAGE, it invokes the



message operation.

When the service is informed of the message operation, it performs these steps:

1. If the source or destination does not refer to a valid INSTANT INBOX, a response operation having status "failure" is invoked.
2. If access control does not permit the application to request this operation, a response operation having status "failure" is invoked.
3. Otherwise:

If the service is able to successfully deliver the message, a response operation having status "success" is invoked.

If the service is unable to successfully deliver the message, a response operation having status "failure" is invoked.

If the service must delegate responsibility for delivery, and if the delegation will not result in a future authoritative indication to the service, a response operation having status "indeterminant" is invoked.

If the service must delegate responsibility for delivery, and if the delegation will result in a future authoritative indication to the service, then a response operation is invoked immediately after the indication is received.

When the service invokes the response operation, the transID parameter is identical to the value found in the message operation invoked by the application.

### **3.4.2 Looping**

The dynamic routing of instant messages can result in looping of a message through a relay. Detection of loops is not always obvious, since aliasing and group list expansions can legitimately cause a message to pass through a relay more than one time.

Instant messaging protocols may implement a hop counter or similar mechanism that gateways can use to detect loops, but CPIM does not require protocols to support any corresponding attribute. If possible, CPIM gateways should translate between such loop-detection mechanisms.



#### **4. Security Considerations**

Detailed security considerations for instant messaging protocols are given in [RFC2779](#) (in particular, requirements are given in [section 5.4](#) and some motivating discussion in 8.1).

CPIM defines an interoperability function that is employed by gateways between instant messaging protocols. CPIM gateways MUST be compliant with the minimum security requirements of the instant messaging protocols with which they interface.

Note that end-to-end security properties (especially confidentiality and integrity) between instant messaging user agents that interface through a CPIM gateway can only be provided if a common instant message format (such as the format described in [\[9\]](#)) is supported by the protocols interfacing with the CPIM gateway.

#### **5. IANA Considerations**

The IANA assigns the "im" scheme.

##### **5.1 The IM URI Scheme**

The Instant Messaging (IM) URI scheme designates an Internet resource, namely an INSTANT INBOX.

The syntax of an IM URL is given in [Appendix A](#).

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## **Appendix A. IM URL IANA Registration Template**

This section provides the information to register the im: instant messaging URL.

### **A.1 URL scheme name**

im



## [A.2](#) URL scheme syntax

The syntax follows the existing `mailto:` URL syntax specified in [RFC2368](#). The ABNF is:

```
IM-URL      = "im:" [ to ] [ headers ]
to           = #mailbox
headers      = "?" header *( "&" header )
header       = hname "=" hvalue
hname        = *urlc
hvalue       = *urlc
```

## [A.3](#) Character encoding considerations

Representation of non-ASCII character sets in local-part strings is limited to the standard methods provided as extensions to [RFC 2822](#)[1]

## [A.4](#) Intended usage

Use of the `im:` URL follows closely usage of the `mailto:` URL. That is, invocation of an IM URL will cause the user's instant messaging application to start, with destination address and message headers fill-in according to the information supplied in the URL.

## [A.5](#) Applications and/or protocols which use this URL scheme name

It is anticipated that protocols compliant with [RFC2779](#), and meeting the interoperability requirements specified here, will make use of this URL scheme name.

## [A.6](#) Interoperability considerations

The underlying exchange protocol used to send an instant message may vary from service to service. Therefore complete, Internet-scale interoperability cannot be guaranteed. However, a service conforming to this specification permits gateways to achieve interoperability sufficient to the requirements of [RFC2779](#).

## [A.7](#) Security considerations

When IM URLs are placed in instant messaging protocols, they convey the identity of the sender and/or the recipient. In some cases, anonymous messaging may be desired. Such a capability is beyond the scope of this specification.



## **[A.8](#) Relevant publications**

[RFC2779](#), [RFC2778](#)

## **[A.9](#) Person & email address to contact for further information**

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## **[A.10](#) Author/Change controller**

This scheme is registered under the IETF tree. As such, IETF maintains change control.

## **[A.11](#) Applications and/or protocols which use this URL scheme name**

Instant messaging service

## **[Appendix B](#). Issues of Interest**

This appendix briefly discusses issues that may be of interest when designing an interoperation gateway.

### **[B.1](#) Address Mapping**

When mapping the service described in this memo, mappings that place special information into the im: address local-part MUST use the meta-syntax defined in [RFC 2846](#)[12].

### **[B.2](#) Source-Route Mapping**

The easiest mapping technique is a form of source- routing and usually is the least friendly to humans having to type the string. Source-routing also has a history of operational problems.

Use of source-routing for exchanges between different services is by a transformation that places the entire, original address string into the im: address local part and names the gateway in the domain part.

For example, if the destination INSTANT INBOX is "pepp://example.com/fred", then, after performing the necessary character conversions, the resulting mapping is:

```
im:pepp=example.com/fred@relay-domain
```

where "relay-domain" is derived from local configuration information.

Experience shows that it is vastly preferable to hide this mapping from end-users - if possible, the underlying software should perform





the mapping automatically.

#### [Appendix C](#). Acknowledgments

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