Available online at www.sciencedirect.com
ScienceDirect
Computer Standards & Interfaces 29 (2007) 584–600
COMPUTER STANDARDS & INTERFACES
www.elsevier.com/locate/csi

# Inter-working between SIMPLE and IMPS

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Received 29 August 2006; accepted 10 January 2007
Available online 30 January 2007

**Abstract**

Instant Messaging is looked upon as one of the killer services for 3G (The Third Generation). This paper analyzes the differences between SIMPLE (Session Initiation Protocol for Instant Message and Presence Leveraging Extensions) and IMPS (Instant Messaging and Presence Services), which are two of the most popular standards for Presence and Instant Messaging in the world. IMPS is more mature and has been deployed in many communication systems, while SIMPLE is more suitable for an IMS (Internet Protocol Multimedia Subsystem) network, so inter-working between them is a hot topic in the value-added service field, but recently the research on the topic is just in the initial stage. Based on the analysis, a bi-directional protocol mapping is proposed to enable the exchange of Presence Information, instant messages and Group information between SIMPLE and IMPS systems. With the protocol mapping and OMA (Open Mobile Alliance) inter-working Architectural Model, an Enhanced Architectural Model is proposed to perform the inter-working functions which can not be completed by the current OMA Architectural Model. A method called IFT (Information Flow Trail) is adopted to describe the message streams and their exchanging between SIMPLE and IMPS. Based on the Enhanced Architectural Model, we implemented an IWF (Inter-working Function) system.


*Keywords:* Presence; Instant Messaging; Mobile Instant Messaging; SIMPLE; IMPS

## 1. Introduction

Instant Messaging (IM) service has prevailed over the Internet for several years. It has met a great success for QQ, MSN, etc. With rapid development of the Instant Messaging service, the requirement for providing Instant Messaging service in the mobile network is desired intensively. Unlike the Internet proprietary specifications of different IM service providers, there are three main international standards for the Mobile Instant Messaging (MIM): SIMPLE (Session Initiation Protocol for Instant Message and Presence Leveraging Extensions), IMPS (Instant Messaging and Presence Services) and XMPP (Extensible Messaging and Presence Protocol), which have arisen from the requirement for the interoperability between different proprietary protocols. IMPS has been deployed in many systems for better maturity, but SIMPLE is more suitable for an IMS (Internet Protocol Multimedia Subsystem) network, so inter-working between them is becoming a research hotspot in the value-added service field. Because of the openness of these three standards, it is possible for them to inter-work together. Ref. [1] defines a bi-directional protocol mapping between XMPP and SIMPLE. Ref. [2] addresses design aspects in the inter-working between the SIMPLE presence protocol and the OSA (Open Service Access)/Parlay Presence and Availability Management APIs (Application Programming Interfaces). One of the OMA (Open Mobile Alliance) workgroups has commenced researching on the inter-working issues between SIMPLE and IMPS. State Key Laboratory of Networking and Switching Technology in Beijing University of Posts and Telecommunications and Research Institute of China Mobile have paid much attention to the inter-working issues and spent a lot of care on researching

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doi:10.1016/j.csi.2007.01.003

them. On the study of the gaps between SIMPLE and IMPS standards, the inter-working functions were presented and a bi-directional protocol mapping for use by IWF (Inter-working Function) was proposed to enable the exchange of Presence Information, instant messages and Group information between SIMPLE and IMPS systems. Based on the functions, the protocol mapping and the architecture established by OMA, an enhanced architecture for the inter-working was proposed to perform the inter-working functions that can not be completed by the OMA Architectural Model. An IWF system implemented by us was described. The message streams and their exchanging are analyzed by a method called IFT (Information Flow Trail).

## 2. Overview of the standards

### 2.1. SIMPLE

IETF (the Internet Engineering Task Force) first set up a working group called IMPP (Instant Messaging and Presence Protocol) to address the interoperability between different IM systems. The basic models [3,4] of Presence and Instant Messaging were created by the IMPP. Due to lack of the consensus, the work of the IMPP was deferred to two workgroups, one is the XMPP workgroup, and the other one is SIMPLE workgroup, then the IMPP is no longer active. SIMPLE workgroup focuses on the application of the SIP (Session Initiation Protocol)[5] to the suite of services collectively known as Instant Messaging and Presence (IMP) [6]. The IETF has committed to producing an interoperable standard for these services compliant to the requirements for IM outlined in Ref. [4] (including the security and privacy requirements there) and in the Common Presence for Instant Messaging (CPIM) specification [7], developed within the IMPP working group [6].

3GPP and 3GPP2 adopt SIMPLE as their basic standard and specify the practical implementations of SIMPE specifications for the Presence, Group and IM service in IMS and MMD (MultiMedia Domain) respectively [8–20]. With the expanding influence of SIMPLE standards, OMA also adopts it as its basic standard and has set up two workgroups to create application level specifications for this standard. The two workgroups are PAG (Presence and Availability Working Group) workgroup and MWG-IM (Messaging Working Group - Instant Messaging Sub-group) sub-workgroup. Presence is seen as an enabler for a plethora of future mobile services, not just IM, so SIMPLE was divided into three components in OMA: Presence enabler, XDM (XML Document Management) enabler and IM enabler, and these three enablers would be in progress independently. The PAG workgroup focuses on the work of Presence enabler and XDM enabler, and the MWG-IM workgroup focuses on the work of IM enabler. The SIMPLE workgroup in IETF is still active and their future contributions will be referenced by OMA just like what has been done before.

The OMA Presence Enabler is a service that manages the collection and controlled dissemination of Presence Information over mobile networks [21–26]. Instant Messaging is a set of system capabilities that provides both a framework for future service development and an application allowing near real-time exchange of Instant Messaging messages between users, whether using mobile networks or fixed Internet connections [27–32]. The XML Document Management has defined a common mechanism that makes user-specific service-related information managed by XCAP (Extensible Markup Language Configuration Access Protocol) [33] accessible to the service enablers that need them [34–39], such as IM enabler, Presence enabler. In SIMPLE technology, the XDM enabler provides the service enabling for Presence service, IM service and the other services, such as PoC (Push to Talk over cellular) service. The Presence enabler provides the service enabling for IM service and the other services which need the Presence, such as PoC service, VoIP (Voice over Internet Protocol) service. That is to say, the XDM and Presence enablers are the basic service enablers supporting for the other services.

### 2.2. IMPS

IMPS, which is also based on Refs. [3] and [4], was first founded by Wireless Village Initiative which was formed to ensure the interoperability of wireless messaging services and IM in particular by Ericsson, Motorola and Nokia. After completing the work of IMPS 1.1, the work of development for IMPS was also merged into OMA in October 1 2002, and OMA MWG-IM sub-workgroup is in charge of it. IMPS enabler is designed for exchanging instant messages and Presence Information not only between mobile devices but also between mobile and fixed devices, which includes four primary features [40–55]:

(a) Presence;
(b) Instant Messaging;
(c) Groups;
(d) Shared Content.

Presence is the key enabling technology for IMPS [40]. The concept of the Presence and Instant Messaging is the same as that of SIMPLE, but the content is different, as described in detail in Section 3. Groups are similar with Shared Group in SIMPLE XDM, as described in detail in Section 3.3. Both operators and end-users are able to create and manage groups [40]. Users can invite their friends or family to chat in group discussions and operators can build common interest groups where end-users can meet each other online [40]. Shared Content allows users and operators to setup their own storage area where they can post pictures, music and other multimedia content while enabling the sharing with other individuals and groups in an IM or chat session [40].

IMPS enabler is the integrated enabler tightly coupled with all the primary features together. Any of the four primary features in IMPS can not work independently. Besides, none of the four features can support the other services which are out of IMPS, such as PoC service.