White paper 8

m-Commerce

e-Business without boundaries

Foreword by E-Minister
Patricia Hewitt MP

InterForum

Helping Britain to Trade Electronically

number eight

Foreword

At the end of 1998 this Government set itself a visionary target of making the UK the best environment in the world for e-commerce. This embraced a far-reaching approach to getting everyone in the UK online – citizens, business and Government.

Since then, we have witnessed the steady progress businesses have made to become integral parts of the e-commerce world. Consumers are starting to embrace new ways to complete transactions, such as internet banking, and, with the advent of digital television, for example, no longer have to have a computer to be "on-line".

There is now an immense and rich array of quality content available and our challenge is not only to encourage the development of information and services, but to promote greater access to this content for everyone. When we bring mobile access into the equation, the potential to reach everyone becomes and exciting possibility. Following Christmas 2000, there are now more than 38 million mobile phone users in the UK. Imagine each person being able to access their bank securely, book train tickets or perhaps even visit a virtual museum via their mobile phone.

I see the Wireless Application Protocol (WAP) services as a natural stepping stone to the next generation of mobile services, familiarising consumers with accessing internet information and using services on the move. Huge growth in the use of e-commerce services is most likely to occur via mobile access because there are few social or economic barriers to owning a mobile phone. This is an exciting time to be involved in mobile telecommunications and internet services, where technology developments are driving the change to access on the move. The challenge for industry is to provide services that people will want to access on the move, again and again.

This White Paper from InterForum has come at a key time for m-commerce, bringing together lessons learnt from the launch of WAP and realistic ideas for how to approach a successful m-commerce future.

Patricia Hewitt MP

Minister for Small Business and E-Commerce

InterForum is a not-for-profit organisation that helps British businesses to trade electronically.

All of InterForum's activities are governed by the compelling need to raise awareness of the many business opportunities and challenges presented by new information and communications technologies (such as the Internet). InterForum works to ensure that education, legislation, and technology are in place to help British businesses profit from the digital economy.

The activities of InterForum are shaped and determined by some of the best-known and most influential companies in the UK. Members of InterForum's governing Charter, Business and e-Market Councils are drawn from suppliers and users of information and communications technologies. This framework guarantees InterForum a unique authority in driving and shaping best practice in the business use of new technologies.

It also ensures that InterForum's activities, events and publications provide an impartial and highly informed source of information. InterForum has achieved a unique position as a respected voice to government.

InterForum has proved its effectiveness in influencing legislation, the development of technology and technology standards, and the way these technologies are used to best effect.

EDUCATION AND AWARENESS

Businesses need to be constantly innovating if they are to succeed. InterForum works to help companies achieve realistic business goals through new technologies by publishing regular white papers and other publications which explain the latest development and provide examples of best practice. All of InterForum's publications are also available through its web site (www.interforum.org).

Face to face meetings and seminars at which members and interested observers can question and debate are part of InterForum's fabric. (Some of these events are restricted solely to members). Each year, InterForum organises a symposium at which speakers of international renown contribute their insights on the latest developments in the global digital economy.

InterForum recognises the need to educate UK businesses to the commercial opportunities and challenges presented by the emerging digital economy. Unlike many, InterForum's educational programmes focus on the business implications and uses of new technologies rather than on the technologies themselves.

InterForum is a respected and impartial voice on many key issues. It is in demand as a contributor and commentator on all issues relating to the business use and development of information and communications technologies, and its views are widely quoted.

AN INTERFACE TO GOVERNMENT

Electronic commerce has the potential to become a huge driver of wealth creation. However there are regulatory barriers to be overcome before its full potential can be realised and electronic trade can be carried out in a trusted and secure environment.

A respected voice to government, InterForum works to ensure that a regulatory framework is in place to support the development of the digital economy. InterForum works with those who are shaping government policy and identifies those issues that require legislative change.

The Department of Trade and Industry, H M Customs and Excise, H M Treasury and The Inland Revenue are members of InterForum.

INTERFORUM MEMBERS

InterForum members include many of the best known and most influential companies in the UK who supply and use new technology.

Members of InterForum's Charter Council are drawn from the companies who are responsible for the development and supply of information and communications technologies. Their co-operation within this Council ensures that the information and policies produced by InterForum are both informed and objective.

Business Council members are drawn from some of the best known companies in the UK who are already meeting the business challenges and opportunities presented by the new technologies. Although Business Council members work in a variety of industries and environments, they share a commitment to the advancement of the digital economy.

MEMBER BENEFITS AND ACTIVITIES

Members of InterForum's governing Council meet regularly to shape and drive the policies and activities of InterForum. These regular meetings give members the opportunity not only to network with peers, but also to share information and examples of best practice.

InterForum members contribute substantially to the advancement of British business by working with government in identifying legislation and policies that create barriers to electronic trade and suggesting change.

All of InterForums White papers, including number 8, are available for download from www.interforum.org in pdf format.

mCommerce

Executive Overview

Mobile commerce - or mCommerce - is set to become the most significant economic and cultural development of the first decade of this century. According to Jeff Bezos, chief executive and founder of Amazon.com, "If you look five to ten years out, almost all of e-commerce will be on wireless devices."

The convergence of mobile technology and the Internet will revolutionise the way businesses interact with consumers and with each other. One of the key enabling technologies of mCommerce is WAP - Wireless Application Protocol.

What is Wireless Application Protocol (WAP)?

WAP is the leading global open standard for delivering information over wireless networks. WAP provides a uniform technology platform with consistent content formats for delivering Internet and Intranet based information and services to digital mobile phones and other wireless devices such as pagers, smartphones and communicators.

Why is WAP relevant?

WAP creates new business opportunities for corporations by providing a new channel for existing services and the possibility for totally new services that can reach customers 24 hours a day wherever they are. Since WAP is an open protocol for wireless information delivery, it provides the same technology to all vendors regardless of the network system. This means that there are WAP compliant terminals from several manufacturers. The server technology is also open, so operators and companies can select from a wide range of products. The common standard offers economies of scale, encouraging manufacturers, application developers and content providers to invest in developing compatible products.

Business opportunities

Companies can offer customers new mobile services that make everyday life more convenient and are easily accessed from the mobile phone. Application categories include:

- Wireless access to Internet content - consumers benefit from immediate access to information they need at that moment.
- Wireless access to corporate IT systems and extranets - corporations can offer new channels for their services and also create totally new services for their mobile customers.
- Wireless access to personal information - wireless device users can access their email, calendars and even screen text headers for their voice mail messages.
- Intelligence Telephony services - carriers can offer their customers secure access to their personal and other customer related information now located in the carrier configuration, billing and other databases in the Intelligent Corporate Business Application, allowing employees to continue to access intranet business applications regardless of time and location.

Applications

Email will become a way of life, enabling users to communicate anywhere in the world. When practically anyone in the country can email - as has already happened in Finland - the phone becomes an extension of the person. It will change the way the whole nation communicates.

Entertainment. Individuals will be able to buy theatre tickets, book restaurants or place bets from anywhere, charged to your telephone account or have the main news items of the day delivered to you on the hour.

Shopping. You can order a meal on the way home from work, or join an online auction from any location

Money. You can examine your bank account, buy and sell shares, check stock market prices or make payments online.

Business Applications. You can continue to keep in close touch with the business with wireless access to internal information systems and applications.

Introduction

According to The Strategis Group, there will be more than 530 million wireless subscribers by the year end. New estimates report that the number of wireless subscribers will break the one billion mark by 2003 - some 48 million of which will be smart phone users by 2002, growing to 204 million by 2005. To put this in perspective, 35% of workers will be mobile by 2002. The multimedia capabilities of smart phones include the ability to retrieve email, and push and pull information from the Internet.

Currently the mobile networks are still dominated by voice traffic - unlike fixed networks which now carry more data than voice traffic. Indeed, despite the uptake of Short Message Service (SMS), particularly by the young, for sending and receiving text messages over a mobile network, data accounts for less than 2 percent of traffic, although this is expected to increase dramatically to 45 % in 2003 once high bandwidth networks are available.

In 1999, 96% of the devices surfing the Internet were attached to personal computers. Within two years, mobile phones based on the internationally agreed WAP standard are expected to oust PCs to become the most popular way of surfing the web, although PCs will still be the first choice for heavy applications such as documents, spreadsheets and video. Wireless technology is developing rapidly. Third generation (3G) mobile networks will give mobile phones enough bandwidth or capacity for two way transmission of anything from voice to video almost instantaneously.

mCommerce will establish wireless services as an extension of today's ebusiness strategies, enhancing existing business to business commerce and enabling high street companies to do business with their customers any time anywhere.

Critically this is happening first in Europe - not the US, where WAP enabled phones will not be available before the end of the year and several competing mobile networks are slowing down the adoption of mCommerce. In Europe, WAP enabled phones are already on the market and can be used over existing Global System for Mobile Communications (GSM) technology to send email, receive news, stock market prices or football results, book theatres or restaurants, place bets, check bank accounts or create a direct link to a company web site. In the near future, developments in cellular networks with the arrival of Global Packet Radio Service (GPRS) and Universal Mobile Telecommunications Systems (UMTS) will offer the bandwidth previously restricted to fixed line technology enabling the use of a mobile device for any interaction.

Another technology that is adding to the potential of wireless communication is Bluetooth, a technology allowing cable-free connection between mobile phones, PDAs and other devices. Gartner Group expects 75 percent of new handsets to be Bluetooth enabled by 2004.

Vision of the Mobile Future - What the technology will enable

- Download music from the Internet - you will be alerted of new tracks according to your personal profile. The charge is automatically debited from your prepaid account
- View train/plane timetables in your location, book and pay for tickets
- Check bank balances and transfer money between accounts.
- Receive alerts that stock you are interested in has reached your predefined buying threshold: buy the stock, account is debited.
- Review share portfolio, read tips and analyse reports
- Request information about restaurants, cinemas and theatres and make booking. Payments are made by m-Commerce, automatically sent to the phone for authorisation.
- Payments for business expenses can be automatically sent to Finance Department

The market is really just at its inception and the real potential has yet to be visualised let alone tapped. The technology is about to explode, bringing phones with such huge bandwidth that they will be able to send and receive high quality moving pictures and CD-quality sound. This will enable you to consult your doctor while on holiday or participate in lectures at an overseas university. Web cameras will enable visualisation too - supporting online diagnosis and video conferencing.

New phones, equipped with Global Satellite Positioning (GPS) or other positioning capability, will also know where you are to within a few metres. This will enable the phone to locate a free hotel room or restaurant with a table, even a nearby parking space. Helsinki is building a virtual model of the city, complete with roads and buildings, one feature of which is that parents will be able to tell exactly where in the city their phone carrying children are.

Indeed, if the current developments by IBM and Sonera - Finland's phone company - are successful, 5,000 Helsinki residents will be part of the world's first virtual village. The 'wireless websphere' is to be based on third generation (3G) wireless communications which will deliver high speed internet to mobile and fixed devices. The virtual village is expected to encompass more than 1,000 companies and 5,000 residents within a one kilometre radius by 2005.

In Japan, internet multimedia capable mobile phones - known as imode - have been available for the last 18 months and have gained four million new users and over 1,000 service providers delivering innovative services to the users.

History

The rapid adoption of the Internet has been rivalled only by the phenomenal success of the mobile phone. Already there are around 300 million mobile phones worldwide and research suggests that there will be three million mobile Internet users by the end of 2001 in the UK alone. Indeed it is predicated that globally there will be one billion WAP phones in use within three years. The technology that has been developed to facilitate the convergence of these two phenomena which already underpin the business and consumer activity is set to revolutionise the way we work, rest and play.

WAP: The WAP Forum

Formed in September 1997, Ericsson, Motorola, Nokia and Unwired Planet (now Phone.com), the forum membership now includes handset manufacturers, telecommunications companies and IS solution providers. This membership means that handset manufacturers representing 90 percent of the world's market have pledged to deliver WAP enabled mobile phones. Carriers representing more than 100 million subscribers have joined the forum.

According to the WAP Forum, "This Commitment will provide tens of millions of WAP browser-enabled products to consumers by the end of 2000. WAP allows carriers to strengthen their service offerings by providing subscribers with the information they want and need while on the move. Infrastructure vendors will deliver the supporting network equipment. Application developers and content providers delivering the value-added services are contributing to the WAP specification."

The WAP architecture is based on web technology that has been extended to support non IP (Internet Protocol) bearer services and adapted to enable its use on small devices such as PDAs, pagers, mobile or smart phones, radios, wristwatches or VCRs. WAP is designed to overcome the difficulties posed by wireless communication and limited network capabilities on the one hand and the limitations of the mobile end user devices on the other.

Using a simplified version of HyperText MarkUp Language (HTML), WAP MarkUp Language (WML). WAP enables ordinary Internet pages to be viewed on a handheld computer or mobile phone.

WAP-enabled devices are companion products that will deliver timely information and accept transactions and inquiries when the user is moving around. They use micro-browsers that are designed to overcome the challenges of mobile handheld devices. WAP services provide pinpoint information access and delivery when the full screen environment is either not available or not necessary. The WAP specification addresses these issues by using the best of existing standards, and developing new extensions where needed. It enables industry participants to develop solutions that are air interface independent, device independent and fully interoperable.

WAP benefits

- Leverages existing investment in web technology
- Operating system independent
- It can work on high latency, low bandwidth networks such as SMS or GSM
- It is device independent

The mobile technologies

Over the next couple of years European mobile networks will enjoy a significant overhaul, providing new levels of bandwidth that are likely to enable an unforeseen generation of mobile applications.

GPRS

Data transmission for mobile Internet users is set to increase significantly later this year with the introduction of the General Packet Radio Service (GPRS) network. GPRS enables “packets” of information to be transmitted between computers at speeds up to ten times faster than today.

- Users can remain continually connected to data networks - there is no longer any need to dial in and log on
- The network is only used when data is potentially transmitted - reducing the cost of mobile communications
- New and innovative pricing structures are expected: usage may be charged on a subscription basis or on the volume of data sent and delivered
- Based on the Internet Protocol (IP), GPRS provides ease of connectivity to the Internet and IP based company intranets

UMTS

A third generation (3G) mobile service is set for release in 2002, UMTS will enable users to receive interactive multimedia and video services on the move. Universal Mobile Telecommunications System (UMTS) is part of the International Telecommunications Union’s ‘IMT-2000’ vision of a global family of third generation mobile communications systems. UMTS will play a key role in creating the future mass market for high quality wireless multi-media communications that will approach 2 billion users worldwide by the year 2010.

UMTS will deliver pictures, graphics, video communications and other wide band information as well as voice and data, direct to people who can be on the move. UMTS will build on and extend the capability of today's mobile technologies (like digital cellular and cordless) by providing increased capacity, data capability and a far greater range of services using an innovative radio access scheme and an enhanced, evolving core network.

- Will deliver high value broadband information, commerce and entertainment services to mobile users via fixed, wireless and satellite networks
- Will speed convergence between tele-communications, IT, media and content industries, delivering new services and creating fresh revenue generating opportunities
- Will deliver low cost, high capacity mobile communications offering data rates up to 2Mbits/sec with global roaming and other advanced capabilities.

UMTS services will launch commercially from 2002. Licences have been awarded in several European territories and field trials are currently underway. Builds on today's significant investment in GSM mobile systems.

Bluetooth

Bluetooth wireless technology is the de facto standard for small form factor, low cost, short-range radio links between mobile computers or PDAs, mobile phones and other portable devices. It will enable users to connect to a wide range of computing and telecommunications devices easily and without the need to buy, carry or connect cables. It delivers opportunities for rapid ad hoc connections and the possibility of automatic, unconscious connections between devices. It will virtually eliminate the need to purchase additional or proprietary cabling to connect individual devices. Because Bluetooth can be used for a variety of purposes it will also potentially replace multiple cable connections via a single radio link. Connections are instant and they are maintained even when devices are not within line of sight. The range of each radio is approximately 10 metres, but it can be extended to around 200 metres with an optional amplifier. A device equipped with a Bluetooth radio can potentially establish an instant connection to another Bluetooth radio as soon as it comes into range.

Bluetooth can be used for a wide range of applications:

- Three-in-one phone: At home, your phone functions as a portable phone (fixed line charge). When you are on the move it functions as a mobile phone (cellular charge). And when your phone comes within range of another mobile phone with built in Bluetooth wireless technology it functions as a walkie talkie (no telephony charge)
- Interactive conference: In meetings and conferences you can transfer selected documents instantly with selected participants and exchange electronic business cards automatically without any wired connections
- The automatic synchronizer: Automatic synchronisation of your desktop, mobile computer, notebook and your mobile phone. For instance, as you enter your office the address list and calendar in your notebook will automatically be updated to agree with the one in your desktop, or vice versa.
- Truly integrate phone, earpiece and PDA with wires, your phone establishing the connection for both voice and data, but remaining safely in your briefcase

In many applications Bluetooth will work with WAP. For example, buying petrol. The engine management system in your car instructs the pump to deliver an

amount of a specific fuel using Bluetooth and then uses WAP to process the payment transaction.

The mobile devices

The worldwide market for information appliances will exceed $17.8 billion in 2004, according to research analysts IDC. The number of wireless device users with access to inbound and outbound information services and Internet messaging will increase 728% from 7.4 million in 1999 to 61.5 million by 2003 in the US alone. “It is easy to envision a time in the next few years when the majority of Internet access could be through wireless and not wired means,” said Iain Gillott, VP of IDC. “The irony is that many users will not know they are using the Internet over the wireless devices - they will simply see, as some do today, updates from CNN, CNBC, Reuters and so on and take that fact for granted. The underlying infrastructure that makes this possible is invisible to them.”

Despite the expected increase in the number of users accessing the Internet with wireless devices, IDC believes users’ lack of understanding is thwarting interest. “Some users believe access to the Internet means browsing and displaying full web pages on the handset display,” Gillott said. “This incorrect perception will have to change, and will change, as more services are offered and the awareness of actual wireless internet capabilities increases.”

It is the diversity of mobile device that is causing most speculation at the moment. Some will be light with small screens, able to fit into the pocket, others will have bigger screens and look more like palmtop computers than phones, others will be worn as part of our clothing.

And creating the right mobile device is a significant challenge. To date, the most popular wireless handsets have been designed to be lightweight and fit comfortably in the palm of a hand. Furthermore, consumers desire handsets with longer battery life, which will always limit available bandwidth, and the power consumption of the CPU, memory and display. Because there will always be a performance gap between the very best desktop computers and the very best handheld devices, the method used to deliver wireless data to these devices will have to effectively address this gap. As this gap changes over time, standards will have to continually evolve to keep pace with available functionality and market needs.

Three types of terminal have been defined:

- Feature phones which offer high voice quality with the capability for messaging and Internet browsing
- Smart phones, with similar functionality but with larger displays
- The communicator, which is an advanced terminal designed with the professional in mind, similar in size to a palm top with a large screen and, possibly, qwerty keyboard

Security

Security is one of the critical issues for successful adoption of e-commerce. And, with the innate portability of mobile devices, a higher level of security is required if stolen devices are not to be used to purchase goods or send fraudulent messages. In time, it is expected that the mobile device will support payments, hence the need for security is significant.

Trust

To feel confident to trade in this marketplace, both business and individual consumers have to feel sure that the risk of fraud is minimised.

- Before carrying out a transaction electronically, a trader must be able to reliably identify the other parties and be sure they are trustworthy.
- When actually trading, you need a level of assurance that the messages you receive are genuine and have not been tampered with during transit.
- Messages must be kept private, unreadable to all except the communicating parties, to ensure eavesdropping is not possible.

To deliver these business imperatives there are four main security features that are needed to create a trusted, secure environment for trading electronically:

- **Confidentiality** - electronic messages that are sent must not be visible to eavesdroppers
- **Authentication** - communicating parties must be certain of each other's identity
- **Integrity** - communicating parties must know when the data they send has been tampered with
- **Non-repudiation** - it must be possible to prove that a transaction has taken place

Organisations are working together to deliver public key infrastructure (PKI) solutions across wireless solutions. A PKI provides a security framework that tightly binds digital identities to content providers and wireless customers and while securing their associated transactions. With the increase in connectivity between consumers and the Internet, the need for trusted and secure e-business transactions is also projected to increase in both frequency and value.

PKI frees up wireless e-commerce growth by letting secure electronic transactions take place any time and any place. According to Radicchio, a global partnership of companies committed to the development of secure e-commerce and PKI for wireless, three quarters of all wireless devices in 2004 will be able to use electronic signatures on PKI.

Payments

It is critical that payment mechanisms are in place to enable retail and media applications as they come on stream. And certainly, this is one area where the integration of Bluetooth and WAP will prove useful: the in-built security of Bluetooth is likely to facilitate short range payments, both in stores and at vending machines.

The vending and cash register industry is developing 'Bluetooth and SMS-enabled' cash tills, vending machines (drinks, chocolates, newspapers), car wash machines and train/bus ticket machines.

The benefits are clear to the consumer, no need for carrying small change, and clear to the retailer, no need for emptying the cash from the vending machine or taking cash to the bank - these transactions are replaced by electronic payments direct to their bank.

Delivering the mobile service

The key to success in reaching out to the mass market will be easy-to-use, secure services - personalised to each customer's lifestyle. Personalised WAP portal solutions allow customers to choose which services are relevant to them. There will be no equipment set-up or configuration required, no user-driven download of software and no need for technical helpdesk support. The terminal will be pre-configured with the ability for the customer to personalise the display with their choice of bank, share trading and favourite shops.

Wireless ISPs and WAP portals, such as BT Cellnet's Genie which provides a range of news, entertainment and commerce services, are gaining increasing popularity. Genie currently has over 500,000 users accessing WAP enabled content from providers that include the BBC, Guardian Unlimited, lastminute.com, Popcorn.co.uk and Excite.

Critical success factors:

- Interface design
- Hosting of the e-commerce site
- Ability to support millions of users and transactions
- Ability to keep information secure
- Total solution planning, integrating all elements of the network and m-commerce solution allowing non restricted access to any content site on the internet, regardless of location or affiliation

Supporting mCommerce

The Applications

This revolution in communication will have a profound affect upon the way we do business with mobile becoming an integral part of business and consumer activity rather than an adjunct as it is today.

Delivering Benefits

A mobile phone is the most intimate communications device in the modern world. When providing services into a WAP enabled phone, a company can connect directly with people's lives.

Until now Short Message Service (SMS) has provided a simple way to send and receive short text messages over a mobile network. It has been used for one to one communication or for service/information providers to offer their services to mobile phone users.

With WAP, pundits believe that mobile phones will become the universal personal interface to information and services. With brands, partnerships and customer loyalties on the move as mobility increasingly permeates everyday activities and lifecycles, to get a share of this totally new opportunity, organisations need to add mobile phone data access into their service channels immediately.

It is widely believed that WAP technology will accelerate the consumer take up of both existing Internet applications such as electronic banking as well as allowing for innovative new services that leverage the additional dimension that mobile technology allows.

However, it is important to recognise that the initial implementations of mobile Internet access are just that: Internet access, not the Internet with which many users will be familiar. The screen on the mobile device does not have colours, it is small and has minimal graphics capability.

Looking forward, this will not be an issue. Mobile screens will have colour graphics, built in video cameras and even loudspeakers, technology that will support the full range of transactions already being proposed. Critical will be the availability of GPRS which will enable users to stay online through high speed data handling technology, without even dialling up.

However, until these devices and networks are available it will be essential to manage user expectations if the huge potential of mobile applications is not to be hyped out of existence before it is ready to deliver.

Business to Business

With the ability to support Internet access and high volume data transmission, the use of mobile technology can now become an integral part of day to day business operations. This means tightly integrating mobile technology with existing business processes and creating new processes - so called e-processes - to exploit the power of the new technologies. Just as m-commerce is an extension of e-commerce at a consumer level, it also extends the business-to-business e-commerce model, providing new opportunities for forging tighter customer and partner relationships, improving supply chain management and improved management of inter-company processes.

Over the past decade organisations have been able to use technologies such as workflow combined with emails and intranets to smooth internal processes, particularly issues such as budget approval or document creation that need input from several people. This can now be extended to mobile technology, ensuring not only that the right people are always involved in the process but also that processes are not delayed by an individual's out of office duties.

This ability to deliver 'approval on demand' will play an increasing role in the provision of service on demand for customers. For example, while banks are all planning mobile banking services for their customers, they will also be able to use this technology internally to improve customer services - by reducing the time it takes to approve a loan application, for example.

One of the most important issues that the integration of mobile technology into core business processes will address is that of traceability. The use of mobile technology to date has been somewhat anarchic - with no corporate control of decision making processes or promises made to customers or suppliers. By integrating mobile technology with trackable business processes, organisations can regain control over their businesses. Decisions can be made after seeing the appropriate information, not just on the word of a colleague over a mobile phone, for example. And the decision making process is traced from inception to conclusion, improving accountability of employee and organisation.

This applies not only to those involved in the management processes but to those delivering customer service - from utility engineers to delivery drivers. With the use of GPS integrated into the phones, an individual's position will be recorded. This will enable even tighter integration of engineering/repair services with customer service. When a customer reports a fault, the information is fed to the engineer: including map positioning and any other relevant information. Once repaired, the engineer, with one touch, automatically updates the job management system and the customer information system - generating an immediate response to the customer to inform them that the repair has occurred. While utilities have been experimenting with mobile technology for some time, this tight integration should enable them to further improve their services.

Additionally, the remote worker can have direct access to corporate information databases. For example, a customer receives an order but it is not complete. The delivery driver can dial into the database from an appropriate WAP enabled device and find out whether the rest of the order is on another lorry and when that order is due for delivery, providing within minutes an answer to the customer's problem. If not, the driver can immediately notify customer service that there is a problem.

The ability to access information that has been tailored to the use of WAP enabled devices will provide huge potential for improved customer service as well as streamlining operations. It is expected that wireless devices will become key platforms for the deployment of e-business intelligence (e-BI) solutions over the next couple of years. For example, with WAP enabled e-BI, a sales person can access inventory availability levels, shipping dates on customer orders and other critical customer information from their mobile phone while at the customer site. Call handling and CMS systems will be able to interface directly into wireless mobile devices, further reducing support cost and increasing customer satisfaction and loyalty.

Additionally, customers and suppliers who already have access to an extranet or intranet via their PC or laptop will be able to access key product, inventory and pricing information from the mobile device.

Mobile Banking

As mobile networks are upgraded with WAP, GPRS and UMTS to deliver next-generation multimedia services, full mobile banking services will be unleashed into the market. Customers will be able to view their account statement, transfer funds between accounts, be notified of large payments or when their balance hits a pre-defined threshold, and will have immediate and full control over their finances.

Next-generation mobile banking services will deliver significant improvements with user-friendly icon driven instructions, instant access, security and immediate transaction processing all at a lower session cost. Banks will attain higher levels of customer satisfaction and increased loyalty by providing instant access banking. They will benefit further from lower administrative costs, no branches, reduced headcount, streamlined call centres and lower handling charges - savings which, hopefully, will be passed onto customers.

Conclusion

So how will the convergence of mobile and Internet technology, the development of m-commerce - really affect us in the future? Within a couple of years or so the mobile phone will become an MP3 player, a digital radio, a gaming device, a television and Internet access terminal all at once. Not to mention a communications handset! Does this mean the end of the computer as we know it? If everything we need to do, say, buy, hear or look at will reach up via our personal digital device - or mobile phone - everything we do could change.

We are at the beginning of the transition to the Internet economy where the Internet will become the fundamental core of all global business. All the distribution channels and methods of working that have been built up during the past 200 years are about to become redundant. The change in the value chain will impact even the largest organisations.

The m-commerce revolution is driving new business models with the potential of world-wide distribution and instant 24 hour, 365 day service. As the geographical location of the business becomes irrelevant, the service utility and customer experience become key.

The killer application will be the highly personalised mobile device, rather than a specific computer application.

The adoption of this business model is not entirely new. Toll-Free or Freephone 800 services of the 1980's and 1990's increased accessibility to a wider geographical target market. The Internet and now

next-generation mobile Internet has extended Toll-Free telephone-commerce into the e-commerce and m-commerce markets.

For mobile network operators the m-commerce market opens up new revenue streams from areas such as data services airtime, transactions, sales commission and advertising. And a new value chain, expanding from just selling airtime to selling goods and providing loans to pay for small purchases. The new value chain will comprise the banks, Internet Service Providers, mobile network operators, retailers, enterprise business, mobile terminal manufacturers all providing a service to the m-commerce customer.

Delivering the m-commerce needs of the business and personal markets requires partnerships and co-operation across the value chain to leverage business' core competencies. These services must be delivered to the customers now, be low priced and be aggressively marketed. Business success will come through co-ordination, flexibility and speed.

Mobile network operators will be making the decision on what role to take in the new world of m-commerce, whether they remain only a carrier for business-to-business and business-to-consumer transactions or extend their service to becoming a bank by offering credit for airtime, credit for goods and loans or billing services to third party companies.

For the small business market mobile network operators will carry the transaction between consumer and business for cash withdrawals and small value transactions, mobile phone payment for canned drinks, chocolate, car wash, train tickets, and for large transactions carrying debit card, VISA™ and MasterCard™.

Certainly the main challenge is to implement a global approach to payments that will gain universal support. Once consumers have real trust in that technology, m-Commerce will explode. "Soon, mobile phones with wireless Internet capability will be in almost everyone's pockets, building the basis of a truly mobile information society. Global security brands established by leading payment associations and financial institutions will have a crucial role in paving the way for consumers to adopt mobile commerce which is an important functional part of the mobile information society," concludes Yrjo Neuvo, executive vice president and chief technology officer of Nokia Mobile Phones.

User stories

Swissair

In support of Swissair's new levels of customer care, IBM has developed an application which enables selected Swissair passengers to check in for booked flight from web enabled phones. With the service, which is initially available in Zurich for selected frequent flyers, Swissair is the world's first airline to provide such an ability to its passengers.

When these passengers use their cellular phones to check in they receive information on the display that would normally be printed on their boarding pass: the exact departure time, gate and seat number. In case of any changes, for example to departure time or gate, the customer receives automatically updated information via the telephone display.

Woolwich

The Woolwich is set to be the first British bank to offer its customers secure access to Internet banking services from their mobile phones, using the WAP server solution. Customers of the bank's personalised banking service, Open Plan, will be able to run their accounts, no matter which mobile phone network provider they use, by using their cell phones to dial-

up their Internet service provider at their usual call rates. They can be confident of complete security as their transactions are transmitted from the WAP phone to Woolwich's exclusive WAP server.

The first group of customers are to be offered a free mobile phone with one year's service contract in return for taking part in a market research programme. They will be able to check balances on all of their Woolwich accounts (including mortgage and unit trusts) move funds between accounts, view current and investment account statements, pay bills and issue instructions. The knowledge gathered as a result of this exercise will be used in planning the roll-out of the service to all Open Plan customers.

Visa

Visa is working with Nokia to develop ways in which financial institutions and mobile phone operators can offer secure payment services to their customers over a mobile phone. Under the agreement, the companies will introduce a standardised means of making secure payments using a mobile phone, meeting different market requirements for security, risk management and dispute resolution. They also plan to simplify the payment process by developing a mobile e-wallet to allow for 'simple-click' purchases. A pilot of the technology will take place this year with MeritaNordbanken in Sweden and Finland.

Additionally, mobile phone users in the UK can use a WAP mobile phone to pinpoint the location of their closest Visa ATM. Users simply type their current postcode into the phone and Visa's Global ATM locator guide will provide the location and details of the three nearest ATM machines. Later this year, customers will also be able to find the exact location of Visa's 531,00 ATMs located in 120 countries worldwide. Alternatively, users can locate ATMs by using street names.

Manchester United Football Club

Manchester United has announced a pioneering sponsorship deal that will allow fans to watch live football matches and buy replica kits through their mobile phones. Vodafone has agreed a four year alliance with the football club under which is not only sponsors the club but also provides wireless internet services to the club's 12 million supporters worldwide. Although Vodafone believes it will be four years before fans can watch the game live on their mobile phones, from August fans with WAP enabled phones will be able to receive news and latest scores direct from their handsets. By the start of the 2002–2003 season when the next generation of mobile phones are widely available, the service will be available worldwide and in dozens of different languages.

Virgin Radio

Virgin Radio has introduced a new service for those with WAP phones. Listeners will be able to interact with the station while on the move. Additional features include the ability for listeners to find out which song is playing at the moment, and even buy the music online. There is also scheduling information, Virgin's playlist and interactive games and competitions. Currently the most popular interactive feature on Virgin Mobile is one that allows you to listen to chart music over an ordinary mobile. Next generation mobile devices are likely to pave the way for combined radio and data from the same device.

Michelin Travel Publications

A new WAP based service has been launched by Ericsson and Michelin Travel Publications that will enable mobile network operators to provide customers with restaurant and hotel locations via WAP Phones. Guide@Michelin will allow WAP phone users to access Michelin Travel Publications'

database of about 60,000 tested and selected locations from its 'Red Guide' of European restaurants and hotels. The new service is based on Ericsson's Location Based Information Services (LBIS) platform and can use Ericsson's Mobile Position System for positioning coordinates.

Waitrose

Waitrose is the first retailer in the UK to go live with WAP enabled mobile phones. Waitrose and WapWorld, the UK's first independent commercial WAP gateway, will enable consumers to buy and receive useful information, including a store locator and recipe of the day.

Waitrose expect that early business through WAP enabled technology will come from 'distress' last moment purchases such as flowers, champagne, chocolates and tickets. Initially customers will be linked to a call centre but the service will rapidly develop to allow them to use the key pad to punch in purchase details. The company plans no delivery charge and will add goods such as books and CDs to the range.

Contacts

Wap Forum - driving the creation and adoption of technology standards for accessing information on the internet via wireless devices
www.wapforum.org
UMTS Forum
www.umts-forum.org
Bluetooth Forum
www.bluetooth.com
InterForum
www.interforum.org
UK Online for Business
http://www.ukonlineforbusiness.gov.uk/

Glossary

Bluetooth

This is a wireless communication specification which uses unique 48-bit addressing based upon the IEEE 802 standard enabling mobile phones, computers, and personal digital assistants to interconnect with each other and with home and business phones and computers using a short-range wireless connection. Built-in encryption and verification is provided.

General Packet Radio Service (GPRS)

This is a packet-based wireless communication service providing a data transfer rate up to a theoretical maximum of 171.2 Kbps and continuous connection to the Internet for mobile phone and computer users. It is based on GSM communication and will complement existing services such circuit-switched cellular phone connections and SMS.

Global Positioning System (GPS)

This comprises 24 well-spaced satellites that orbit the Earth and make it possible for people with ground receivers to pinpoint their geographic location. The location accuracy is anywhere from 100 to 10 metres for most equipment.

Global System for Mobile communication (GSM)

This is a digital mobile telephone system that has become a de facto standard in Europe. It digitizes and compresses data, then sends it down a channel with two other streams of user data, each in its own time slot. It operates at either the 900 MHz or 1800 MHz frequency band.

personal digital assistant (PDA)

This term is applied to a small portable hand-held device (often referred to as a palm-top computer) that provides computing and information storage and retrieval capabilities for personal or business use, eg for easy access to personal diary and address book information.

public key infrastructure (PKI)

This is a secure framework of services required to support the operation and management of public keys for widely distributed users or systems. It allows users to identify themselves and communicate privately using electronic signatures in combination with public and private keys to certify the identity of the sender.

Short Message Service (SMS)

This service enables messages of up to 160 characters to be sent to mobile phones that use Global System for Mobile (GSM) communication. Under SMS messages do not require the mobile phone to be active or within range and will be held for a number of days until the phone is active and within range.

smartphone

This describes a wireless telephone set with special computer-enabled features, such as a built-in address book, not generally associated with a standard telephone.

Universal Mobile Telecommunications System (UMTS)

This system based on GSM will provide broadband, packet-based transmission of text, digitized voice, video, and multimedia at data rates up to and possibly higher than 2 megabits per second (Mbps), offering a consistent set of services to mobile computer and phone users wherever they are located.

Wireless Application Protocol (WAP)

This is communication protocol specification standardizes the way that wireless devices, such as cellular telephones, can be used for Internet access, including e-mail and the World Wide Web. Devices and systems that use this protocol are able to interoperate.

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Metropolitan Police
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