Unified communications

Exploration Programmes:
Corporate Technology Explores Future Telecommunications

Unified Communications

In the future people will no longer communicate at discrete times but will communicate continuously using the always-on features of the new networks (UMTS, GRPS, ADSL, WLAN). The communication may be passive in the sense that the network sends status information about the person (presence information) or active when the user sends a message, sets up a call, or makes a video connection. This new communication model requires a new platform and protocol. We see the current instant messaging platforms as the most likely platforms and the emerging Session Initiation Protocol (SIP) as the underlying protocol.

The Exploration Programme "Open Communication Services Architecture" develops person-to-person and person-to-content communication services based on an open communication service architecture. It concentrates on advanced real-time services for Open Switch communication systems and makes use of state-of-the-art technologies such as Voice over IP, Web, WAP, Intelligent Network technologies as well as enhanced media processing technologies like voice processing and Intelligent Agents.
With its Exploration Programmes, Corporate Technology is exploring telecommunication technologies and new service possibilities with a long-term view of 2–5 years. Further, the expertise built up in the course of this activity enables active support of business innovation projects.

JOHN RIORDAN

Swisscom's core business is person-to-person communication services. If we examine the revenue this is currently mainly voice based; however, we can see a strong growth in data person-to-person communications in areas such as fax and SMS traffic.
We believe that this is a great business to be in. Communication is the basis of any civilisation and has a very high value to humans.
If there is any doubt about this we must simply look at the development of human civilisation: speech was the fundamental change which allowed humans to build civilisation, then came the written word, its key use was communications in the form of the written letters. With the invention of electricity we have seen huge advances in communications, telex, telephone, fax, email and now instant messaging.
Due to its high value to people, communication has generally been a profitable business. The communication world is changing, users are going from discrete communication events such as a phone call to wanting to be constantly connected to their friends, families, etc. We see this requirement from the success of Instant Messaging services such as *MSN* and *ICQ* where users want to know if their friends are online.
This requirement can only be fulfilled if users can have mobile devices which enable them to be always connected. The mobile devices may use various networks such as WLAN or GPRS to connect to the services.

Swisscom needs to offer its customers an integrated communication service from which they are always connected to the network and to each other. By "connection to each other" we mean the presence information (e.g. online, offline, talking, location, sounds, snapshot, video picture). The service must support messages exchange, voice calls setup, video calls and knowledge about the status (presence) of the other members related to the user.

In this article, we limit ourselves to person-to-person communications as we believe that this is the most attractive business to be in. An earlier report on Instant Messaging [1] serves as a basis for the findings presented here. Below we outline the services currently offered by instant messaging (IM) platforms.

Messaging

Instant messaging enables the users to exchange messages with friends who are online. Messages appear in a window where the previous message received or sent is shown.

Buddy list

This is basically the user's address list. By clicking on a friend's name the user can bring up the message box associated with that friend and send him a new message. Not only is it an address book, but the friends in the address book usually have granted the user access rights to information such as if and how the user can communicate with the friend, and if the user has access to presence information (online, offline, activities etc).

Presence

Initially, presence was just used to indicate who was online. Once a user logged on, his presence information was set to online and when he logged off then it was set to offline. This was the key differentiator from other chat systems and email: when he sent a message to a recipient the user knew whether the recipient would see it and could respond. He also felt connected to his friends as he knew when they were online. The presence information was extended to include information such as if the screen saver was on, indicating the user was away. It was then embellished to include information set by the user such as mood or planned activities. Video and sound has now also been included so that the user can even see what his friend is doing. With the move onto the always-on world of mobile phones we see the presence information being even further extended with location such as in *friendZone*. Presence changes the communication model, as now we are continually getting passive information about our friends.

Directories

A key component of IM systems is the directory which enables users to find friends. However, it is much more powerful than this, as users register interest, language, gender, age etc, so that it is possible for users to find people with similar interests. It will also be possible to find persons available and in the local area with specific skills to do a specific job such as fix a car.

Prototype Platform Built at Corporate Technology

A web-based unified prototype communication platform has been built where the key differentiating factor is the always-on nature of the connectivity and the ability to use the platform to connect to other media such as voice, video, and instant messaging. The web model is easily extendable to also support WAP. The communications model is based around the concept of a personal address book/buddy list. For each contact (friend) there can be multiple contact entries: telephone numbers, email, address etc. Presence information is displayed indicating if the user is online and with which provider; moreover,

the friend can provide specific personal information such as "busy" in a text field.
Figure 1 gives an overview of the interface. In this example, if the user's friend John was logged on, with the MSN instant messaging platform a presence indicator would be on for the MSN contact information. By selecting the message button the user could send the friend an instant message at MSN. This is where presence really becomes useful: rather than asking the user which instant messaging platform to send the message to, he would select the platform where the user was logged on. By selecting the phone button the user could phone the person directly. By indicating the mobile phone status as well, e.g. John has his phone turned on and is free for a conversation, allows to decide which number to phone.
As it is often difficult to find address, number, or email address for a person, we have extended our platform with a directory lookup function which enables users to search various directories including the Swisscom directories to find information such as phone number or email, and then add these entries to their buddy list.
To leverage the existing online instant messaging communities we have configured our platform to connect to other instant messaging platforms such as MSN Yahoo. This extension was realised using the jabber software.

Jabber

To build our communications platform we used the Jabber Open Source project for Instant Messaging. This software consists of three key components as described below.

- *Jabber Server:* Messaging server which can be used to exchange messages between messaging systems such as other jabber servers or other IM systems such as ICQ, MSN.
- *Jabber Clients:* Many different GUI front-ends for PC, J2ME phones, Windows CE etc.
- *Jabber Protocol:* XML, extendible enables transport to Yahoo, ICQ and MSN Messaging Systems.

In figure 2 we show graphically how the messaging platform components are configured. The diagram shows multiple jabber servers providing instant messaging/communications services integrated together. In addition, these Jabber servers can be connected to other messaging platforms such as MSN. Of special interest is the integration with SIP (Session Initiation Protocol) which we are currently working on. SIP is the new standard for initiating voice and instant messaging communications over IP. It has been adopted by Microsoft's instant messenger. It is likely that SIP will be used to join the various messaging platforms together. Based on the knowledge gained within this activity we were able to play the lead technical role in launching *friendZone* for Swisscom Mobile.

Instant Messaging Growth

With the explosive growth of Instant Messaging (MSN, AOL and ICQ) we see the development of a new communications model has happened in a surprisingly short time: In just one year, from July 2000 to July 2001, the numbers have increased from 50 million to 70 million users. In 2001, Microsoft's messenger is catching up and overtaking the other instant messaging platforms. Microsoft had in July 2001 over 20 million subscribers for their MSN platform. One year earlier there were only 8.4 million. In figure 3 we show the growth of the various messaging platforms.

Extension to Real-time Communication Services

The communication platforms described above have their roots in the data messaging world, but are now being extended to also offer real-time communications.

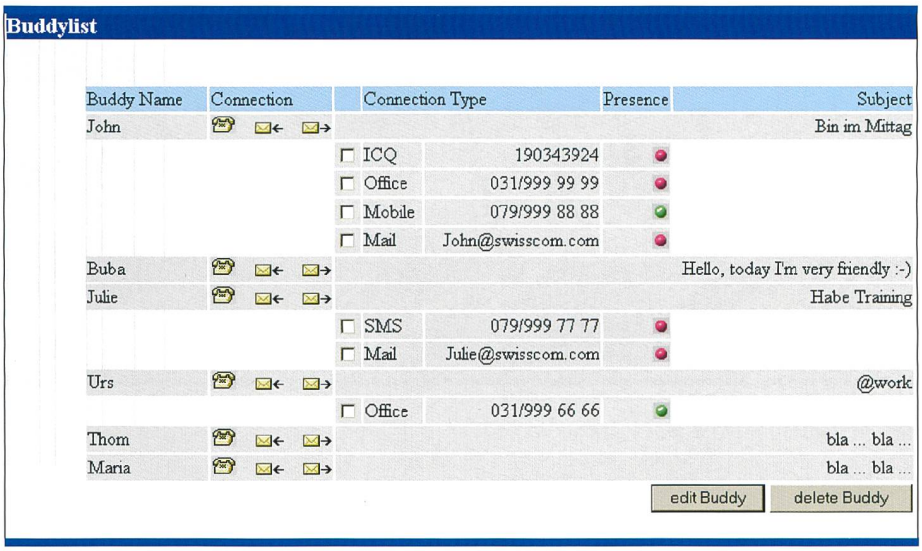

Fig. 1. Integrated communications interface.

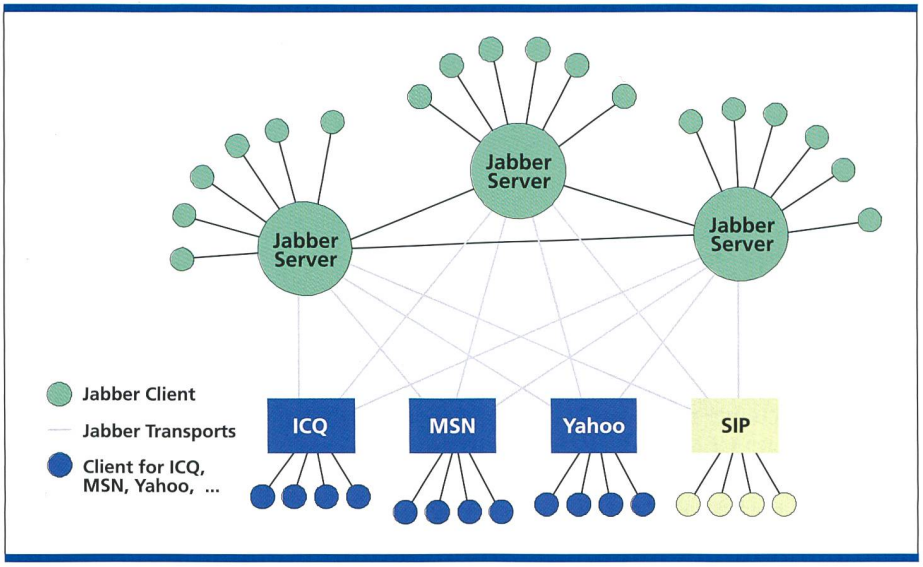

Fig. 2. Integration of Jabber with other messaging platforms.

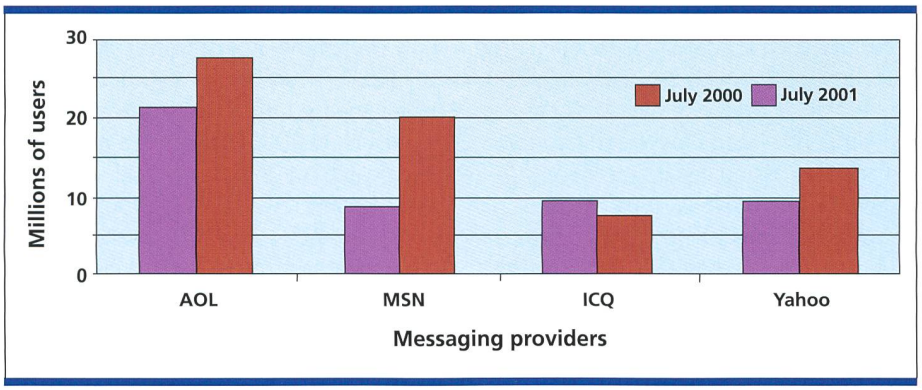

Fig. 3. Instant messaging growth.

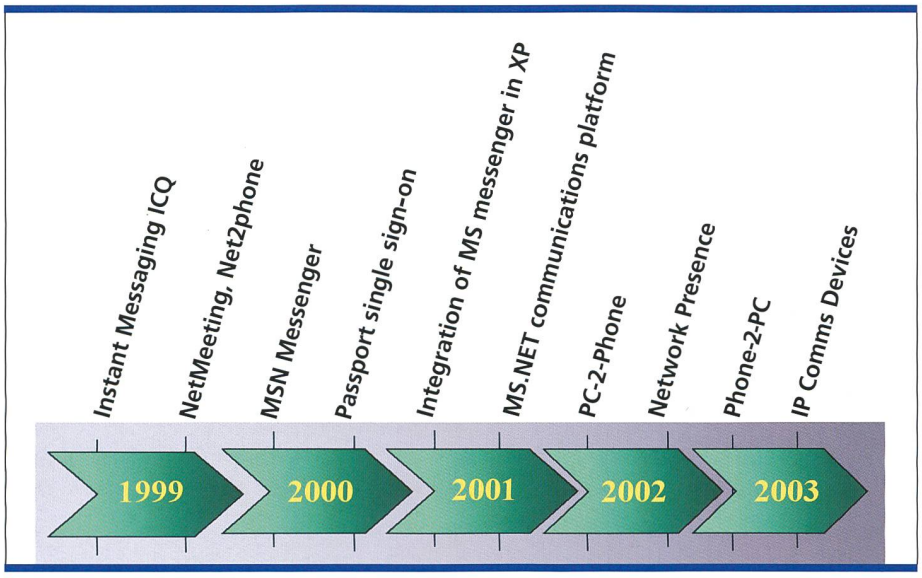

Fig. 4. Migration to always connected.

Initially, voice quality was lower than with normal telephony. New codecs are being developed specifically for IP which can offer FM sound quality between IP devices. Examples of these codecs can be seen and heard in our labs.
In addition, video communication is becoming popular, driven by the development of PC processing power and the availability of cheap bandwidth coming from WLAN and ADSL.

Consequences
Always-in-contact technologies and platforms will allow people to build online communities where distance will no longer matter. People will always be electronically connected, similar to the way primitive communities were connected with each member knowing what the others were doing. So a father will be able to watch his children and at the same time be connected to his employer, all whilst visiting a customer. This will have huge social and economic implications. Within a short time we envisage communication devices on the market which are totally integrated with the messaging platforms with extensions such as voice calls or video calls. Figure 4 shows how the communications platform is developing. The Microsoft Windows XP operating system is an example of this development: it comes with MS messenger already installed. This client only works with the MS Messenger platform. The wireless village initiative supported by Nokia, Ericsson and Motorola plans to have IM functionality and presence incorporated into the edge devices by 2002.

Conclusions
In our opinion, the Swisscom key business is person-to-person communications services. Communications has always been the basis for social and industrial development and change and we have seen the model for communications is changing. We believe that customers will expect integrated communications service offer-ings similar to those we have built: always-on connectivity to friends/ colleagues along with the standard functions already available from operators such as Swisscom, i.e. voice. To offer this, communications requires terminals which support the applications and applications integrated with the network to extract the largest amount of information on the end customer. The lowest common denominator is a web client as implemented by our prototype. However, this solution is not very bandwidth-efficient and cannot be used to extract information from the terminal such as status (away from terminal).
There is a strong possibility that these applications will not be offered by operators such as Swisscom, but by companies such as Microsoft who are leading application offerings on the PC, such as MSN integrated with the messaging applications in the MSN network. Vendors such as Nokia will also be providing wireless-village messaging functionality in their handsets and it is quite possible that the messaging functionality on the network side will also be offered by Nokia.
These developments seem to indicate that operators in general could be pushed out of the provisioning of person-to-person communications services and into the role of bit pipe producer offering connectivity to the end customer from their edge terminal to the applications service provider. This, of course, would have serious consequences for the profitability of operators. If the operator no longer controls the application then it is difficult to justify charging the customer more for valuable applications such as SMS and voice and less for bulk data such as WAP access or dialup connectivity.
To counter these problems we believe that it is vital that the operators take control of the new communications platform. This will not be easy given the lead taken by the current IM platforms and the integration already available with the current end devices. One way to proceed is to leverage the current IM platforms by integrating them for the end customer and extending the functionality by offering services such as network presence information as was done in our project.

Outlook

For Swisscom to build a successful platform we need standards. The current emerging standard is SIP and SIMPLE. We plan to extend our communications platform to become SIP/SIMPLE compliant. We also plan to extend it with audio and video information so that users really have a feeling of being connected. We are currently examining potential terminals which can be integrated into a messaging platform. In relation to other platforms such as MSN it will be interesting to see how fast they can establish themselves in the mainstream business of multimedia communications, including of course our key business, i.e. voice. [1, 3]

John Riordan *received a Bachelor of Science in computer science from the University College Dublin in Ireland in 1984. His first Job in Ireland was to build an integrated communication platform for CPT, a word processing company moving into the communications market. In 1986 he moved to Switzerland where he worked for Hasler AG developing the new generation of IP routers and bridges for Ascom. In 1994 he moved to Swisscom Corporate Technology and took up responsibility for introducing Internet services. He introduced the first email server, built the first web site for Swisscom and the Swisscom chat service. He then worked for Bluewin to develop the first PC-to-Phone solution called Surfcall. He is currently working on unified communications and the integration of these services with presence and network authentication using SOAP and SIP.*

Zusammenfassung

Kommunikation ist eine Schlüsseltechnologie jeder Gesellschaft. Die Kommunikationsplattform der Zukunft basiert auf einer ständigen Verbindung der Benutzer und einem stetigen Austausch von Anwesenheitsinformationen. Ein Benutzer wird diese Informationen dazu verwenden zu entscheiden, auf welche Weise er mit einem andern Benutzer in Verbindung treten will. Solche Plattformen entstehen gegenwärtig basierend auf dem Instant-Messaging-Konzept und entsprechender Infrastruktur. Für Swisscom als Kommunikationsanbieter ist es unabdingbar, ihre Infrastruktur Richtung Unified Communication auszubauen.

References

[1] Tim Wouda: Service Differentiation by Instant Messaging, http://ctap.swissptt.ch/rundblick/slides/rundblick_280501/sld001.htm (closed user group only)

Abbreviations

Buddy List	Personal address book with list of friends plus status
Codec	Coder-Decoder (used for sending voice over digital networks)
GUI	Graphical User Interface
IM	Instant Messaging
IP	Internet Protocol
SIP	Session Initiation Protocol

Pointers

- Jabber homepage: www.jabber.org
- Wireless-Village homepage: www.wireless-village.org
- MSN homepage: www.msn.com
- SIP protocol homepage: www.sipforum.org
- WAP-ICQ project (Closed User Group only), homepage: twiki.swissptt.ch/cgibin/twiki/view/Main/Projects/WapIcq/

Fernmessung mit MEMS

Auf dem kürzlich in Washington D.C. abgehaltenen International Electron Devices Meeting (IEDM) 2001 wurde ein mikroelektromechanisches System (MEMS) gezeigt, mit dem Gase am Entstehungsort bereits vollständig fernanalysiert werden können (Bild). Es wird kein zusätzliches Spektrometer mehr gebraucht. Entwickelt wurde das MEMS von Polychromix, Honeywell und dem Sandia National Laboratory. Mit Hilfe eines programmierbaren Gitters kann man mit ihm jede beliebige Kombination von Gasen messen. Das Bild zeigt einen Ausschnitt aus der Gitterkonstruktion: oben den programmierbaren Polychromator, unten das feste Hilfsgitter. Die Reihenfolge der Gitterelemente für die Gemischanalyse spielt keine Rolle.

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Honeywell Technology Center
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Neue Anwendung für GPS

Forscher am Jet Propulsion Laboratory in Pasadena haben erste erfolgreiche Versuche unternommen, mit Hilfe der Satelliten des Global Positioning System die exakte Höhe des Meeresspiegels zu bestimmen. Das ist wichtig, um bessere Vorhersagen über Wetter- und Klimaveränderungen zu bekommen. Bislang glaubte man, dass dafür die Auflösung des GPS nicht ausreicht. Erste Messergebnisse lassen eine Genauigkeit von ± 2 cm erwarten.

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