

MAGIC
Integrating Magic
Tomorrow's Solutions Software
Today Enterprises

Mobile eBusiness

Magic White Paper

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1. Introduction

Mobile eBusiness: The next eBusiness frontier

eBusiness is quickly turning into *the* business, as the convenience and cost savings of the web are becoming apparent. The new Internet frontier is mobile eBusiness, or “mBusiness,” with a strong focus on mobile commerce, or “mCommerce,” for both the consumer and business markets. Mobile eBusiness is the arena in which innovation and powerful solutions are anticipated.

The wireless Internet is expected to grow at a faster rate than the traditional PC Internet connection. The combination of the common familiarity and convenience of the telephone together with the vast opportunities of the web will fuel the next wave of wireless web access. Calculations show that within the next two years there will be more wireless devices for browsing the Internet than PCs accessing the web. Analysts such as IDC and Forrester Research predict that in the near future the tiny mobile devices will displace the PCs as we know them today.

Mobile eBusiness is the term now used to define an extension of traditional eBusiness to wireless devices, just as mCommerce is the extension for eCommerce. Mobile commerce represents a subset of all eCommerce transactions, both in the business-to-consumer (B2C) and the business-to-business (B2B) areas. It is the conduct of business over a wireless network — a mobile telecommunications network — that creates vast opportunities. This business communications network is progressing quickly and is now conveniently enabled by the agreed upon Wireless Application Protocol (WAP) specification. This specially designed, wireless-oriented protocol is today’s standard that is quickly being adopted by the mobile handheld devices.

It is important to note that mCommerce is not only expected to expand its share of the eCommerce market, but also to expand the overall eCommerce market through rapid evolution of mCommerce services. mBusiness requires careful eBusiness adaptation to include mobile access for enhanced services and business communications that are not only anytime, but also anywhere. Magic Software Enterprises is prepared to lead your business in exploiting the innovative technologies that will enable reaching these new horizons.

2. The Mobile eBusiness Trend: Convergence of two strong market forces

Two powerful market forces drive this new mobile eBusiness frontier; the Internet on the one hand and mobile telephones on the other. These forces are now converging to provide the new opportunity of mobile Internet, also known as the “wireless web,” setting the stage for mobile commerce.

(((Internet business)))

The Internet is enabling millions of people to share information and conduct business electronically. This proliferation via the Internet of eCommerce, email, news, and education, has become a primary shared resource around the world. It is no longer a question of whether to move your business to the web, or when to join the fast-moving opportunity. It is clear that time is of the essence, and enterprises worldwide are enhancing their businesses by taking advantage of the Internet.

(((Mobile industry)))

Alongside the growth of the Internet, we see an even more rapid growth in the wireless telecommunications industry. Gartner Group expects the number of mobile phones deployed

worldwide to exceed 1 billion between 2003 and 2005. Cellular devices have become widely available and affordable in both the business and consumer markets. In Japan and parts of Europe the number of mobile phone users is already higher than the fixed line users. The low cost, ease of use, and convenience of the mobile phone are all key factors contributing to its phenomenal adoption rate.

Mobile phones are not only conveniently portable, they are also personal and use a secure smart card that can support the necessary secure identity and value- management services. Mobile phones, unlike the Internet, already have very strong authentication features built in, making them ideal for electronic payment.

(((Internet and mobile converge)))

The convergence of the Internet era and the mobile phone phenomenon has released a new market force, now being referred to as Mobile eBusiness, or wireless eCommerce. A fantastic market opportunity is around the corner with explosive growth anticipated. The initial breakthrough is largely driven by the Wireless Application Protocol (WAP), an open standard for wireless Internet communication. IDC predicts that in a couple of years there will be more mobile devices with web access than PCs with wired access. (See Figure 1 below.)

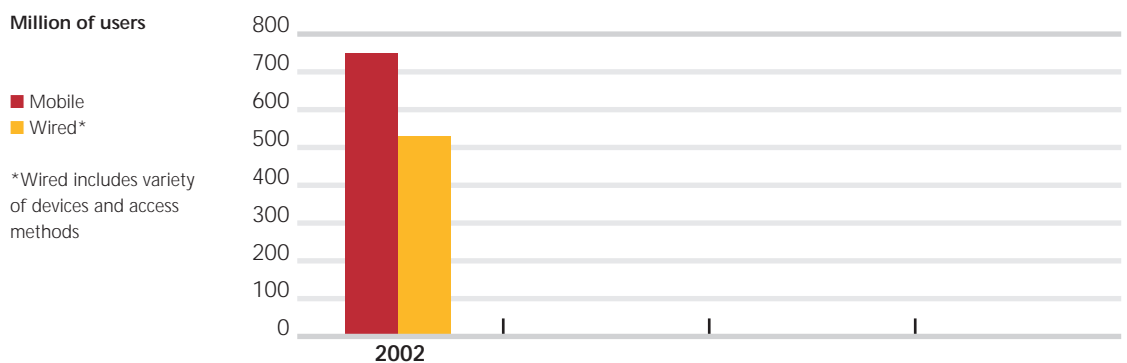


Figure 1
Mobile Internet Access to Exceed Wired Access Worldwide by Year-End 2002. Redrawn from IDC, 2000.

It will not be long before this development will enable the mobile phone to become the most common client device for eCommerce applications. Research findings indicate that this fast growth will be directly linked to the evolution of mobile phones and their convergence with other hand held devices in order to provide the most satisfactory web access. In almost all countries the penetration of mobile phones is much greater than the penetration of Internet access. Many people do not use a PC outside of the office, but keep their mobile phones with them at all times. Mobile commerce has great potential for this group. Whatever you do over the Internet can now be done on the road simply by using your mobile phone, and with even stronger authentication features.

(((Magic mobile eBusiness solution)))

Magic based eBusiness solutions are already today reaping the benefits of the cellular phone interface to eBusiness applications. The significant cost-savings are evident in a variety of vertical industries. One example is a schedule management system for hospitals. This system manages the work schedules for doctors and nurses on the web, allowing the staff to be easily connected via mobile phones from anywhere to this key system. An added benefit is that it enables patients to check these schedules via their cellular devices, ensuring better service and more satisfactory doctor appointments. Another successful Magic-based implementation is for a reservation system. This complex web-based system is accessed by mobile phones to ensure immediate notification and confirmation to all system users.

(((Wireless in Europe)))

Europe is leading the way for mobile Internet access. The adoption of a single standard, GSM, which dominates the European wireless world,

coupled with the high penetration of mobile phones, has placed Europe ahead of the US in the area of wireless communications. mCommerce is rapidly growing with the mobile phone's ideal characteristics for ensuring secure electronic payment. This capability positions the mobile phone to become the ideal electronic wallet in Europe. It is anticipated that Europe is on the verge of an explosion due to the adoption of WAP technology. A Forrester report found that nine out of ten executives in Europe plan to launch Internet sites specifically for mobile devices.

(((Short Message Services (SMS))))

In Europe the sheer volume of Short Message Services (SMSs) proves that there is an appetite for this technology. SMSs provide the ability to send and receive text messages to and from cellular telephones. In 1998 SMSs started an exponential growth, with 2 billion SMS messages sent within the GSM network in October 1999.

SMS is used primarily for simple person-to-person messaging, with increasing mobile information services such as news, stock prices, weather, and notification of email and voice. It is an ideal technology for pushing brief one-to-one or one-to-few information. SMSs are paving the way for transactional mCommerce services. It is anticipated that for the next five years mCommerce applications will use both SMS and WAP technologies to enable mobile communication.

(((Wireless in Japan)))

Mobile Internet access is already well established in Japan, with more than ten million subscribers. Three million subscribers access the Internet via WAP, while seven million subscribers are connected through the NTT DoCoMo i-mode services. The i-mode service is not based on

circuit-switched WAP/GSM technology, but rather it uses a proprietary Japanese packet mobile data network, which requires special i-mode handsets. According to Butler Research, with a half million new i-mode subscribers a month, NTT DoCoMo could soon rival America Online, to become the largest subscriber-based Internet access service.

The popularity of mobile commerce in Japan is evident in both the consumer and business markets. NTT DoCoMo's i-mode is the world's first mobile portal, now followed by all major Japanese portals, thus increasing mobile access to the Internet. All large banks offer access to account information and account operations from i-mode devices. Commercial groupware packages, including address books, scheduling, task lists, email, workflow, project management, etc., are all accessible from either i-mode or palm computers. Portable phones in Japan are being transformed into electronic commerce devices with charges for online purchases simply added to the user's telephone bill from the telecom operator.

(((Hype & reality in mCommerce)))

It is important to be aware that the adoption of new technologies is a process with defined stages.

Gartner Group points out that all hot technologies go through a set hype cycle, but at different paces. Once a significant breakthrough has occurred, the technology goes into a stage of unrealistic projections. This is a time when the technology doesn't live up to the inflated expectations. Only afterwards is there a true understanding of the technology, and only then can the real benefits of the new trend be realized.

According to Durlacher Research, the hype for mCommerce is just past the peak of inflated expectations. This disappointment stems from the lack of technological and application readiness and availability. It is expected that during 2001-2002 the reality of mCommerce and significant market growth will come in to play. See Figure 2.

3. Wireless Application Protocol (WAP)

Enabling wireless Internet

(((WAP, de facto world standard)))

In order to best enable the breakthrough for mCommerce, WAP (Wireless Application

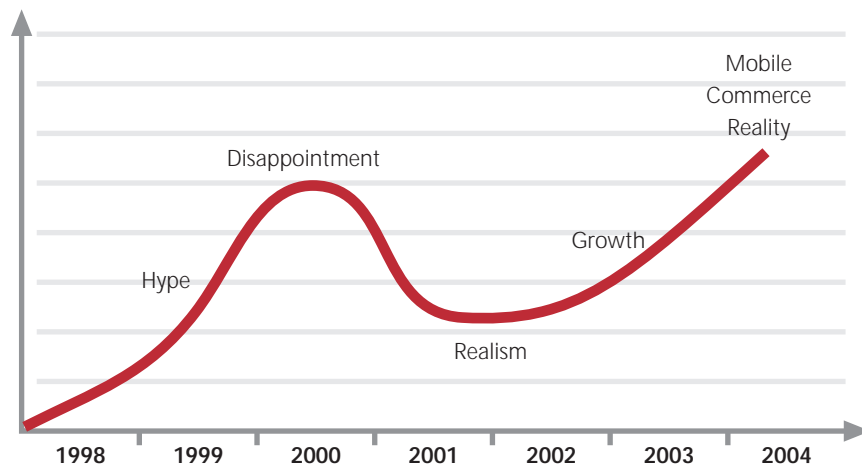


Figure 2
mCommerce Hype Curve.
Redrawn from Durlacher
Research Ltd., 1999.

Protocol), the de-facto worldwide standard for wireless device communications, has emerged. Telecommunications companies delivered a technical specification to provide a worldwide standard for delivery of Internet-based services to mass-market wireless devices. This universal open standard enables a wide range of wireless services that are independent of the underlying digital wireless network technology. An important milestone in the convergence of wireless devices and the Internet was in the recent formalization of the relationship of the WAP Forum with the World Wide Web Consortium (W3C). This relationship produced an agreed-upon single language that can now be used for static and mobile browsers. Content can now be created that dynamically adapts to the capabilities of each device.

(((WAP/Internet reachability)))

The WAP standard is based on existing Internet standards, such as XML and IP, to enable utmost compatibility and ease of implementation. WAP defines an XML syntax called WML (Wireless Markup Language) and a scripting language WMLScript that are optimized for the tiny displays and extremely low bandwidth found on wireless handheld devices. All WML content is accessed over the Internet using standard HTTP 1.1 requests. The WML's user interface components map well onto existing mobile phone user interfaces. This means that end-users can immediately use WAP-enabled mobile phones and services with minimal re-education.

(((Widespread WAP)))

In designing WAP, the constraints of both the Internet and of the wireless world have been taken into account. Particular emphasis was put on limited bandwidth, challenging conditions of use, and the UI requirements of small screens.

The standard is already well accepted due to the lack of serious competing standards, and the embracing of industry leaders. Widespread WAP adoption provides the end-user with more value-added services that are easy to access and easy to use directly from mobile phones.

4. Mobile eBusiness

What is it for?

Mobile commerce makes it possible for your customers to reach you wherever they are and whenever they need your services, whereas Internet commerce demands that the customer be seated at a laptop. This flexibility, brought about by mobility, is rapidly enabling a new set of applications in both the business and consumer markets.

New business potential is now emerging for corporations across industries. New channels for existing business and a set of new services are now available. With mCommerce, corporations can reach their community members around the clock, independent of their locations.

(((mCommerce in business)))

The mCommerce business market is composed of a wide range of organization types. For example, manufacturing companies might integrate the use of mobile devices such as Personal Digital Assistants (PDAs) into their ERP systems, or use mobile supply-chain integration applications. Immediate, convenient access to the back-end database for up-to-date information is a significant business advantage.

Banking services are prime candidates for mobile CRM applications to enhance their customer service and transaction capabilities not only around the clock but, also, around the globe.

Organizations that are service-driven, such as consultants, also will have significant gains from the mobile device.

Applications for mobile dispatching services will improve response and efficiency, reducing resources, and ensuring real-time order-tracking with lower administrative costs. The applications for mobile field delivery and dispatch services are suited to a wide set of industries such as courier services, utilities, office-equipment services, and health care delivery.

(((Magic based mCommerce solutions)))

A particularly successful Magic-based mCommerce implementation in the apparel industry illustrates the business advantage of such solutions. The web-based store management system described below has shown significant return-on-investment with the addition of mobile phone Internet access.

The application allows on-the-road sales persons and store managers to manage sales and inventory by store or by product, to acquire information on work-in-progress in the factories, and to allow greater precision in the movement and distribution of products between stores. The system's primary advantage is that actions can be taken quickly, increasing the information flow and decision execution among the retail outlets.

Thousands of mobile Internet-enabled phones are in use in two hundred and sixty franchise stores that are managed through this Magic-based store management information system. The mobile phones enable the retail outlets to make sale requests, receive inventory information, make suggestions, direct product placement among stores, and provide shipping while on the move. Significant improvements to the business model are achieved by eliminating

indirect operations and paperwork, while increasing turnover, faster delivery and knowledge of merchandising, and other store information.

(((mCommerce for the consumer)))

A significant rise in the consumer mCommerce market is anticipated due to the increasingly low costs of mobile phones. Mobile consumers will make purchases, conduct banking, and download cash or tickets when needed wherever they are, simply by using a mobile phone. Consumer mCommerce applications include mobile financial services, security services, shopping, advertising, dynamic information management, and entertainment.

The unique value of the mCommerce proposition is in providing easily personalized, local goods and services anytime and anywhere. Mobile commerce is providing the next generation of services that will permit the use of cell phones and other wireless devices for even further convenience for today's consumer.

(((Growing mCommerce market despite limitations)))

There is a variety of drivers behind the anticipated growth of this market. The accessibility, ubiquity, and convenience of mobile devices are the prime reasons for their popularity. There is a growing expectation that the business executive, like the field service provider, be available any time and anywhere. Business decisions are made around the clock and around the globe. The immediacy and ease of access to up-to-date information in conducting business often determines success or failure. The need for real-time information and for communication anywhere, independent of the user's location, is becoming a business imperative.

Mobile devices are being used today, even with existing constraints stemming from technological limitations such as bandwidth, usage conditions, and user interface. Current uses of mobile devices take into account the limitations and focus on providing targeted information that frequently requires only short responses. Once the current limitations are overcome, increased sophistication of mobile applications is anticipated. Further application enhancements are expected in the areas of localization, personalization, and instant connectivity.

(((Location and personalization provide added value)))

Significant added value is expected once applications are developed that take into account the physical location of the hand held device. Relevant services can be offered based not only on the personal profile of the device holder, but also on the device holder's location and time factor. A great potential exists for applications in the travel business. These are already underway to assist in navigation and suggest alternate travel routes based on congestion and weather reports.

The personalization factor is anticipated to make the mobile device not only the electronic wallet, but also the real "life tool" for all conceivable information and transaction needs. Personalized one-to-one marketing based on user preferences and current location is a particularly attractive area and a growth area for more focused advertising.

(((Next steps)))

Further telecommunication-deregulation, coupled with technological communication advances, is adding to the success of mobile devices as the key business tool. Increased evolution of mCommerce is anticipated with technology

advances such as higher speed transmissions, as suggested in third-generation (3G) networks and GPRS (General Packet Radio Service) for instant access to the Internet. The GPRS promise of "always on" connection will propel the adoption of mCommerce even faster. The instant connectivity will eliminate the current need for a call to the Internet to be made and thus will enable easier and faster (immediate) access, making the wireless device the preferred way to access information. Another promising technology is Bluetooth chips, which provide short range wireless communication operating at 1 megabit per second. It is anticipated that the maturation of the technologies mentioned above as well as others will dramatically push forward the currently much-touted potential of mCommerce.

5. Magic Technology Inherently WAP-enabled

Magic's core technology for development and deployment of enterprise business and eCommerce applications is well-suited to support the requirements of the next wireless generation. The well-proven strengths of the Magic technology are particularly relevant for mobile commerce implementations. Magic's productivity, scalability, platform independence, multiple DB support, and layered architecture are all key benefits while leveraging existing resources to enable migration to the world of mCommerce.

(((Concurrent diverse client support)))

Magic's multi-tier architecture allows a clear separation and independence of the various application functions, thus ensuring ease of development and enhancement of existing Magic applications as requirements are continuously changing. In particular, as the traditional GUI

client choices are quickly expanding to include web browsers and mobile devices, it is essential to have an environment that is easily adaptable to change. With Magic a single server-based application can support a variety of diverse clients, including mobile devices.

(((Multi-tier architecture)))

Magic's multi-tier architecture enables separation of the business logic from the web content and the client interface. The architecture diagram below, figure 3, illustrates that the business logic need not be modified because the content layer handles content that is appropriate for web browsers, mobile devices, or traditional desktops. The appropriate content is dynamically merged according to the relevant specifications of the various devices. The additional presentation format now being supported with Magic is the Wireless Mark-up Language (WML) for WAP-enabled mobile devices.

(((mCommerce as easy as eCommerce)))

With Magic technology the existing development methodologies and developer skill sets can be leveraged. Developing web applications that are WAP-enabled is as easy as building traditional Internet applications. The WAP-based services are relatively easy to use and straightforward to implement because of the underlying architecture.

Using Magic for wireless communications has significant advantages. Because the application logic is separate from the user interface, the existing application logic need not be touched when defining a new client interface. As easily as Magic can merge with HTML or XML pages, so is a WML page supported for use on WAP devices.

(((Magic merge capability)))

Magic provides the means to embed application data into WML pages at runtime. This feature allows developers to merge into the WML pages raw data dynamically retrieved from the database, as well as processed data that is based on the application business logic. In addition, during the merge the Magic application logic can manipulate the resulting WML page, modifying it according to the application business rules. The final WML page is then submitted via the WAP Server to the cellular device for display and for further interactions between the end-user and the Magic application.

Magic enables merging with the required mark-up language to meet the continuously changing diverse needs for deployment in both wireless and traditional Internet applications. With Magic an additional wireless client can be simply defined for the mobile user. Note that the same Magic Application Server can simultaneously serve a variety of clients including Internet browsers

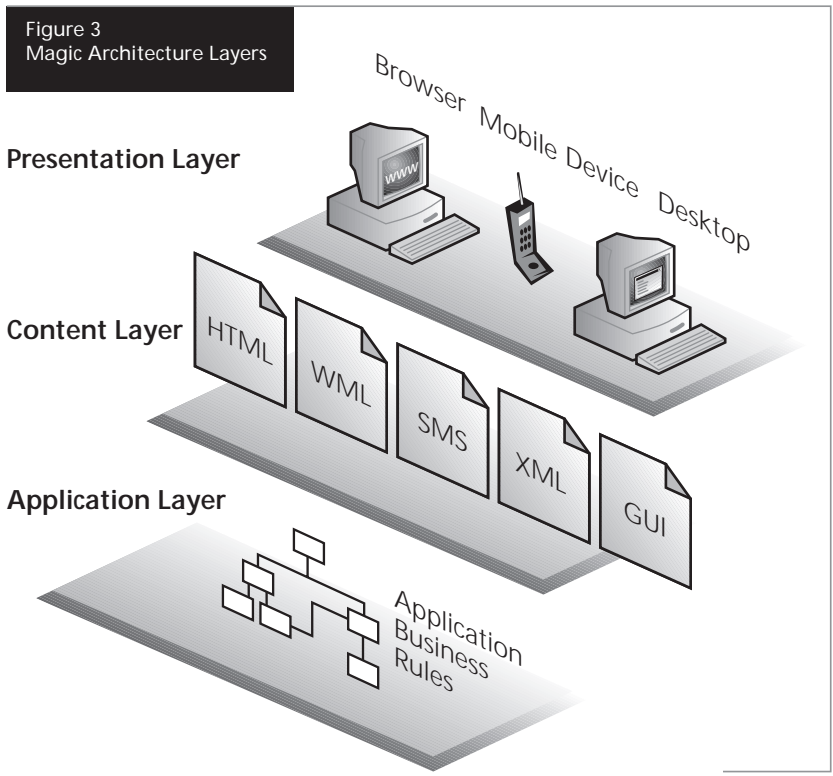


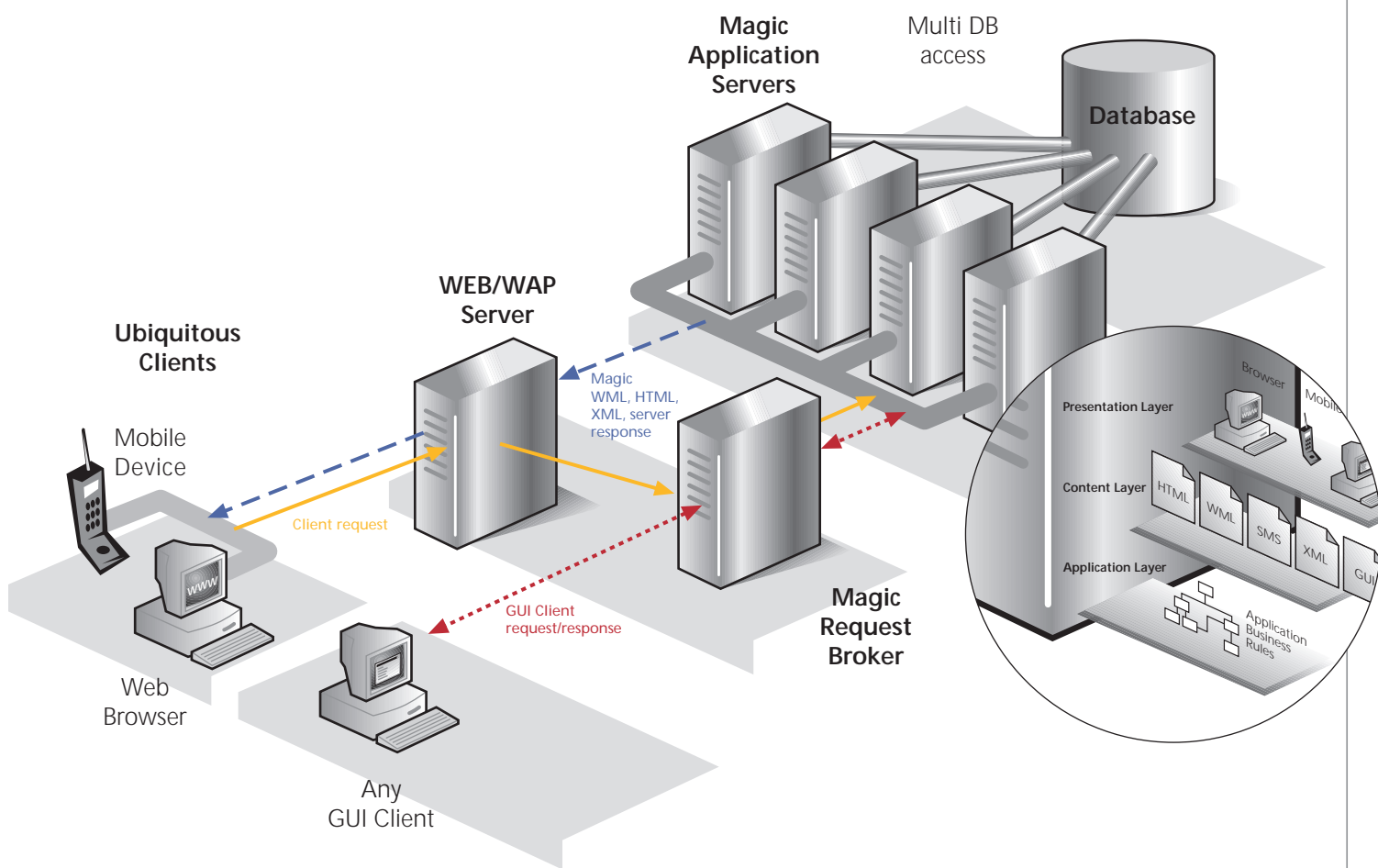
Figure 3
Magic Architecture Layers

and wireless devices, while maintaining the existing application logic. Below is a diagram, figure 4, illustrating the information flow between the Magic server and the various clients.

6. Magic Applications Adaptation to mobile eBusiness

Magic eBusiness and CRM applications have a significant benefit when adapting to wireless devices. The Magic core technology provides the foundation for conducting effective

Figure 4
Magic Client Independence
Schematic Information



mBusiness by enabling the use of leading edge technologies such as the Wireless Application Protocol. Magic's business solutions are designed to serve the mobile business community by enabling a wireless web interface in addition to the desktop browser-based Internet connection.

Business is no longer conducted only within the bounds of the corporate office. Decision-makers are frequently on the road, and need immediate real-time access to their key business applications. An extended mobile service is needed for eBusiness and CRM applications to ensure the flexibility required in the mobile world of today.

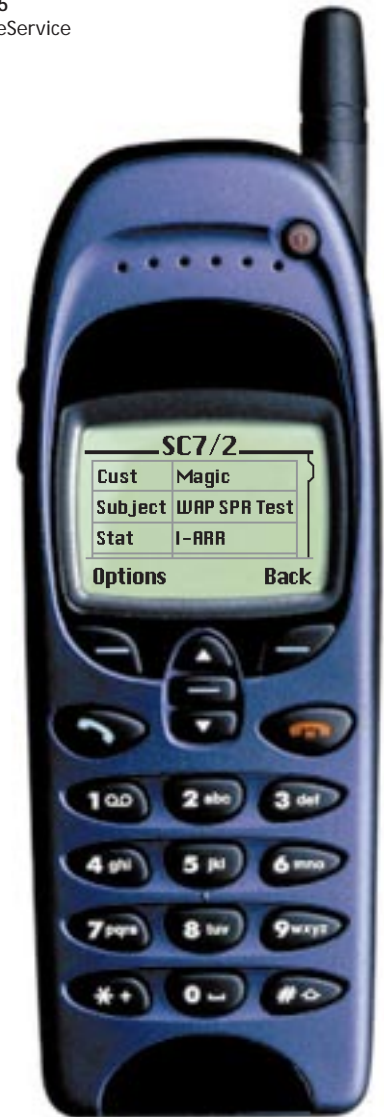
(((Magic CRM Suite - mBusiness advantage)))

The extended mobile capability of Magic's solutions enables the real-time business pulsing required by management, and provides improved customer satisfaction at the same time. The wireless interface expands the application's reach from the desktop browser user to additional concurrent mobile users, enabling remote business transactions, confirmation, and administration. This allows innovative marketing and selling to customers on the move as well as a deeper, more personalized customer relationship, directly resulting in an improved bottom line and greater customer satisfaction.

(((Magic eService)))

Magic eService's mobile capabilities are designed to bring benefit to the customer who needs to check service status from the road, as well as the agent and manager who need to be alerted regarding service emergencies. eService provides the critical real-time information required by the end-user, support staff, and manager, directly to the mobile phone.

Figure 5
Magic eService



The customer can inquire into the status of service requests including statistics of new service calls, calls in process, current status and closed calls. In addition, the customer can search for a particular service call and view the correspondence relevant to the request of interest. In Figure 5, the customer has requested to view a service call regarding WAP. The customer name, subject and status (arrived) conveniently appear on the wireless device. The customer

can drill down to receive more information. Inquiry into service requests can be done in real time from any location, providing the end-users with a more satisfactory experience and with a greater connection to the service department.

The service manager and other relevant parties can receive online updates of the virtual support center from the road, including snapshots of service status for the entire service department. In addition, predefined alerts can be sent by the eService system directly to the wireless device, informing managers of critical situations as defined by the enterprise's business rules. Sales and service managers can receive real-time up-to-date information to allow them to keep their fingers on the pulse of the business at all times and from anywhere directly via the WAP enabled device.

(((Magic eMerchant)))

Magic eMerchant, Magic's eBusiness application, is particularly well-suited to order processing with hand-held devices, due to its high level of personalization and features such as predefined order templates. These features are necessary to accommodate today's mobile limitations of small screens, scarce bandwidth, and slow communication. eMerchant enables quick order modification and confirmation efficiently from your hand held device. In Figure 6, the customer procurement manager has decided to edit a saved order and is choosing the items that he/she wishes to change. The procurement manager then enters the new quantities for the selected items. Order tracking and status checking via the mobile phone further adds to eMerchant's suitability for the manager who wishes to be involved with the procurement process at all times. Magic eMerchant's mobile capabilities make it particularly suitable for B2B commerce, where different personnel within the customer

organization need to confirm or track the order, and where real time information regarding order status has special relevance.

Figure 6
Magic eMerchant



7. Conclusion

The increasing mobility of business people will go hand in hand with the expectation that business will be done more and more from the road. Web access to mobile devices will give immediate access to information and transactional services. This technological evolution empowers mobile users of wireless devices to easily access live interactive information, services, and applications. Services and applications include email, customer care, call management, information services, electronic commerce transactions and banking services, online address book and directory services, as well as corporate Intranet applications.

Mobile access is necessary, not only for sales 'road warriors,' but also for executives, field support staff, knowledge workers, and, potentially, all workers. This is driven by the need for organizations to create a workforce that is more productive, responsive and connected, with improved support for virtual teams, and the ability of management to have their finger on the pulse of the business at all times. New sources of competitive advantage will be created for visionary enterprises prepared to take advantage of the emerging opportunities.

The Magic core technology and Magic applications are leading the way with significant mBusiness deployments. As many companies world-wide plan a migration to mobile eBusiness, Magic will continue to provide the needed technology and support to ensure utmost productivity and fastest time-to-market.

Australia

Magic Software Australia
Tel: (61) 2-9386-0560
Fax: (61) 2-9386-0562
infoaustralia@magic-sw.com

France

Magic Software Enterprises France
Tel: (33) 1-49-04-1414
Fax: (33) 1-49-04-1415
infofrance@magic-sw.com

Germany

Magic Software Enterprises Germany
Tel: (49) 89-962-73-0
Fax: (49) 89-962-73-100
infoGermany@magic-sw.com

Hungary

Magic (Onyx) Software Enterprises
Hungary Ltd.
Tel: 36-1-216-9910
Fax: 36-1-216-7271
infohungary@magic-sw.com

India

Magic Software Enterprises India Pvt. Ltd.
Tel: (91) 20-427-3025
Fax: (91) 20-427-3085
infoindia@magic-sw.com

Israel

Magic Software Enterprises Ltd.
Tel: (972) 3-538-9408
Fax: (972) 3-538-9402
infoisrael@magic-sw.com

Italy

Magic Software Enterprises Italy s.r.l.
Tel: (39) 02-760-200-67
Fax: (39) 02-760-208-11
infoitalia@magic-sw.com

Japan

Magic Software Japan K.K.
Tel: (81) 3-5365-1600
Fax: (81) 3-5365-1690
infojapan@magic-sw.com

The Netherlands

Magic Software Enterprises Nederland
Tel: (31) 30-656-6266
Fax: (31) 30-656-6277
info-nl@magic-sw.com

Spain

Magic Software Enterprises Spain
Tel: 34-91-571-3305
Fax: 34-91-571-1644
infospain@magic-sw.com

Thailand

Magic Software (Thailand) Corp Ltd.
Tel: (66) 2-955-0555
Fax: (66) 2-955-0339
infothailand@magic-sw.com

UK

Magic Software Enterprises (UK) Ltd.
Tel: (44) 1344-667-000
Fax: (44) 1344-667-001
infouk@magic-sw.com

USA

Magic Software Enterprises Inc.
Tel: (800) 345-6244
(949) 250-1718
Fax: (949) 250-7404
info@magic-sw.com

Canada

Magic Software Enterprises of Canada, Inc.
Tel: (416) 504-2927
Fax: (416) 504-4126
infoCanada@magic-sw.com

International

Magic Software Enterprises Ltd.
Tel: (972) 3-538-9292
Fax: (972) 3-538-9333, 538-9393
sales@magic-sw.com

Magic Software Enterprises
A Formula Group Company

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www.magic-sw.com

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