

**SIMPLE-XMPP Interworking**  
**draft-mierla-simple-xmpp-interworking-01**

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Abstract

This document describes the behavior for the logical entity named the SIMPLE-XMPP Interworking Function (SIMPLE-XMPP IWF) that allows the interworking between the SIMPLE (Session initiation protocol for Instant Messaging and Presence Leveraging Extensions) and XMPP (eXtensible Messaging and Presence Protocol - also known as Jabber protocol) protocols. It refers to the conversion of the message format from one to the other protocol.

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## **1. Introduction**

SIMPLE [\[1\]](#) extends the Session Initiation Protocol with Instant Messaging and Presence functionality. The Session Initiation Protocol (SIP) [\[3\]](#) was designed to initiate and manipulate media 'sessions' between communicating parties.

XMPP is an XML-based streaming protocol designed for Instant Messaging and Presence [\[2\]](#).

The primary objective of a SIMPLE-XMPP Interworking function (IWF) is to provide protocol conversion between SIMPLE and XMPP protocols. The document describes the requirements and behavior of the SIMPLE-XMPP Interworking function for conversion of the SIMPLE and XMPP protocols.

How to use SIP to initiate XMPP chat sessions [\[9\]](#) or how to initiate sessions over XMPP [\[11\]](#) are not the subject of the present document.

## **2. Conventions Used in this Document**

In this document, the key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" are to be interpreted as described in [RFC 2119](#) [\[8\]](#) and indicate requirement levels for the protocol.

## **3. Definitions**

### **3.1 IWF (InterWorking Function)**

Performs interworking between SIMPLE and XMPP protocols.

### **3.2 SIMPLE Server**

This can be either a SIP proxy, redirect or registrar server [\[3\]](#) that supports SIMPLE.

### **3.3 XMPP Server**

Any entity that acts according to the definition of entity 'Server' for XMPP protocol [\[2\]](#).

### **3.4 EndPoint**

An endpoint can send and can receive instant messages. An endpoint is an entity from which the instant message originates or terminates. An endpoint can either be a SIMPLE client or an XMPP client.



### **3.5 'Non Signaling' message**

Any message which does not change the state of IWF within an Instant Messaging sequence.

### **3.6 'Signaling' message**

Any message which changes the state of IWF within an Instant Messaging sequence.

## **4. Functional Requirements and Behaviour of the SIMPLE-XMPP IWF**

SIMPLE-XMPP IWF can be designed in various ways. This may include coexistence of SIMPLE Servers and/or XMPP Servers with IWF. The co-location of the SIMPLE server and/or XMPP server in conjunction with the IWF is a matter of implementation and not a protocol issue. There shall be no assumptions made for the optional elements and components present in either SIMPLE or XMPP networks. The solution provided here shall work for a minimum configuration required for both protocols. There may be recommendations for other configurations, which include optional components.

### **4.1 Basic Configuration**

SIMPLE EndPoint <-----> IWF <-----> XMPP EndPoint

### **4.2 Advanced Configuration**

SIMPLE EP <----> SIMPLE Srv <----> IWF <----> XMPP Srv <----> XMPP EP

### **4.3 Functionality**

Therefore, an IWF must contain the following functions:

a) Instant Messaging flow management between SIMPLE and XMPP protocols. The incoming Instant Messaging message from any endpoint must be delivered to the other endpoint after the protocol conversion.

b) Address resolution for the two protocols.

The IWF should contain the following functions:

a) Presence flow management between SIMPLE and XMPP protocols. The incoming presence message from any endpoint must be delivered to the other endpoint after the protocol conversion.

The IWF may contain the following functions:



a) Interoperability Service reservation and release. The IWF may reserve some messages to act as 'Signaling' messages, but these messages must be known by all parts involved in usage of IWF (e.g., the SIMPLE SUBSCRIBE message intended for a XMPP conference may be interpreted by IWF as 'joining' the conference and act according to). The IWF may release any resource that was not released by any of the parts involved in an IM sequence and is no longer in use (e.g., when an IM sequence is ended and for unknown reasons one part does not close the connection established with the IWF, the IWF may release any resource related to it).

b) Ability to provide the state of the Interoperability Service. The IWF may inform the endpoints about the state of IWF, like stop, restart and so on.

c) Ability to process the messages for supplementary services (file transfer, ...) if the service is supported by the all parts of the Instant Messaging flow.

## **5. General Interworking Requirements**

The IWF shall provide the seamless interworking of the two protocols. The functioning of IWF must not involve any modification to the SIMPLE and XMPP protocols, but may involve specific profiles of these protocols.

The IWF should:

a) Follow the mandatory requirements as defined by SIMPLE protocol and XMPP protocol

b) Support all the addressing schemes of both SIMPLE and XMPP protocols.

c) Release any related resources on the detection of the end of the Instant Messaging flow between two parts.

d) Not make any assumptions about the capabilities of either SIMPLE client or XMPP client.

The IWF may:

a) Have a look-up table for resolving the addresses.

b) Use any type of data storage for keeping address resolution information.

c) Use DNS for address resolution





d) Define a set of 'Signaling' messages without changing the SIMPLE protocol or XMPP protocol

## **6. Mapping between SIMPLE and XMPP**

To convert SIP messages to XMPP messages and vice-versa the IWF must follow the general mapping procedures.

### **6.1 General Procedures**

- a) A clear mapping between SIMPLE and XMPP addresses shall be provided to support all the addressing schemes of both SIMPLE and XMPP protocols.
- b) A clear mapping between SIMPLE and XMPP messages shall be provided to reflect similar meaning in the Instant Messaging sequence.
- c) For a given message of a given protocol, there may not be a corresponding message of the other protocol that may appear to be equivalent. The IWF needs to create a mapping between the messages or generate error messages based on common understanding of an agreed upon standard.
- d) A clear mapping between SIMPLE and XMPP message attributes shall be provided to reflect similar meaning in the two protocols.
- e) All attributes used in each message on one side may not match exactly the corresponding message of the other side. In this situation, some manipulations need to be done by the IWF so that an agreed-upon standard can be created based on common understanding although all attributes do not exactly match.
- f) The messages that do not have a match on the other side should be terminated on the IWF, and IWF should take the necessary action on them (e.g, silently discard of any unknown message).
- g) In case the IWF is required to generate a message on its own in any of the sides, IWF should follow the mandatory requirements as defined by SIMPLE protocol or XMPP protocol.

### **6.2 Message Type Conversion**

The message types of the two protocols are to be converted as follows:



SIMPLE Message	XMPP Message
MESSAGE	MESSAGE
SUBSCRIBE	PRESENCE
NOTIFY	
REGISTER	IQ

Figure 1

The common attributes of the messages of the two protocols are to be converted as follows

SIMPLE Attribute	XMPP Attribute
From	from
To	to
Call-ID	thread
CSeq	id
Message body	body

Figure 2

Any other attribute from any of the two protocols may be converted into an attribute of the other protocol if the meaning of the attribute is not changed. Any attribute which does not have a similar meaning attribute in the other protocol must be silently discarded.

### 6.3 Presence Specific Attributes Conversion

SIMPLE uses PIDF [10] format to carry the presence information and the XMPP presence attributes must be converted to satisfy the PIDF format and meaning. Other details are subject for further discussions.

## 7. Managing the message flow

The management of the messages shall follow the following guidelines:



- a) Unexpected messages in a particular state of the Instant Messaging sequence shall be treated as 'Error' messages.
- b) All messages which do not change the state of the Instant Messaging sequence shall be treated as 'Non Signaling' messages.
- c) All messages which expect a change in state of the Instant Messaging sequence shall be treated as 'Signaling' messages.
- d) The content of all 'Non Signaling' messages must be delivered with no change to the destination.
- e) The 'Signaling' messages may end at IWF or may be delivered to the destination in the appropriate meaning form.

## **8. Security Considerations**

A security scheme should be enabled in the IWF. A simple security scheme may be when the IWF will accept only requests from a pre-configured set of SIMPLE Servers or XMPP server only and it will reject all other requests.

All other security requirements are for further discussion.

Assumptions for the endpoints:

- a) All endpoints trying to use IWF are authorized with the respective SIMPLE servers or XMPP servers.

Required for the endpoints:

- a) All endpoints trying to make open an Instant Messaging flow using IWF are respectively permitted to do so from IWF, as long as their messages pass an accepted SIMPLE or XMPP server first.

Required for IWF

- a) Procedures for preventing denial of service security attacks.
- b) Maintaining persistent data for authorized endpoints for future verifications.

## **9. Examples and scenarios**

This section describes some examples of Instant Messaging scenarios that will show primarily the input and output messages of the IWF for interworking between SIMPLE and XMPP.



### 9.1 Basic Instant Messaging sequence

The 'Signaling' messages (control messages) may be represented by the Presence Messages, if the Presence is supported by the EndPoint.

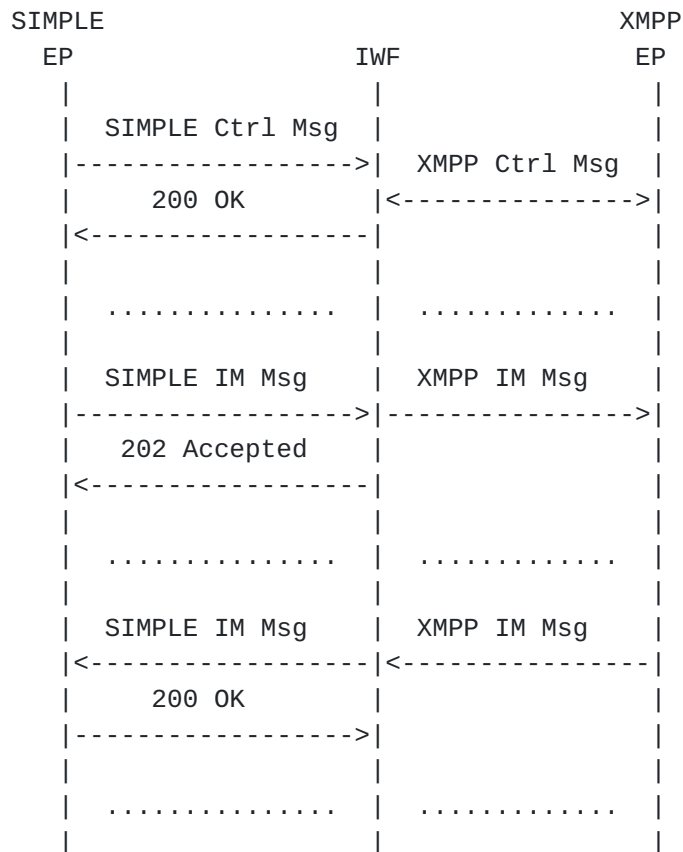


Figure 3

### 9.2 Sample message conversion

Scenario:

- SIP server with SIMPLE support is sipserver.com
- XMPP server is xmppserver.com
- xmpp.sipserver.com is a DNS alias for SIP server
- sip.xmppserver.com is a DNS alias for XMPP server
- all SIP messages for xmpp.sipserver.com will be processed by IWF
- all XMPP messages for sip.xmppserver.com will be processed by IWF
- address mapping between SIMPLE and XMPP

The XMPP address 'xuser@xmppserver.com' is mapped by SIMPLE server as 'xuser\*xmppserver.com@xmpp.sipserver.com'.

The SIP address 'suser@sipserver.com' is mapped by XMPP server as 'suser\*sipserver.com@sip.xmppserver.com'.





## a) Sample Instant Messaging message

Example of a SIMPLE message for an XMPP endpoint

```
| MESSAGE sip:xuser*xmppserver.com@xmpp.sipserver.com SIP/2.0
| Via: SIP/2.0/UDP xmpp.sipserver.com;branch=as42tbK14rfaFhxzi
| From: <sip:suser@sipserver.com>;tag=49394
| To: <sip:xuser*xmppserver.com@xmpp.sipserver.com>
| Call-ID: arnskGnska@1.2.3.4
| CSeq: 1 MESSAGE
| Content-Type: text/plain
| Content-Length: 6
|
| Hello!
```

The appropriate XMPP message generated by IWF

```
| <message id='1'
|   from='suser*server.com@sip.xmppserver.com'
|   to='xuser@xmppserver.com'>
|   <body>hello!</body>
| </message>
```

Example of an XMPP message for a SIMPLE endpoint

```
| <message id='1'
|   from='xuser@xmppserver.com'
|   to='suser*server.com@sip.xmppserver.com'>
|   <body>hi!</body>
| </message>
```

The appropriate SIMPLE message generated by IWF

```
| MESSAGE sip:suser@sipserver.com SIP/2.0
| Via: SIP/2.0/UDP xmpp.sipserver.com;branch=ld82682JUgskF12ed
| From: <sip:xuser*xmppserver.com@xmpp.sipserver.com>;tag=49394
| To: <sip:suser@sipserver.com>
| Call-ID: sgRTk893HG@5.6.7.8i
| CSeq: 1 MESSAGE
| Content-Type: text/plain
| Content-Length: 3
|
| Hi!
```

Figure 4



## b) Sample Presence messages

## SIMPLE message

```
| NOTIFY sip:xuser*xmppserver.com@xmpp.sipserver.com SIP/2.0
| Via: SIP/2.0/UDP xmpp.sipserver.com;branch=as42tbK14rfaFhxzi
| From: <sip:suser@sipserver.com>;tag=49394
| To: <sip:xuser*xmppserver.com@xmpp.sipserver.com
| Call-ID: 3nedu3e0@1.2.3.4
| CSeq: 1 NOTIFY
| Event: presence
| Subscription-State: active;expires=1800
| Max-Forwards: 20
| Content-Type: application/cpim-pidf+xml
| Content-Length: ...
|
| [PIDF Document]
```

## XMPP message

```
| <presence id='1'
|   from='suser*sipserver.com@sip.xmppserver.com'
|   to='xuser@xmppserver.com'>
```

## SIMPLE message

```
| SUBSCRIBE sip:xuser*xmppserver.com@xmpp.sipserver.com SIP/2.0
| Via: SIP/2.0/UDP xmpp.sipserver.com;branch=as42tbK14rfaFhxzi
| From: <sip:suser@sipserver.com>;tag=49394
| To: <sip:xuser*xmppserver.com@xmpp.sipserver.com>
| Call-ID: 4tqsdf430@1.2.3.4
| CSeq: 1 SUBSCRIBE
| Max-Forwards: 20
| Event: presence
| Accept: application/cpim-pidf+xml
| Expires: 1800
| Content-Length: 0
```

## XMPP message

```
| <presence id='1'
|   from='suser*sipserver.com@sip.xmppserver.com'
|   to='xuser@xmppserver.com'
|   type='subscribe' />
```



Figure 5

## Author's Address

Daniel-Constantin Mierla  
Fraunhofer FOKUS  
Kaiserin-Augusta-Allee 31  
Berlin 10589  
Germany

EMail: mierla@fokus.fraunhofer.de

**Appendix A. Revision History****A.1 Changes from [draft-mierla-simple-xmpp-interworking-00](#)**

- Abstract adjusted.
- The word Jabber is now referred only in the abstract, otherwise it was replaced with XMPP.
- New examples with XMPP to SIMPLE request conversion.
- The address translation within IWF is more intuitive in the sample scenario.

**Appendix B. Acknowledgments**

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