

Nokia in Messaging

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Introduction

Mobile messaging has emerged as the clear leader in non-voice traffic and revenues. SMS has exceeded all predictions and is currently developing into one of the most important revenue generators for many mobile operators. Despite the limitations of its user interface and technological capabilities, SMS has undoubtedly become the single most important wireless data bearer.

Conventionally, SMS has been a major service both in Europe and Asia Pacific, and American markets are beginning to see increased SMS traffic – two-way SMS is now implemented across most networks and interoperability will become a reality in the US market in 2002. To ensure that SMS continues to develop in the future, the mobile industry has joined forces to produce the next generation SMS standard: Multimedia Messaging Service (MMS). For the operator, MMS gives immediate access to an experienced user group, while for users, it means they can start using new services without delay. The Nokia Picture Messaging concept is a clear evolutionary step from SMS towards MMS, as it educates users to send richer content, beyond simple text.

Nokia is a strong advocate of open standards, and believes that by using open international standards we can create services that will be widely used. Because of Nokia's involvement, the extensions to the SMS standards need both terminal and network aspects.

Features of Enhanced Messaging Service (EMS) such as interoperability will encourage its use by introducing more versatile services and Nokia will provide support for EMS in its terminals. Furthermore, with content downloading and terminal management Nokia continues to support and develop Smart Messaging services.

Among the different types of messaging, Multimedia Messaging Service (MMS) will emerge as a key technology. MMS enables rich content to be created for messages, while also functioning as a highly versatile platform for mobile applications and services. To ensure the mass-market adoption of MMS, it will be supported by all Nokia mobile phone categories.

Instant messaging is moving from the fixed Internet into the mobile domain. People are no longer tied to the fixed environment if they want real time communication with presence information. The mobile terminal will become the preferred method of accessing personalised services, including instant messaging, which will become the main application for group messaging and chatting services in operator's service portfolios.

Instant messaging will also be the first presence-enabled application. In essence, presence has two aspects: it shows my status to others, as well as showing the status of others to me.

As services, instant messaging and presence can be seen as separate, even though in the initial phase they will be bundled into one seamless user experience. Presence is an efficient tool that can also be used for other non-messaging services such as multiplayer gaming and directory services.



The combination of instant messaging and presence services offers an appealing business case for operators. Connecting messaging between fixed Internet and mobile domains is appealing to user and, as users are already familiar with the concept from the Internet, it should not take long for the service to catch on.

IP Convergence will bring a new era in messaging in many ways. The user experience will remain the same, but the underlying technologies will change. 3GPP release 5 will introduce SIP as a call control protocol that will also be used in messaging. However, SIP will be introduced in the GPRS/1xRTT environment with an adequate quality of service level before Rel 5 timeframe, allowing users to progress easily to true mobile multimedia messaging.

Short Messaging Service – SMS

At present, SMS is the biggest profit generating mobile data service for the mobile operators. Currently, depending on the area, SMS can contribute up to 30% of operators' revenue. In addition to being highly profitable, it is also the fastest growing mobile service.

The number of short messages being sent in most markets is booming, which brings new challenges for the network operator – capacity, scalability, load sharing, efficient routing and the demand for value added services. In October 2001, an estimation from the GSM Association stated that the number of short messages sent globally every day has reached 1 billion. Nearly 90% of all the SMS's sent are for person-to-person communication, yet numerous services have been created for application to person communication.

Limitless applications are possible

Currently, SMS is being utilized to offer lucrative value added services. To ensure the continuous development of these services, Forum Nokia (<http://forum.nokia.com>) works in close co-operation with operators and third party designers to develop versatile applications, which include:

- Chatting
- E-mail notification
- Stock market alerts and other financial information
- Location tracking with GPS equipment
- Distribution management for delivery companies
- Traffic and weather information
- Sports results instantly with the push service
- Banking transactions
- Airline information.

SMS standards offer high service flexibility

Besides pure text messaging, Nokia has introduced Picture Messaging and Smart Messaging. Also Enhanced Messaging Service (EMS), as an extended part of the SMS standards, is fostering open standards to ensure interoperability across terminals. Currently, Smart Messaging is offered to anyone who wishes to implement it and Nokia has actually offered Smart Messaging to 3GPP to be standardised as another example of enhanced messaging.

Smart Messaging

There is a vast number of mobile phones that support Smart Messaging on the market today. Operators, content providers and users have all benefited from this large base of Smart Messaging capable phones, high-quality content and services, with some of the most popular being the downloading of ringing tones and operator logos. The Smart Messaging specification has been widely accepted by content providers and other terminal manufactures. The open Smart Messaging specification includes support for:

- Ringing tones
- Operator logos
- Picture messages
- Business cards
- Calendar and address book entries
- Caller line identification icons
- Downloadable profiles
- Internet access configuration
- WAP configuration and bookmarks

Enhanced Messaging Service – EMS

Enhanced Messaging Service (EMS) is an enhanced SMS technology that enables people to change typefaces, format text in bold and italic, and align it as they choose. Additionally, it makes it possible to download and send icons, animations, and ringing tones. The EMS standard is part of the SMS standard and it includes support for concatenated messages i.e. the terminal can automatically combine several messages when handling EMS messages.

At present, Nokia sees that multimedia messaging will be available on a large scale next year. Therefore, EMS brings only limited new value to Nokia customers, especially since similar services are already available through Smart Messaging now. Yet, Nokia is committed to open standards, and naturally we continuously study the development in the industry.



Multimedia Messaging Service

The success of SMS is a good example of what happens when an application is widely available on easy-to-use terminals from different manufacturers and on different interconnected networks. The widespread adoption of this common and easy-to-use application created a larger unified SMS application market that fed its own growth, and upon which everyone profited.

Nokia sees Multimedia Message Service (MMS) as the key application in its entry into the 3G terminal market. MMS is an end-to-end application for person-to-person mobile messaging, mobile to mobile, mobile to Internet and Internet to mobile. It will provide rich multimedia content, including images, audio, video, data and text, yet will not compromise the ease of use of SMS or its established usage patterns. MMS is a globally standardised service and happens to be one of the first 3GPP standardised 3G services today.

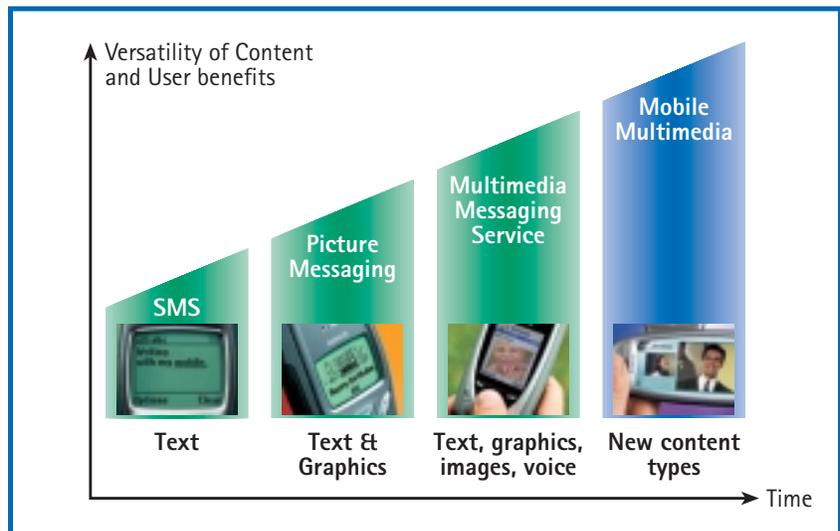


Figure 1. Multimedia Messaging migration path

Multimedia Messaging Migration

Our migration path in multimedia messaging builds on the well-established SMS model by adding new functions and new content types in steps that consumers will readily understand. This will encourage adoption of MMS, leading to rapid take-up and high penetration. MMS delivers a location-independent, total communication experience – combined with ease of use that is a simple, logical extension of SMS.

MMS can be used in various situations whether it is business or leisure and it meets the needs of many user segments. It promotes market development by introducing new user benefits in understandable steps. The possibility of taking a picture and immediately sending it gives the user an opportunity

Comprehensive survey reveals “fertile market” for multimedia messaging

A study conducted by HPI Research Group has highlighted the potential for upcoming mobile multimedia messaging services. Thanks to the groundwork laid by the clear success of 2G messaging, there is a ready-made subscriber base of mobile-device users who will easily make the move to multimedia messaging. HPI interviewed over 12,000 people in six markets from March to April in 2001: the United Kingdom, Germany, Italy, USA, Brazil and Singapore. This study discovered “a very buoyant and fertile market in which to launch new messaging services”. This is borne out by

the widespread presence of messaging devices and messaging habits that already exist.

For the total sample, the greatest demand is for services that offer functional improvements to messaging. Three-quarters of those currently with access to a messaging device welcomed some functional advancement such as easier text input. In addition, just over a half of the current messaging population is interested in visual enhancements, such as the ability to send a photograph, video or music clip, or to enhance text.

to share an important moment with friends or relatives. This opportunity can be extended for business use where a photograph can be annotated with text or explanations and sent instantly back to the office.

MMS messages can include many types of content including photographs video clips, maps, graphs, layouts, plans and animations. From a network perspective, an Multimedia Messaging Service Center (MMSC) is needed to deliver MMS messages. The MMSC enables multimedia messages to be sent with various content types from terminal to terminal with instant delivery much like SMS messages today. Furthermore, the MMSC also enables messaging between Internet applications and terminals and vice versa.

Nokia MMS solutions support flexible addressing of multimedia messages to both familiar phone numbers (MSISDN) and e-mail as defined in the MMS standard. MMSs can be created from either Internet applications or terminals equipped with an integrated or connected camera. Also, images can be downloaded from various Internet applications, in which MMS messages can be created, stored and forwarded.

MMS as a technology platform

Since MMS supports a wide variety of content formats, it can also be seen as a technology that enables numerous services, not only limited to person-to-person messaging. Hence, MMS technology can be further utilised as middleware for countless services that will function in the mobile domain. MMS can also be used as an optional delivery mechanism to download Digital Rights Management (DRM) protected

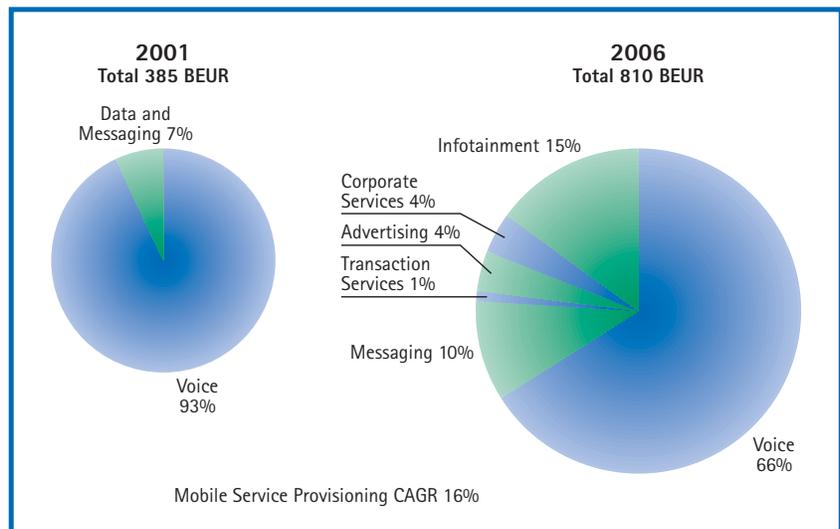


Figure 2. Global Mobile Service Revenues. Source: Nokia 10/2001.

content such as MIDI ringing tones, animated GIF screensavers and downloadable game packs. Digital Rights Management (DRM) mechanisms will be implemented to control the forwarding of copyrighted content to others.

One can subscribe to MMS based services very similarly as to the WAP and SMS services today. Both push and pull MMS content will be available. These services can be e.g. headline news, a daily cartoon strip or the latest sports news – accompanied by a short audio clip of the excited commentator’s report. The messages can consist of pure information or be combined with an element of advertising. MMS adds multimedia content to these messages.

When taking a closer look at the global mobile service spending revenues, one can detect a trend that will lead to a notable decrease in voice services towards 2006. In this diagram, the messaging division include all SMS, MMS and e-mail services counted together and, one should note that the other data services in the bigger pie can include MMS content (Nokia 2001).

E-mailing with MMS

With the store and forward functionalities of the MMSC, message delivery is instant i.e. the content is directed to the receiver’s terminal. Whereas, in the case of mailbox based solutions like e-mail and Unified Messaging (store & retrieve) the message must be manually downloaded. Accordingly, the obvious benefit with the MMS based e-mail usage is that the sender can be confident that the receiver will see the message sent, while with the mailbox based solutions there can be a degree of uncertainty whether the receiver has downloaded the message or not. Furthermore, with MMS solutions the sender pays and the receiving of these messages is free of charge, so together with the instant delivery this ensures that the receiver will truly get the message.

In Nokia’s MMS vision, MMS and mailbox services can exist in parallel. (Just like SMS and e-mail today.) MMS will be a service, optimised for mobile messaging, on it’s own, and most of the messages will be sent inside the

MMS environment, i.e. mobile to mobile (although also e-mail connectivity is provided). So, with the Nokia concept, messages are not sent first to the mailbox. Instead, we push the messages immediately into the receiver's terminal, i.e. we try to make the pipe between two terminals as short and efficient as possible.

Message content

In e-mail various kinds of attachments can be sent. Messages in MMS are optimised for mobile use, and only well defined set of media formats can be exchanged. Actually, in MMS there are no text + attachment type of messages, the messages are always multimedia presentations, where various message components are displayed in predefined order by the sender. So in practise, the message "opens up" fully and there is no need to click on any attachments, since they do not exist.

Thanks to the enormous user base of e-mail, it will remain as one of the most important and highly used forms of communication and, although, e-mailing over MMS is a very convenient option, Nokia will support POP3 and IMAP4 clients in certain terminals e.g. the Communicators.

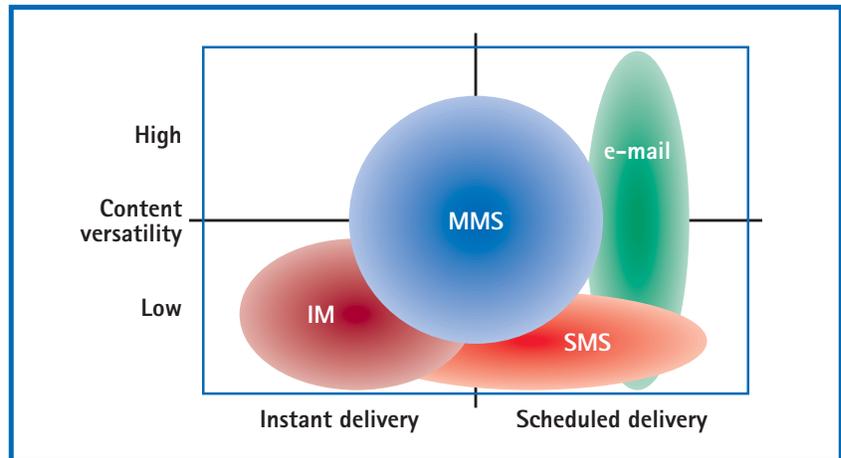


Figure 3. Messaging technologies positioning in terms of Content Versatility and Delivery

Instant Messaging and Presence

Presence is defined as information describing the "status" of the user. The Presence features of Instant Messaging (IM) are a means for exchanging "status" information with other users. Presence information enables a new communication paradigm, "See before you connect". With this paradigm a user wanting to communicate with another user, first checks the status and availability

of the other user and then, based on the Presence information, chooses the most appropriate communication means. Instant messaging and Presence services have existed in the Internet for some time and have given birth to a range of other interesting services and features.

From a messaging perspective, Instant messaging has been described as a means of sending small, simple messages that are delivered immediately to online users. However, this definition has evolved over a period of time and today's instant messaging services allow users to send more than simple text messages. They allow users to exchange rich textlike pictures, files, imbed smileys, use coloured fonts, and even do video calls. The advanced instant messaging services today also come with a lot of corporate features such as white-boards, scratch pad area, netmeeting features etc. For user personalisation, they offer multiple features like group discussions, skins, screen backgrounds, privacy features etc.



In the fixed Internet world, Instant messaging services have proven to be quite popular. Now Instant Messaging services are moving to the mobile domain. The mobile terminal is becoming the personal trusted device, which will be the preferred access device to one's services. The value proposition of Mobile Instant Messaging consist of two elements – connectivity between the Internet and mobile world for interactive messaging and presence value, "See before you connect". In addition, mobility adds new dimensions to these basic value propositions by offering a number of highly attractive features that make the overall value proposition for Mobile Instant Messaging much better.

The main added value of Mobile IM is that access to IM services becomes ubiquitous, meaning that a user can access Presence information and exchange IM messages at any time and not only when seated in front of a desktop PC. This will have a profound influence on usage patterns and will also change Presence information to reflect more the mood and state of the user, rather than focusing on whether the user is logged in or not on a PC. Being online/offline in fact becomes for the most part irrelevant, since the mobile users are online by default, assuming their phone is on. Instead, the locations and situations, where the mobile users are, and the preferred communication method become more relevant.

A key aspect of Instant Messaging and Presence is the immediate nature of the message and presence exchange. The always-on characteristics of the GPRS and 1XRTT services being rolled out today, perfectly complement an IM service; using a GPRS/1XRTT service, the IM users can remain connected to their service providers at all times and will thus receive immediate updates of the change in the Presence info of other users and receive their messages in real time.



In the early phase of its evolution, mobile instant messaging can use SMS as a bearer, which is widely available even in low-end as well as legacy mobile terminals. Naturally, WAP and the Web browsing can also be used to offer Mobile IM services to legacy clients.

At the moment there are several proprietary instant messaging services in the market that do not interoperate in a user-friendly way. In short, users of different services are not able to send and receive instant messages and presence information from each other. In order to ensure fast time to market and service adoption, interoperability issues must be taken under consideration. Initiatives such as Wireless Village ensure interoperability between different mobile terminals, service providers as well as mobile and fixed Internet domains. The more users there are using these messaging service, the greater the value added to the user is.

At some point, instant messaging will cannibalise SMS traffic in person-to-person messaging. This is the case, especially, when there are terminals and networks that enable GPRS/1xRTT always-on connection. However,

there will remain a business case for SMS person-to-machine messaging, for example keyword services. Also SMS will prevail as a main messaging technology for legacy terminals.

Instant messaging benefits for the operators

Mobile operators see Instant messaging as an attractive service due to several reasons. First, there is a vast base of over 300 million fixed Instant messaging users globally. Operators can connect their mobile users to this large base on the Internet world and offer messaging between mobile and Internet domains. Even in their mobile network, operators can connect their subscribers using mobile and PC's for messaging.

Second, operators have a possibility to offer messaging services for different target groups: one-to-one, one-to-many (group communication) and many-to-many (chat). For example, chatting services have proven to be extremely popular in the fixed Internet. SMSCs are not capable of multiparty messaging, therefore an Instant messaging server is needed in the network in order to offer IM services. Also, as SMS is restricted to text-only messaging, Instant messaging enables richer messaging contentwise.

Third, users are already aware of Instant messaging service from the fixed Internet and able to quickly adopt to the mobile version when available.

There is a clear operator business case for mobile instant messaging services. According to Strategy Analytics, mobile instant messaging users will contribute an ARPU of US\$ 4.44 by 2004 with mobile instant messaging services contributing 20% of the operator's

messaging revenues. Contrary to popular belief that instant messaging is a US phenomenon, the Europeans and Asians are more heavy users of instant messaging than their American counterparts. A study conducted Netvalue found that in Europe, Spaniards spend as high as 10.6 days/month on instant messaging services as compared to 10 days/month for Germany, 8.9 days/month for USA, 8.1 days/month for UK and 8.4 days/month for France. Again in APAC – Out of the total time spent on Internet, in China users spend 11%, in Singapore 22%, in S. Korea 11%, in Hong Kong 32% and in Taiwan 11% doing instant messaging. The Chinese are the single largest community of instant messaging users globally.

Presence and messaging

In the mobile domain, presence will be richer and even more powerful service than what we may be used to in the fixed Internet environment. Mobile context will expand presence from being online for instant messaging into a useful tool of self-expression and continuous mobile awareness. The mobile terminal is evolving into personal trusted device (PTD); and presence, among other features, will be one of the main drivers towards it.

Presence and messaging are separate applications or services and can work independently of each other. However, by utilising the Presence service, a user has a better idea as to whether a recipient is available to receive messages, and is in general willing to communicate. Therefore, the two services are often used in tandem.

Presence will support all existing mobile communication, not just messaging. Presence information will initiate

additional communication in the form of messaging and voice calls. It generates new traffic the same way as fixed Internet instant messaging has proven – a change in the presence information may result in a greeting or other kind of message. Other applications can also be built so that they utilise presence information.

IP Convergence in messaging

The major corner stone towards IP based communications in messaging will be the introduction of 3GPP Release 5 specification, which utilises Session Initiation Protocol (SIP) as the call control protocol, which will also be utilised in messaging. All the data traffic will be based on packet switched bearers, whereas in previous releases voice and video are based on circuit switched bearers. The major change will be the use of SIP, which will be used for

all session set-ups as well as messaging services. From the messaging point of view, 3GPP Release 5 will enable easy combination of all messaging into true mobile multimedia messaging, where video, voice, pictures and other types of multimedia components are created, sent and received in a simple and efficient way. Boundaries between different messaging technologies will disappear. But, the key consumer promise of IP convergence is that applications work seamlessly together.

IP convergence will happen in small steps, introduction of GPRS/1xRTT connection being one of the first ones. Standardisation efforts, for example Wireless Village, will drive the market towards All-IP terminals and networks from the services point of view. Through these industry initiatives service providers are able to start offering interoperable messaging services to their customer from day one and get on to the learning curve.



Conclusions

Messaging on mobile networks is dominated by SMS today. However, the nature of mobile messaging is quickly evolving from a pure textual base to a visual base and developing from the popular SMS to the more advanced MMS. The mobile communications industry is evolving from a voice-driven form to a personal multimedia form with text and image driven intermediate steps.

SMS was the first mobile data service to make a serious financial boost on operators' revenues and multimedia messaging will clearly lead the way to more profits for operators. Another aspect of the mobile communication evolution learned from the success of SMS is the demand for instant creation and consumption of content. Multimedia messaging applications are the essential drivers of continuous growth in new services beyond voice, and promise increases in airtime, revenue, service differentiation and customer loyalty.

Instant messaging and presence will add another dimension into the mobile messaging environment. They will offer popular Internet services in a mobile context, raising the whole value of communication blurring the boundaries of mobile and fixed Internet messaging paradigms.

In the future, all the different messaging technologies will serve a valid function and will be justified in co-existing. SMS is superb for quick and pithy communication, while MMS is an excellent way of sharing richer content in person-to-person communication. Moreover, MMS can also be used as a bearer for content in general. Instant messaging enables simple and appealing consumer services in group communications as well as in person-to-person messaging. Furthermore,

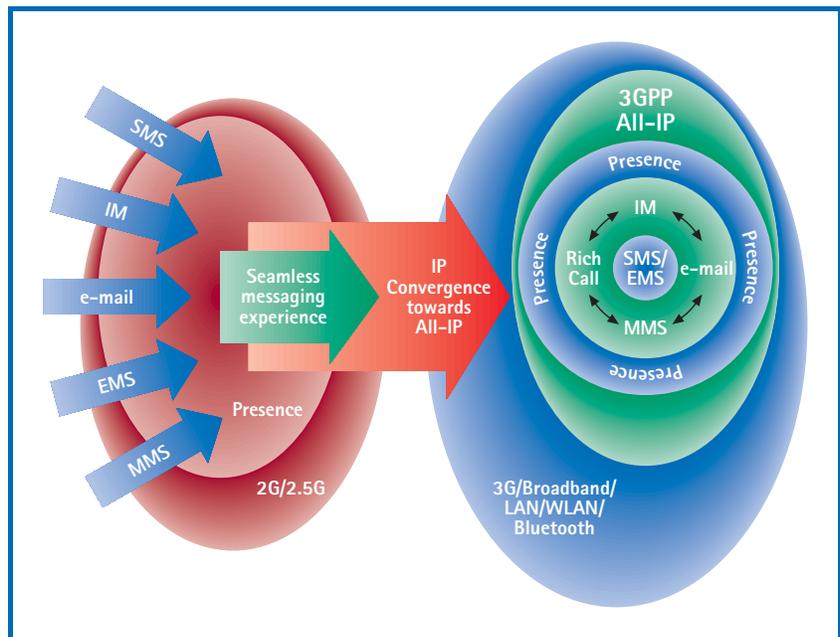
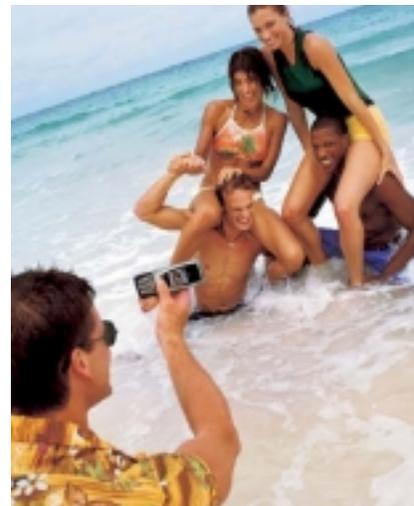


Figure 4. IP convergence in mobile messaging

presence will be the glue that combines all the messaging technologies into a package that is easy to understand and use.

From the user point of view, presence will combine all messaging technologies into one seamless messaging experience. Presence specific applications, such as presence enabled phonebook, will be in a center of communication experience. Presence information will initiate the messaging experience. In addition, presence can be seen as the UI for messaging.



IP Convergence will have major impact on how mobile services, messaging services included, will be delivered and consumed. For 3GPP Rel5 solution, Nokia is studying various alternatives for implementing MMS and other messaging technologies. Nokia sees that MMS will evolve continuously along the path started by Nokia's MMS based on 3GPP R99. Also, Nokia sees that MMS is inline with its plans for an All-IP Service Platform.

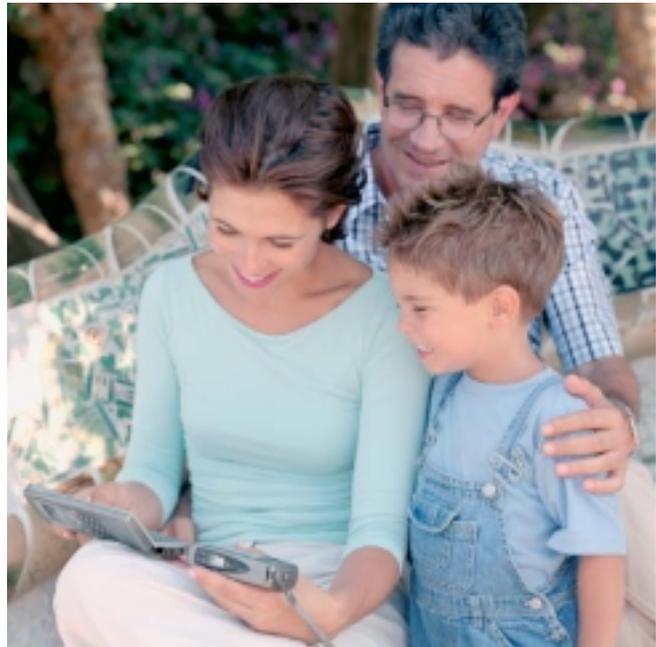
In the quest to further develop and facilitate the next generation of products and services, Nokia is developing an open technical architecture that enables seamless interoperability between key applications, network environments and user identity/addressing. Additionally, we will limit the complexity of the technical environment supporting applications and services; users simply do not want to be concerned with the underlying technologies. Yet, they want seamless messaging experiences i.e. they are not interested whether the message being sent is an instant message, SMS, MMS, e-mail or something else. Accordingly, Nokia supports open technologies, standards and relevant initiatives that support and facilitate the deployment of global technologies and applications and stimulate market growth.

IP Convergence will finally combine messaging technologies into one seamless solution technology wise. The user experience remains the same, some new features may be introduced. Mobile Multimedia as a concept will cover both rich call and streaming applications and services. Also in All-IP era, Presence will be used as a communication enabler element.

Nokia's solution to cover all these demands is Mobile Internet Technical Architecture (MITA). For the players in

the field, MITA is the essential framework when creating user-friendly Mobile World experiences. MITA supports network evolution to All-IP voice and data, while underpinning key technologies like IPv6 and Presence, the overall aim being a network that is driven by services.

Seeing that messaging will remain as the most important mobile data service, we will continue to ensure that the Nokia terminals offer the best of messaging capabilities both from a consumer and an operator point of view.



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