phone.com

Enabling the Wireless Internet

Why You Should Develop Applications Using the Phone.com WAP Solution

white paper

About Phone.com

Phone.com, Inc. is a leading provider of software that enables the delivery of Internet-based services to mass-market wireless telephones. Using its software, wireless subscribers have access to Internet- and corporate intranet-based services, including email, news, stocks, weather, travel and sports. In addition, subscribers have access via their wireless telephones to network operators' intranet-based telephony services, which may include over-the-air activation, call management, billing history information, pricing plan subscription and voice message management. Visit http://www.phone.com for more information.

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Introduction

In today's software development industry, contemplating entry into a new market requires substantial consideration and courage. There are many important questions to address: What resources will be required to understand the market? What changes and additions will need to be made to the product line to enter this market? What will the impact on support be? And most importantly, will this commitment of valuable resources result in increased sales or market share, and ultimately profitability?

At Phone.com, we believe the microbrowser-enabled mobile subscriber represents a fundamentally new market with incredible potential. Following is an explanation of the market opportunity, the forces behind this emerging global market and how your company can benefit from becoming a Phone.com™ application development partner.

The Market Opportunity

Market Size

At the beginning of 1999, Dataquest estimated that there were over 285 million wireless subscribers in the world.[i] Strategy Analytics recently predicted that 525 million WAP (Wireless Application Protocol) handsets will be shipped in the U.S. and Western Europe between 1999 and 2003.[ii] Figure 1 shows the continued explosive growth of wireless handsets. The wireless handset, in its current form, has become one of the most popular consumer electronics items ever.

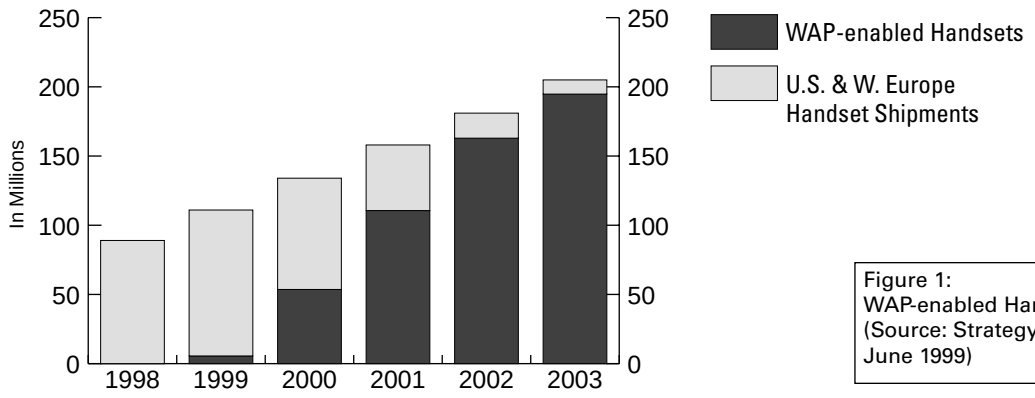

Figure 1:
WAP-enabled Handsets
(Source: Strategy Analytics, June 1999)

Strategy Analytics wrote, "There will be a significant market opportunity for mobile Internet services and products. In the short term, demand will be strongest in the business sector — for E-Mail, messaging and corporate LAN/Intranet access applications."[iii] Today there are a number of handsets that already provide real-time access to data, email, and push and pull information from the Internet. According to the Strategis Group, there are over two million subscribers using a cellular or PCS device to access the Internet or email.[iv] Figure 2 shows Strategis' projections for this market's growth over the next few years.

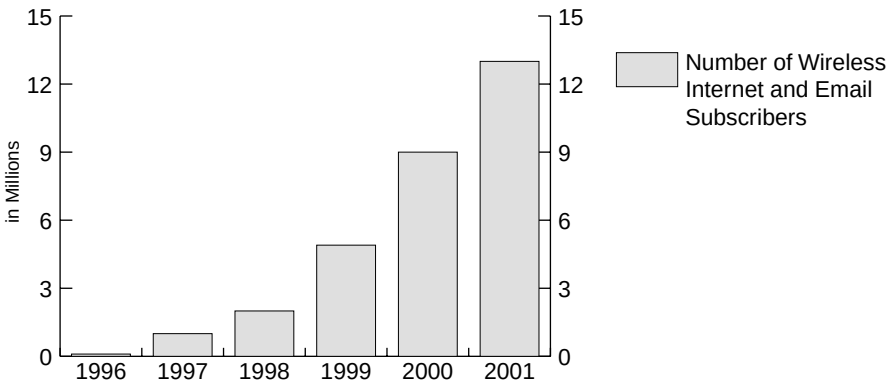

Figure 2:
Global Wireless Internet and Email Subscribers

According to the Strategis Group, twenty percent of the adult population of the United States is interested in either wireless email or Internet access, representing a target market of over 39 million potential subscribers.[v] These individuals want that access today over a "small wireless device like a cellular phone or pager,"[vi] an inexpensive, easy-to-use device and service that will bring these features to their pocket. As wireless Internet services roll out around the world, subscribers are discovering the mobility value of a variety of applications including travel, traffic, games, banking, stocks, restaurant guides and dispatch.

Market Opportunities for Wireless Applications and Services

How do developers harness the technology of wireless data to deliver practical applications to everyday consumers? Consider the following application and service opportunities.

Corporate Applications

- **Sales Force Automation.** Sales people spend between twenty and eighty percent of their day away from a PC terminal or wired computing device. Although many carry wireless handsets throughout their workday, using the handset as a modem to access wireless data is time consuming and considered too much of a hassle. When their wireless phone becomes microbrowser-enabled, a whole new set of productivity opportunities emerges. The handset can now be used to provide instant, direct access to the latest pricing and competitive information anytime, anywhere. Important sales lead and contact information, updated with the latest news from the office, is always available. A salesperson can even call up the datasheet or brochure that the customer is looking for and fax it to the nearest fax machine, while the customer is waiting.
- **Dispatch.** Keeping delivery and service personnel aware of ever-changing orders and schedules becomes easy with a microbrowser-enabled handset. The phone alerts the technician every time a schedule change occurs, and provides them with one-button access to view the changes. When a job is completed, the technician can update the order record, keeping the dispatch center up-to-date on progress in the field. This allows the dispatch center to answer more calls from customers, instead of their own service staff. Service personnel can also use the handset to order replacement parts from a simple form.

Online Services

- **Real-time Delivery of Content.** Subscribers can now get current information about weather, news and stocks whenever they need it, wherever they are. Real-time information can also be delivered to a subscriber's handset based on their criteria, providing up-to-the-minute stock quotes, or traffic alerts that are tailored to the subscriber's commute route.
- **Banking.** Over the last decade, banks have introduced new ways to make it easier for their customers to perform banking tasks, such as the proliferation of ATMs and mini-branches in supermarkets. The next logical step is to bring ATM features to the display of a wireless handset. Of course, subscribers couldn't withdraw cash or make a deposit but they could get their current balance, transfer funds between accounts and receive a fax of a mini-statement. With online banking extensions, subscribers could also pay bills right from their phone.

- **Electronic Commerce.** Subscribers can use their handset just like their PC to purchase products and services over the Web.

Teleservices

- **Feature Control.** A microbrowser-enabled handset adds a completely new dimension to the ways in which wireless service providers can interact with their subscribers. The service provider can now send information about new rate plans right to the handset, accompanied by an alert to notify the subscriber. After reviewing the new plans, the subscriber can choose to change rate plans or activate a previously unused service feature. Providing easy access to feature controls can increase the usage of features like voicemail and call forwarding.
- **Prepaid Services.** Currently prepaid subscribers must dial a special number on their handset to hear their available balance. When it's time to recharge, they must call another number and enter information at various automated voice prompts, or return to the store where they purchased the phone to recharge the account. With a microbrowser-enabled phone, prepaid subscribers can see their current balance with the press of a button. By pressing another button, they can also recharge their account by entering a credit card or voucher number into the handset. When the transaction is completed, the subscriber can see the balance updated in real-time. This makes prepaid wireless both easier for the subscriber and even more cost-effective for the wireless network operator.

Personal Productivity

- **Email.** Wireless subscribers can keep track of their email right from their handset. In addition to receiving email, subscribers can compose and reply to messages. Synchronization tools can keep different mail sources synchronized with the handset to make managing email easy.
- **Organizer.** Providing a wireless subscriber with a real-time copy of their address book and calendar represents another enormous opportunity to extend existing applications to a large, new base of subscribers. Using synchronization and notifications, subscribers can be alerted when a co-worker changes an appointment. They can also select a contact from their address book and direct the application to dial the contact with the push of a button.

Community and Games

- **Interactive Chat.** Teenagers around the world are adopting new technologies to stay in touch. Using ringtones to identify friends, and the ability to send and receive email and notifications while on the go make staying in touch easy and fun.
- **Auctions.** A community has formed around online auctions, but today the bidder must stay near a PC during the final moments of bidding before the deal is actually closed. Using notifications and the ability to interact with the Web from a wireless phone gives the bidder the ability to carry the auction with them.
- **Games.** Wireless subscribers can test their knowledge against other wireless phone users in a trivia game or enjoy a round of cards. Games also provide the ability for subscribers to interact and compete against each other for prizes.

These target markets represent huge opportunities for network operators to reach new subscribers and increase minutes of use for existing subscribers. Application developers and content providers that develop solutions for these target markets will likewise reap considerable benefits, such as:

- The ability to offer free and subscription-based services to large, new pools of consumers. While subscription-based services offer obvious revenue opportunities, free services can also be used to increase traffic into companion Web services offered for traditional PC access.
- Product sale or revenue sharing opportunities with operators for applications that enhance or expand their existing services.

The Phone.com Solution

Phone.com provides the technology and market knowledge to enable operators, content providers, application developers and device manufacturers to profit from these new market opportunities. Since 1996, Phone.com has been providing the UP.Link™ solution, based on Phone.com's own Handheld Device Markup Language (HDML). Today the UP.Link solution provides support for both HDML and the Wireless Markup Language (WML), as defined by the WAP Forum. Both languages are similar to HTML but are used to develop powerful, yet easy to use, interfaces on a microbrowser-enabled handset. WML was developed using XML, so it is based on existing Worldwide Web Consortium (W3C) standards.

Figure 3 provides an overview of the Phone.com architecture. Phone.com's solution consists of four major components: UP.Browser® microbrowser, UP.Link Server Suite, MyPhone™ mobile portal platform and UP.SDK™ developer kit. UP.Browser is a microbrowser embedded in the handset, which provides all of the services needed to display information and accept input from the user. The center of the Phone.com solution is UP.Link Server Suite, which associates each UP.Browser with a unique subscriber account and acts as the conduit for information flowing between UP.Browser and applications running on Web servers. MyPhone provides operators with a branded and customized service, offering a wireless Internet portal designed for the unique needs of their subscribers. The software developer kit, UP.SDK, provides a robust toolkit for the construction of wireless Internet applications for publication on any Web server.

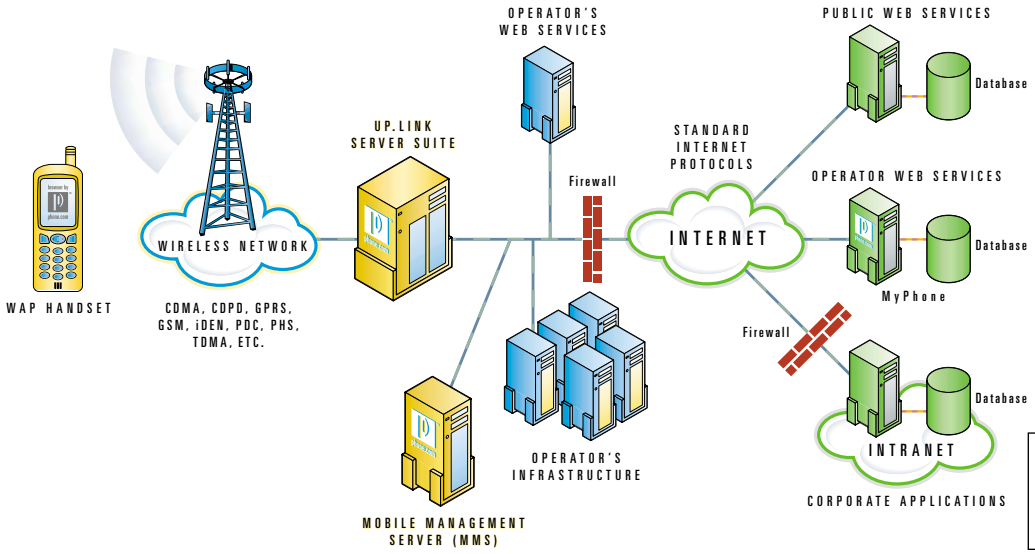

Figure 3: Phone.com's Complete Solution

UP.Browser is the ultimate thin client. It takes very little ROM and RAM space, which makes it extremely inexpensive for device manufacturers to integrate into existing handsets. It provides an effective, simple user experience that takes advantage of softkeys and a small display screen to enable powerful, interactive applications.

UP.Link Server Suite is installed in an operator's network and acts as a proxy for each subscriber's handset. The server provides storage for the subscriber's data, security encryption for both the air interface and Internet connections, fax and notification services, as well as content translation for different versions of HDML and WML. Also available are the UP.Mail,® UP.Organizer™ and UP.Web™ applications that provide a set of powerful productivity tools for wireless subscribers.

UP.SDK developer kit provides the tools necessary to develop robust wireless Internet applications. Included is a complete set of developer documentation and the powerful UP.Simulator™ software, which allows developers to build services and then test them right on their development workstation. Also included are libraries in Perl, C++ and COM that enable the development of powerful, dynamic WAP applications. To help developers get applications running quickly, UP.SDK includes examples in HDML, WML, WMLScript, Perl, ASP and C++.

The Phone.com Architecture

Airlink Independence

The entire Phone.com solution is air interface independent. It can operate in networks that use CDMA, CDPD, GSM, iDEN, SMS and TDMA and Phone.com will extend our products to include future standards, such as IMT-2000, as they become available. Both UP.Browser and UP.Link can provide complete service without consideration of underlying protocols.

Device Independence

WML makes development for a wireless device as easy as writing a Web page. A developer writes one page that can be viewed from any device with UP.Browser or other WAP-compatible browser. For each handset model, the UP.Browser microbrowser takes advantage of the display's capabilities to render the page, just as Web browsers do on different resolution PC displays. Third-party vendors are also offering versions of UP.Browser for popular PDAs, providing an even broader, open market of devices.

Real-time, Guaranteed-delivery Push Services

One of the most powerful aspects of Phone.com's solution is the ability to push content to the subscriber. This guaranteed delivery mechanism allows application developers and content providers to provide updated information anytime. The solution goes beyond two-way SMS by delivering both a text message and a URL. This means messages sent to the subscriber's handset can not only inform the user but also allow the user to take action by giving them immediate access to the application behind the message.

Wireless Security

UP.Link Server Suite provides excellent end-to-end security. It uses the Secure Sockets Layer (SSL) protocol to provide encryption and security between the UP.Link server and any Web server. Over the airlink, UP.Link WAP Gateway and the UP.Browser microbrowser use the WAP Forum's Wireless Transacation Layer Security (WTLS) protocol to keep data secure over and above any encryption the airlink protocol may provide. WTLS is based on the W3C's own TLS protocol but has been optimized to meet the unique needs of the wireless environment without any loss in encryption strength.

Duality

Information available on a subscriber's handset is also available using a standard Web browser. This dual access methodology makes it easy to perform input-intensive tasks at a standard PC, such as entering a large number of appointments or importing contacts from other Personal Information Manager packages. This interface also allows for better integration and interaction between office-based personnel and those using a microbrowser. For example, an assistant can use a standard Web browser to enter an appointment into the UP.Organizer application, which immediately becomes available to the subscriber on their handset.

Personalized Services

UP.Link Server Suite allows application developers to personalize their content to suit each subscriber's needs. Every subscriber is assigned a unique ID that is included in communications between the handset and the application. Applications can use this ID to uniquely identify subscribers and serve them personalized content. In addition, UP.Link Server Suite supports standard cookies for each subscriber, thus enabling applications that already use this mechanism to deliver customized content.

Universal Printing

Another powerful UP.Link service is the ability to print documents to any fax machine in the world. For example, the UP.Mail application enables subscribers to fax the contents of their email and attachments to the nearest fax machine. Attachments can be in Microsoft Word, Adobe Acrobat PDF, or PostScript formats. Applications developed for the Phone.com platform can provide this kind of functionality using Phone.com's open fax API. A fax machine becomes the subscriber's local printer wherever they may be.

Standards Conformance

Phone.com was the first company to provide a clear upgrade path to the Wireless Application Protocol (WAP) specification developed by the WAP Forum. Release 4 of UP.Link WAP Gateway and the UP.Browser microbrowser provide complete WAP 1.1 solutions enhanced with Phone.com's industry-leading advanced features. As a founding member of the WAP Forum, Phone.com is committed to helping evolve the WAP standard to continue innovation, while also ensuring that its own products always offer the most robust WAP solutions available.

Network-grade Reliance and Manageability

UP.Link Server Suite has been designed to meet the most demanding operator's network requirements. All provisioning is Web-based for easy access and the system can be managed from any popular network element manager using Phone.com's standard SNMP MIB.

Over-the-Air Provisioning

Phone.com's Mobile Management Architecture (MMA) centralizes the management of voice and data parameters for a handset. MMA enables real-time management of handset parameters which gives the carrier new flexibility for voice and data applications.

Phone.com has already successfully licensed UP.Link-based services to over 45 network operators, including AT&T Wireless, Bell Atlantic Mobile, Bell Mobility, Cegetel/SFR, DDI, IDO, GTE Wireless, Nextel, Omnitel, Sprint and Telstra. Nationwide rollouts of services are underway with U.S. operators, as well as operators in Australia, Canada, Europe and Japan.

Phone.com not only provides the technology to reach and engage wireless subscribers but also the marketing knowledge and background to help application developers build successful, easy-to-use applications. Content providers such as ABC News, Bloomberg Financial, InfoSpace, The Weather Underground and ESPN Sports are already offering services to wireless subscribers today. Wireless e-commerce and stock trading are available from industry leaders like Amazon.com and Ameritrade. Corporate applications are available from companies like Lotus, Vantive and CableData. Dispatch applications from eDispatch, Information Mechanics and ServiceHub are helping businesses reduce costs and increase ROI. Applications have also been written to enhance an operator's existing wireless service, such as self-service activation from Lightbridge and a visual interface to voicemail from Comverse. International developers including Dennotai, In Fusio and Webraska have deployed popular services such as games, restaurant guides and traffic applications.

Phone.com's UP.Browser has been integrated into handsets provided by 25 leading manufacturers including Alcatel, Mitsubishi, Motorola, NeoPoint, Nokia, Panasonic, QUALCOMM, Samsung and Sony.

When Will You Join the Wireless Internet?

Phone.com's business model has been structured to promote the growth of the wireless Internet market. Phone.com does not charge handset manufacturers a licensing fee for its UP.Browser microbrowser object code. This reduces the development costs for the manufacturer, which in turn leads to a lower pricepoint for Phone.com-enabled handsets. Phone.com also provides the UP.SDK developer kit free of charge to encourage the use of HDML and WML by the development community. This increases the number of desirable applications available to the consumer, thereby increasing the value of every UP.Browser-enabled handset to the wireless service provider.

How Developers Benefit

Why should an application developer or content provider consider developing a wireless Web service? The following questions should help a prospective developer consider the possible advantages.

- How could your existing products be enhanced if your customer could access their data/activities/etc., from a wireless handset?
- Would your existing customers benefit from gaining real-time access to your services when they aren't at a desktop or even a laptop computer?
- Would your customers benefit from being informed of changes as they happen? Examples include financial, real estate, field service and construction/contracting applications; traffic warnings; weather updates and warnings; decision-making scenarios; and sales.
- How could your services be enhanced to take advantage of this medium of interaction?
- Would entering this market give you a significant advantage over your competitors?
- What new markets could you reach if your services were offered on a wireless handset?
- Would your applications or content appeal to millions of wireless subscribers?
- Do you offer information or services that would be more timely if subscribers received them on their phone instead of at their desktop?
- Have your applications been limited by the amount of computing power you could put right in front of the customer? With the microbrowser approach this is no longer a concern. All the subscriber needs is a wireless handset to gain access to your service.
- Are there customers who have to go out of their way to purchase your product or use your service? What if the power to purchase was in their pocket? What if they could purchase your product or use your service right from their handset?

Summary

Phone.com has opened the door to an enormous new market opportunity. For the first time, application developers can write a single Web-based application that can serve millions of wireless subscribers across different handsets and wireless networks. Your customers can access information anytime, anywhere, and can even be informed of important events when they happen. Customers can make hard copies of important documents from the nearest fax machine without having to turn on a laptop or fumble with incompatible cables.

If you believe your company could benefit from addressing this market opportunity and you would like to join the ranks of leading-edge developers who are already writing next generation mobile applications, visit our Web site at http://www.phone.com and download the latest version of the UP.SDK developer kit.

If you would like to discuss this opportunity further or would like to discuss joining our Phone.com Alliance Program, please send email to alliances@corp.phone.com, or complete an application form on our Web site at http://www.phone.com/solutions/alliance_form.html.

End Notes

[i] Dataquest, *Cellular Telephony Services Worldwide, 1993-2002*, January 1999.

[ii] Cliff Raskind, Strategy Analytics, *Unwiring the IP Network with Global Standards: Bluetooth and WAP*, May 1999.

[iii] Declan Lonergan, Strategy Analytics, *Mobile Internet: Status & Key Trend Analysis*, November 1998.

[iv] The Strategis Group, *Wireless Internet and Email Markets: 1997*, 1997.

[v] Ibid.

[vi] Ibid.

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