Instant Messaging: IMPP Protocol Standard and Its Impact on Messaging Business

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Instant messaging (IM) is one of the fastest growing applications on the Internet. In six years instant messaging has gathered about 100 million users all around the world. This paper explains what instant messaging is and gives an overview about IETF's (Internet Engineering Task Force) IMPP (Instant Messaging and Presence Protocol) protocol standard proposal. The paper also presents some usage scenarios for instant messaging and tries to figure out what kinds of business opportunities instant messaging arises. Also strengths and weaknesses of instant messaging are discussed.

1. INTRODUCTION

1.1 General

Instant messaging is a relatively new way to communicate. The first instant messaging applications came to the market in 1996 and after that the number of instant messaging users has grown rapidly. In 2001, there were about 100 million instant messaging users all around the world and the number of users is increasing all the time. The Gartner Group has estimated that by 2004, 60 percent of all real-time communication - including text, voice and video - is based on the IM technology. [6] [11]

Instant messaging is just what is sounds like: Sending immediate messages between users connected to the IM service. The messages are normally short text messages but some systems support also more complex messages and attachments.

Instant messaging can be used for many things. You can chat with your friends or send messages to your business partners. In addition to sending and receiving messages, instant messaging applications typically include some way to monitor presence of other users. The most common way to present presence information is a buddy list. In this context the buddy list means a list which contains information about the users with whom you are messaging with and some kind of status information about their statuses, like online or offline.

1.2 Scope

This paper tries to explain what is instant messaging and what are the features of current instant messaging applications. The paper also introduces IETF's IMPP instant messaging protocol standard proposal and tries to figure out how the new standard will affect messaging business.

In section 1 we have learned the basics of instant messaging. In section 2, we will describe what are the common characteristics of current instant messaging applications and look what crucial is missing from them. In section 3 we will introduce IETF's IMPP instant messaging standard proposal which tries to fix the problems presented in section 2. We will also talk about requirements of the forthcoming IMPP protocol and about the standardization status. In section 4 we will go through some usage scenarios of current and future instant messaging applications. After that, in section 5, we will discuss about business opportunities of instant messaging. In section 6 we will evaluate strengths and weaknesses of instant messaging. In section 7 we will summarize the material presented in this paper and make some conclusions.

2. CURRENT INSTANT MESSAGING SOLUTIONS

This section describes the basic features of current instant messaging applications and tells what crucial is missing from them. The material in this section is based on [1], [6], [7], [11] and [13].

2.1 General

Currently there are many different instant messaging systems in use. Most of them are free but there are also some commercial solutions. The basic functionality of these systems is quite identical. The presence information is presented using buddy lists and the messages are short text messages. Buddy lists are used as 'phone books' and message sending is typically possible only to the users listed in your buddy list.

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2.2 Applications

The first instant messaging application was AOL (American Online) Instant Messenger. It has been available for paying customers of AOL since 1996. In 1998, AOL launched a free version of its messenger. The AOL messenger is nowadays the most common instant messaging application and it has more than 50 million users.

After AOL launched its instant messenger, many other companies realized the potential of instant messaging. Currently there are available dozens of instant messaging applications and most of them are free. The most popular free IM applications after AOL messenger are ICQ (I Seek You), Yahoo! Messenger and Microsoft's MSN Messenger.

In addition to free applications, there are also some commercial IM products, like Lotus SameTime and Microsoft Exchange Conferencing Server 2000. These products are usually part of some bigger software solution and they are aimed to business users. Normally these products are not used in the public Internet so they can offer good enough security level for companies internal use.

Besides the basic features described below, some current instant messengers have also more advanced features. ICQ, for example, have Napster-like file sharing utility, powerful user database search engine and possibility to open voice-chat conversations. ICQ server is also connected to mobile networks so it is possible to send SMS (Short Messaging Service) messages from your ICQ client to your friends' cellural phones. In addition to personal computers, ICQ is also available for mobile devices equipped with Palm OS or Windows CE.

2.3 What is missing?

Although current IM applications have many useful features, there is still something missing from them. The biggest fault is missing interoperability. Each IM system has its own protocol and messages can not be delivered between different systems. So if you want to send a message to your friend using other IM system, you must register to the other service and obtain a new client from the other IM service provider in order to send the message.

Another problem of current applications is inadequate security features. Most of the applications provide some way to authenticate users and deny message receiving from specified users. Also message filtering based on the message content and presence information delivery restrictions are possible in some services, but message integrity, secrecy and complete user privacy can not be ensured.

3. IMPP: A PROTOCOL STANDARD PROPOSAL FOR INSTANT MESSAGING

This section will introduce IMPP and tell what IMPP model for presence and instant messaging is. The section also describes requirements of the protocol and presents some details about the forthcoming protocol standard. The material in this section is based on [2], [3], [4], [5], [8] and [14].

3.1 General

IMPP (Instant Messaging and Presence Protocol) is IETF's (Internet Engineering Task Force) protocol standard proposal for instant messaging. The standard is developed by IETF's IMPP working group. The working group consists of experts from different companies involved with instant messaging product development.

The goal of the working group is to "define protocols and data formats necessary to build end-user presence, notification and instant messaging system"[8]. Although there are many existing instant messaging systems as presented in section 2.2, there is still need for a new standard. The IMPP protocol will try to solve the problems described in section 2.3 and define a uniform protocol which is usable also in mobile terminals.

3.2 A Model for presence and instant messaging

The IMPP working group started its work by defining a model for presence and instant messaging service. Actually the working group defined two distinct models, one for presence and one for instant messaging, because in some situations these services can be implemented separately.

The IMPP model for presence is presented is figure 1. The model defines two types of 'clients': presentities and watchers. A presentity is the one whose presence information is observed. A watcher is the one who is interested in the presentity's presence information.

Watchers are divided into two categories: subscribers and fetchers. A subscriber makes a subscription to the status of the presentity and receives a status notification every time the status of the presentity has changed. In contrast, a fetcher does not get all status notifications but simply requests the current status of the presentity.

The IMPP model for instant messaging is quite similar to the presence model. Also the instant messaging model defines two types of 'clients': Senders and instant boxes. A sender is the one who sends an instant message. The system delivers the message to the instant box of the recipient.

The third thing what the IMPP model defines is structure of presence information. Presence information of a presentity consists of an arbitrary number of elements, called presence tuples. Each tuple describes one communication address. In addition to communication address, a tuple contains information about communication mean and communication status. Using several tuples to present presence information enables one user to have one contact address and many devices which each have own communication address and status.

3.3 Requirements

The models defined in section 3.2 are basic use cases for the presence and instant messaging service and they define the basic functional requirements. In addition to these two models, the IMPP working group has defined complete list of requirements for the service. Although the list is long and contains very detailed issues, the requirements can be summarized with four principle requirements. These principle requirements are presented in table I.

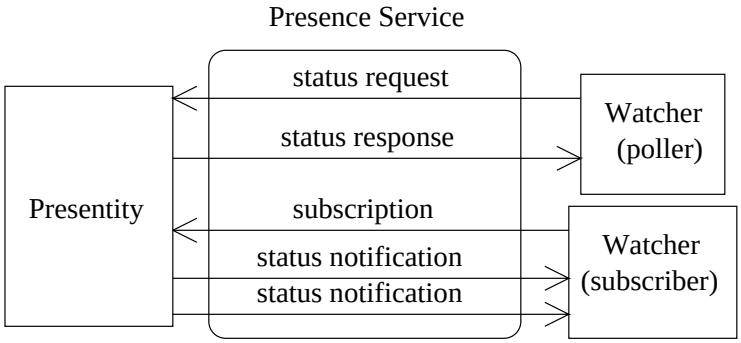

Fig. 1. IMPP presence model.

Requirement	Description
Interoperability	The standard protocol must define all needed data formats and transport mechanisms in order make different protocol implementations work together.
Security and privacy	The standard must provide a way to ensure delivery of messages and presence information in a secure and privacy-protected way. This means that users are authenticated and it should be possible to ensure message integrity. Also delivery restrictions of presence information should be supported.
Scalability	The standard protocol must work with huge number of users distributed to different parts of the Internet.
Wireless operation	The standard protocol must be usable in mobile devices.

Table I. IMPP requirements.

3.4 Protocol standard

Work of the IMPP working group is still going on. The group was formed in 1999 and it should have finished its work in May 2001 after publishing the RFCs defining the IMPP protocol. The work of the group has delayed and the group is still working on with the specifications. At the moment the IMPP working group has published 2 informal RFCs and three Internet drafts.

The IMPP protocol will standardize message flow, addressing, message format and data format of presence and instant messaging. The message flow of the protocol will be similar to the IMPP models described in section 3.2. The addressing will use URIs (Uniform Resource Identifiers) and addressed are in the following format: *im:user@host.com*. The *im*-prefix identifies that the address is instant messaging address. The data of instant messages will be transported inside a MIME (Multipurpose Internet Mail Extensions) payload. Also MIME secure multiparts can be used so this enables secure end-to-end message transmission. The presence information data is presented using XML (Extensible Markup Language).

Although the IMPP protocol will define addressing and message format, it will not define how the data is transported. The IMPP specification will only propose to use one of the following protocols:

—SIP (Session Initiation Protocol instant messaging extension)

—PRIM (Presence and Instant Messaging)

—IMXP (Instant Messaging eXchange Protocol)

These transport protocols are developed by different parties and they are all designed to carry on instant messages and presence information payload.

4. USAGE SCENARIOS

This section introduces typical instant messaging usage scenarios. The scenarios are divided into three categories: Amusement, business negotiation and session initiation. These scenarios are only examples where instant messaging can be used. One has to remember that instant messaging can be used to any real-time person-to-person communication. In the future, there can be many new usage possibilities.

4.1 Amusement

Nowadays amusement is the most common use of instant messaging. In the middle of 1990s, when instant messaging came to public use, nearly all instant messaging usage was amusement use. Since then new ways to use instant messaging have been invented but even today amusement users are the biggest group of instant messaging users.

A typical amusement use case could be as follows: You have several friends who are regular Internet users. When you are using Internet, you would like to discuss with your friends. But you do not know who are online right now. By using instant messaging, you can see statuses of your friends from your buddy list and change immediate messages with the friends who are online. This would save time and money. You could send free instant messages instead of calling or sending SMS messages.

4.2 Business negotiation

Business use is one of the most potential usage scenarios of instant messaging. Nowadays only a small fraction of instant messaging usage is business use. The biggest obstacle to business use is security: In order to use instant messaging to make business, the usage must be secure. The current public IM services are not secure enough for all business users so some companies have also internal servers. This of course restricts the usage possibilities because messaging is possible only inside companies.

Imagine the following situation: You have settled a meeting with your business partner but suddenly you get an obstacle. You have very tight schedule like your business partner and you would like to change the time of the meeting. You could of course call your partner but you would not like to disturb her when she is not available. By using instant messaging, you could see when your partner is online and initiate interactive discussion. You can both find a common place from your schedules and arrange a new time for the meeting.

4.3 Session initiation

Instant messaging can also be used for initiating more complex sessions, like videoconferencing connections. Before a videoconferencing connection can be established, all ends of the connection must agree some connection parameters, like connection addresses and transmission speeds. This can be easily done using instant messaging.

Imagine that you need to open a videoconferencing connection and participants of the connection are in several places, possibly in different countries. You have agreed the technology to use, but the participants did not know the exact connection addresses and transmission speeds beforehand. You can of course use telephone to reach them all but is it hard to call everyone at the same time. And calling is also expensive if participants are in different countries. But by using instant messaging, you can easily discuss with all participants and agree on unclear connection parameters. You can change messages with all conference members and they all can see what you say. And if you have some problems with the connection, you can all talk about these problems interactively if all participants of the conference connection are using instant messaging. In addition to discussion just before the connection is opened, instant messaging can also be used for conference room reservation and acknowledging these reservations.

5. BUSINESS OPPORTUNITIES

As with all new technology, one crucial question is where to get money to develop the technology and take it to use. This section describes the parties involved with instant messaging and how they can finance their operation. The material in this section is based on [9], [10] and [12].

5.1 Current applications

Currently most instant messaging applications are free and their operation are financed by selling commercials. The applications have closed interfaces and the only way to use some IM server is download the system-specific client and use it. The client has typically banners containing blinking advertisements.

Another way to get money is sell commercial IM products. This way the users pay for the services and system vendors get their money from users. These commercial systems are ment for business users and these servers are usually in private networks. These systems are often part of some bigger software entity and they are closely connected to other programs.

5.2 Future systems

In the future, the interoperability of instant messaging systems will bring forth many new business opportunities. The standardized protocol and interoperability of different instant messaging systems will change the service architecture. Open interfaces will enable separate client and server products to be used and users will have more choices what clients and servers they can use. This of course creates some new business opportunities. The old ways to make money, advertising and manufacturing commercial instant messaging systems, will still of course be possible.

After standardization of the instant messaging protocol, the service architecture of instant messaging systems could be similar to what email has today. ISPs (Internet Service Providers) could have instant messaging servers for their customers who pay for the usage of these servers in their Internet-connection bills.

Another new possibility could be separate client and server products. If the interface between clients and servers is standardized, some companies could make clients and other could make servers. Of course there will also be free solutions but there would also be place for separate client and server products.

Also mobility creates new business opportunities. Mobile terminal vendors could integrate instant messaging clients to their products. This would expand the usage possibilities of instant messaging because an instant messaging client would be easy to carry. This would be good for mobile vendors because they would get money by selling new terminals. But for mobile operators, this could be hard thing. They would of course get money from data transportation but it is also expected that SMS and MMS (Multimedia Messaging Service) traffic would decrease.

The most crucial thing for these new business opportunities is interoperability. Without it, these new opportunities are not realizable. The big question is, how fast the interoperability of different systems will be implemented if implemented at all.

6. STRENGTHS AND WEAKNESSES

This section describes strengths and weaknesses of instant messaging. First we will go through strengths and useful features of instant messaging. After that we will discuss about weaknesses and present some critique about the whole service.

Instant messaging is a useful intention for many reasons. The biggest advantage of instant messaging is presence information: You can know before you send a message whether your buddy is able to receive that message

or not. This is really useful feature because delivery of the message is never delayed and you will never get busy signal. In the future presence information can also be used with many other services.

Presence information also enables dynamic routing. There can be many different types of terminals and one user can have several of them. Without presence information, it is impossible to know which one is active right now. But by using presence information, each user can have one contact address and several communication addresses which each have their own status. When a message is sent to a user, the terminal where the message is delivered can be selected from the list of active terminals. If all terminals are inactive, then the user is not present and it is not possible to reach her anyway.

In the future, instant messaging can also support more complex messages and carry different types of information. For example by using message attachments, which also some current IM applications support, it is very easy to exchange more complex information. Also application launching is very useful feature. With application launching, you can for example share files with your friends and open voice chat connections. And after all, this is virtually free.

Although instant messaging has many strengths, there are also some weaknesses. At first we have to ask do we really need instant messaging? We have IRC (Internet Relay Chat), which enables group and person-to-person conversations, and we have SMS messages, which we can use when we are not connected to the Internet. The big question is, will there be space for new instant messaging technology or will the current technologies (IRC, SMS) roll over the new standard?

Other crucial question is interoperability. Will current IM service providers implement the forthcoming IMPP protocol to ensure the interoperability? Or do they want to keep their current customers and keep their systems closed. If the interoperability is not ensured, the instant messaging will not fulfill the expectations. Also capability to deliver more complex messages that simple text can be weakness. The IMPP specification is still under work and if its support for other than text contents is not well enough, the interoperable IM systems are not so useful as expected.

Also privacy raises questions. Although the IMPP standard would solve the problem of authentication, message integrity and user privacy, it not sure that people will trust the service. Although it will be possible to restrict the visibility of presence information, do people want to publish their presence information at all?

7. CONCLUSIONS

It has been said that instant messaging will be the third killer application on the Internet after email and World Wide Web (WWW). The truth is that instant messaging has potential to fulfill the expectations but there are still many open questions. The key to the success is interoperability, which is one of the goals of the IMPP protocol standard in addition to security and mobility.

In this paper we have introduced what is instant messaging and what kinds of instant messaging application are currently in use. We have talked about the new IMPP instant messaging protocol standard proposal and went through its basic features. We have also discussed about possible usage scenarios and business opportunities of instant messaging. At the end of the paper we talked about strengths and weaknesses of instant messaging and the forthcoming protocol standard.

The future of instant messaging is hard to predict. Instant messaging has some useful features, like presence information which enables also dynamic routing. Instant messaging can be used to many things and it is virtually free. But there are still some open questions. We have to think do we really need new messaging solutions or are current systems (IRC, SMS) enough for us. Also the implementation of interoperability is uncertain because some current IM system vendors may want to keep their current customers and therefore keep their systems closed.

Although there are many open questions, it is true that instant messaging has potential. If instant messaging features are implemented in mobile terminals it will expand usage possibilities of instant messaging considerably. And at the time when fixed Internet connections are becoming more common and Internet services are going mobile it is probable that some form of instant messaging will be one key application on the future Internet.

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