

Mobile Enterprise OUTLOOK™

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HIGHLIGHTS:

WIRELESS WIDE-AREA
BROADBAND

LOCATION-BASED
SERVICES

MOVING IT INDOORS

COMMAND AND
CONTROL

LOCATION-BASED
SERVICES

WELCOME TO THIS EDITION OF MOBILE ENTERPRISE OUTLOOK.

Once again, the wireless industry is moving at breakneck speed. In this issue, I will discuss four trends: wireless broadband services, how to provide better wireless network coverage inside your company, location-based services and the move toward turning our wireless devices into our command-and-control devices. Each of these has implications for the corporate world.

Broadband wireless service provides wireless data speeds that until recently were unobtainable. With these services you can quickly and easily connect your field force to your corporate information stores. But as you will see in our first article, this is only a start; there is much more to broadband. Verizon Wireless has been the leader with wide-area broadband services up and running for more than a year. Now Sprint has joined the fray and Cingular is not far behind.

Need better wireless coverage inside your company's walls? There are a number of options available today. You can move toward a wide-area/Wi-Fi solution and buy all new wireless devices or you can look into some in-building devices that will enable you to easily and efficiently bring wide-area signals into your office at minimal cost.

Some location-based services (LBSs) have been available from various wireless network operators for a year or more, and some are only beginning to come online. Tracking your fleet or rerouting pick-up and delivery vehicles are not the only applications for LBS. There are many more. In our third article, we will help you understand what can and cannot be accomplished using LBS.

Much of the wireless industry is working toward enabling our wireless devices to become command-and-control devices with which we will purchase content, pay bills and participate in other activities that will appeal to consumers. However, some of this technology and the applications that will drive it can be of significant value in the corporate world when used to provide access to information and, in general, make better use of wireless devices. While command-and-control is still in its infancy, understanding what is happening in this space will give you a glimpse into the possibilities.

I think all of these topics will be of interest to you.

WIRELESS ADVANCES

As I was preparing this issue, I came across two interesting pieces of information. The first is that according to the feds there are now more wireless phones in use in the United States than wired phones. The second is the prediction that by 2010 most wireless customers will use their wireless phones and data devices for more than 75 percent of their calls. Both announcements support the trend we are all seeing. As we become a more mobile community, the demand for wireless voice and data services is increasing. Today, U.S. citizens talk more per month, by a factor of two, than the rest of the world. According to a report issued by Merrill Lynch, we average more than 680 minutes of wireless voice use per month. The next closest is Hong Kong, with an average of only 385 minutes.

MOST OF THE WIRELESS
WIDE-AREA NETWORKS IN
THE UNITED STATES ARE
REPORTING THAT
LESS THAN 10 PERCENT OF
THEIR TOTAL MONTHLY
REVENUE IS DERIVED FROM
DATA SERVICES.

We use our wireless phones extensively for voice services because it is convenient to do so. We can take care of both business and personal matters, and if we have wireless coverage at home, on the road and at work, our wireless phone provides a single point of contact, single voicemail access and unprecedented flexibility in our daily lives.

However, as I have said before, it is no longer a sure thing that the most important messages we will receive from a customer, client or our boss will arrive by voice. In many cases, the most important message we receive on any given day will come by e-mail or instant messaging. More than ever, we need to be able to take our e-mail with us.

Thanks to wireless voice and data, we don't have to be strapped to our desk. We can be mobile and still be in touch. Not only are we consuming wireless voice services at a record pace, we are quickly driving up wireless data usage. Data is the second part of the equation for us to be truly mobile and responsive at the same time. Being able to walk out of a meeting knowing what is going on before we even make it back to our office, or leaving a customer's location and being fully up-to-date before we get to the next customer, makes us more productive. We provide better service to our clients and co-workers, multitasking as never before, which, by the way, saves money for our company.

I am heartened by the number of new subscribers we are adding each month by way of single yearly subscriptions and corporate licenses. Don't forget that your feedback is welcomed and encouraged, as are suggestions for future topics and articles. As you know, the wireless industry is changing quickly. Keeping up with all of the advances is a challenge. One thing I enjoy about speaking at conferences and other events is that it gives me an opportunity to find out what is on people's minds when it comes to wireless technologies, implementations and solutions. So send me a note with your comments and/or sug-

gestions for topics you would like to see covered in these pages.

I hope you enjoy this issue of *Mobile Enterprise Outlook* as much as I enjoyed writing it.

WIRELESS WIDE-AREA BROADBAND

Wireless wide-area broadband is being referred to as the new killer technology for wireless data. Today there are more than 190 million wireless voice customers in the United States. That is about 60 percent of the U.S. population, and this percentage is expected to reach over 80 percent within the next five to eight years. Of these, a much smaller percentage are wireless data customers.

Most of the wireless wide-area networks in the United States are reporting that less than 10 percent of their total monthly revenue is derived from data services. However, they are also quick to point out that this number is on the rise. In fact, while there are reports that only 500,000 of Verizon Wireless' 45.5 million wireless customers now use wireless broadband services, the number is growing each month.

Verizon entered the high-speed wireless world in October 2003 with two markets: San Diego, Calif., and Washington, D.C. Today it offers broadband service in 43 markets, with a total population of 119 million, and it's not stopping there; it will have more markets up this year and next.

Meanwhile, Sprint PCS, which has been working on its own network upgrade plan, has launched service in 34 markets and is promising to have 60 markets with a total population of 150 million covered by early 2006.

As you can see from the coverage sidebars, many cities are up and running with wireless wide-area broadband today, and more will be coming online as fast as the network providers can install the equipment. Also important, Cingular Wireless has announced that it will be rolling out its 3G network upgrades in the form of WCDMA (also referred to as UMTS) with a

WIDE-AREA BROADBAND SERVICES COVERAGE AREAS

Name of provider:

VERIZON WIRELESS

Technology:

CDMA2000 1XEV-DO

Cities covered:

43 MARKETS,

119 MILLION PEOPLE

Data speeds:

Down to device:

400 TO 700 KBPS

Up to network:

128 KBPS

Markets: (as of July 2005)

ATHENS, GA
ATLANTA, GA
AUSTIN, TX
BALTIMORE, MD
BOSTON, MA
CHICAGO, IL
CINCINNATI, OH
CLEVELAND, OH
COLUMBUS, OH
DALLAS/FORT WORTH, TX
DAYTON, OH
HARTFORD, CT
HOUSTON, TX
INDIANAPOLIS, IN
JACKSONVILLE, FL
KANSAS CITY, MO
LAKE CHARLES, LA
LAS VEGAS, NV
LOS ANGELES, CA
MADISON, WI
MIAMI/FORT

(CONTINUES)

high-speed data component known as HSDPA (don't you just love the acronyms?) toward the end of 2005 and into 2006.

TODAY AND TOMORROW

Today we have wide-area wireless broadband available in a number of markets with more on the way. Verizon, Sprint and Cingular are all on track to add cities. In many cases, upgrades will encompass much more of the geography in cities where high-speed service is available only at airports or in the city core.

Since Verizon and Sprint are the only networks offering commercial broadband wireless services today, I will limit this discussion to these two networks, their data speeds, published pricing and product offerings. I will update this report once Cingular brings some of its UMTS/HSDPA network into commercial operation and will include new Verizon and Sprint figures.

WHAT'S THE BIG DEAL?

When it brought up its high-speed data network in two cities in 2003, Verizon's first customers were people who owned laptops and wanted to access their corporate data at speeds approaching wired DSL and cable speeds. Sprint is also targeting these customers—for a very good reason.

Companies with employees who travel and use notebook computers to communicate with the home office and corporate applications find it easy to use wide-area wireless broadband. Both Sprint and Verizon offer PC Cards for sale at their stores, on their Web sites and, of course, through their corporate sales channels.

Verizon's PC Cards include products from Novatel, Audiovox, Kyocera and Sierra Wireless. They are available online for between \$50 and \$200. Various service plans are available with an unlimited access plan selling for \$79.99. Sprint's PC Cards are from Sierra Wireless and Novatel. They will retail for between \$150 and \$250, but because it just launched this service, the PC Cards are free for the moment. Published data service rates include a

40MB-per-month plan at \$40 and an unlimited plan for \$80 per customer per month.

Obviously, if you are purchasing a number of cards and service contracts you should discuss pricing with your sales representative. Like all wireless services, there are usually discounts available for quantity and extended contracts.

THE USER EXPERIENCE

Wireless broadband services are growing quickly and will continue to accelerate due to the ease with which a laptop can be outfitted with a card, and because the user experience is similar to being connected to a DSL or cable network. As a result, customer support is not an issue.

I have learned for myself how easy and reliable the Verizon service is. (I will also be using the Sprint network now that it is commercial.) When I received my PC Card and software, it was a simple matter to install the software, insert the PC Card and set up the automatic log-in information (user phone number and password). Once this was done, I simply booted up my laptop and clicked on the application to load it. Then I saw the screen that indicates whether EV-DO service is available or if I will have to use 1x, and the signal strength. I have found in the 10 or more cities where I have used EV-DO that the signal strength is usually very good—even inside hotels and companies I am visiting. I can click on the connect button and within seconds the application reports that I am connected.

Without having to reenter my user name and password, I launch my Microsoft Outlook client, which automatically invokes my VPN (virtual private network), and off I go. The system speed is great and I often find myself working with multiple sessions (e.g., Outlook and an Internet connection), just as I do when I am in my office connected to my DSL service.

I have found that if I have Verizon's EV-DO coverage at a hotel that offers wired Internet access, or I am in a coffee shop that offers Wi-Fi service, I don't connect to them. Wireless broadband is so simple to

LAUDERDALE, FL
MILWAUKEE, WI
NEW HAVEN, CT
NEW LONDON, CT
NEW ORLEANS, LA
NEW YORK, NY
NEWARK, NJ
ORLANDO, FL
PHILADELPHIA, PA
PHOENIX, AZ
PITTSBURGH, PA
PORTLAND, OR
PROVIDENCE, RI
RICHMOND, VA
ROCHESTER, NY
SEATTLE, WA
SAN ANTONIO, TX
SAN DIEGO, CA
ST. LOUIS, MO
ST. PETERSBURG/
WEST PALM BEACH, FL
SYRACUSE, NY
TAMPA, FL
WASHINGTON, DC

Name of provider:

SPRINT

Technology:

CDMA2000 1xEV-DO

Cities covered:

34 MARKETS
(60 BY EARLY 2006)

Data speeds:

Down to device:
400 TO 700 KBPS
Up to network:
128 KBPS

Markets:

ATLANTA, GA
AUSTIN, TX

(CONTINUES)

use and so consistently fast that I don't have to pay the \$10 per day to the hotel or sign up for Wi-Fi service.

COVERAGE

An amazing amount of geography is covered by Verizon's EV-DO. In the Los Angeles area, for example, I had great coverage in the city and well down into Orange County. In San Diego, I had great coverage even inside many hotels and buildings. This is also true on the East Coast. It appears that when Verizon brings up a city with EV-DO it brings up a large surrounding area as well.

Even so, there are times when I am outside of EV-DO coverage. In those cases, I access the Verizon network using its CDMA2000 1x data service, which gives me connectivity at between 50 and 100 Kbps. Though this works and I can easily access my Exchange server and other applications, it is not nearly as nice as having EV-DO.

Both Sprint and Verizon's PC Cards provide seamless data connectivity on their 1x and EV-DO networks. Before I connect, the launch application shows me which service is available. Over the past year, I have found that once I make the EV-DO connection the service is fast and usable even in low-signal areas.

I have heard it said many times that 85 percent of all of mobile workers who travel do so within a single region. If this is the case for your staff and EV-DO is available in their home regions, it certainly pays to investigate equipping those who carry laptops with a PC Card and EV-DO service.

Since this solution is so easy to set up and use, your support staff should not be overloaded with calls from your mobile fleet. Once the software and PC Card are loaded and installed, mobile workers should be able to use the wireless wide-area broadband as though they were on a wired service.

If your mobile workforce is part of the 15 percent who travel from region to region, you will need to consider where they travel and how many of the cities are covered with EV-DO. Some cities where the

airports have been covered do not have EV-DO up and running. For example, Verizon provides EV-DO coverage at the three San Francisco Bay airports (San Francisco International, Oakland and San Jose) but the cities are not yet covered. However, from my observation, if an airport is covered, it is likely that the rest of city will be in the near future.

BEYOND LAPTOPS

While Verizon, Sprint and soon Cingular will be spending billions on their upgrades to wide-area broadband data services, they all know that laptop customers alone will not provide a return on these large investments. (One reason Wi-Fi hotspots are not necessarily money-making endeavors is that the number of people using laptop computers is much smaller than the number using wireless voice services.)

To see what is coming next for corporate wireless broadband customers, you only have to look as far as Verizon. In the spring of this year, Verizon launched VCast, a series of multimedia services, on its EV-DO network. VCast is aimed at the consumer space, and there are four or more wireless phones capable of VCast service. The addition of consumer applications will help the company recover the costs of the network upgrade and will certainly add to its average revenue per user (ARPU).

Now that VCast is up and running, Verizon is going back to the business community with additional handheld devices on EV-DO. Verizon's latest broadband device is the Samsung SCH-i730 smartphone based on Microsoft's Windows Mobile 2003 Pocket PC phone second-edition software. This phone also has Bluetooth for local-area access and Wi-Fi for use on corporate and Wi-Fi hotspot systems. The phone has a large screen that slides up to expose a QWERTY keyboard.

The SCH-i730 can be used to connect to corporate, Internet or intranet e-mail services using Microsoft's ActiveSync solution, Intellisync's Mobile Suite or Good's Good Link server software (which is comparable

BIRMINGHAM, AL
BOISE , ID
BOSTON, MA
BUFFALO, NY
CHARLOTTE, NC
CHICAGO, IL
CINCINNATI, OH
CLEVELAND, OH
COLUMBUS, OH
CONNECTICUT
CORPUS CHRISTI
DALLAS, TX
DENVER, CO
DES MOINES, IO
DETROIT, MI
FT. MYERS, FL
HAWAII
HOUSTON, TX
INDIANAPOLIS, IN
JACKSONVILLE, FL
KANSAS CITY, MO
KNOXVILLE-
CHATTANOOGA, TN
LAS VEGAS, NV
LITTLE ROCK, AR
LOS ANGELES, CA
LOUISVILLE, KY
MEMPHIS, TN
MIAMI, FL
MILWAUKEE, WI
MINNEAPOLIS, MN
NASHVILLE, TN
NEW JERSEY
NEW ORLEANS, LA
NEW YORK, NY
NORFOLK, VA
OKLAHOMA, OK
OMAHA, NB
ORLANDO, FL
PHILADELPHIA, PA
PHOENIX, AZ
PITTSBURGH, PA

(CONTINUES)

to RIM's BlackBerry service). It can handle most e-mail attachments including Microsoft Word, Excel and PowerPoint. There will also be a number of corporate applications available for this phone.

This is the first of many broadband-capable phones we will be seeing in the market. Many mobile workers will find that this phone does everything they need while in the field and will elect not to carry a notebook computer in the future.

CONCLUSIONS

Wireless wide-area broadband services are here. They should prove a boon for corporate IT managers who want to provide wireless access to their workforce but have been waiting until the speeds improved. Well, they are better, a lot better, and they will be even better over time. The next evolution of CDMA2000 1xEV-DO (called Rev. A) will see speed increases in both directions. Data speeds down to the device will more than double, and speeds from the device to the network will increase considerably.

Cingular's wireless broadband system will also provide fast access when it is launched in the near future, but with both Verizon and Sprint upgrading their networks to true wireless broadband capabilities, you don't have to wait to get your corporate customers up and running quickly and easily.

If you and your staff have not yet experienced a wireless wide-area broadband connection, it's time to find out how easy and compelling it is. Your mobile workers will appreciate it, and you will have hassle-free wireless connections back to your corporate information stores.

LOCATION-BASED SERVICES

Because of a mandate from the Federal Government known as E911, or Enhanced 911, wireless network operators in the United States are required to enable PSAPs (Public Safety Answering Points) to locate

wireless phone customers within a few hundred feet when they dial 911 on a wireless phone. This program has been mandated for some time now, and while every phone on every network is not yet capable of providing coordinates to the PSAPs, a large number are.

There are several ways in which this information can be calculated by network operators. Some use GPS receivers in the handsets, some use GPS receivers in the handsets along with the GPS receivers located at each cell site (CDMA networks such as Verizon, Sprint and Alltel) and others use TDOA, short for time difference of arrival technology, which measures the time it takes for a cell phone signal to be received by two or more cell sites. Some systems employ both technologies.

A third network-based method is totally software driven. This technology can be used with GPS or AGPS (Assisted GPS) services to increase the accuracy of the location in places where GPS receivers don't see enough satellites to provide an accurate fix.

Regardless of the technology or technology combination used to provide accurate locations for 911 calls, there is a by-product of the E911 requirement: the ability to track cell phones and other wireless devices. As a result, there is a new class of services known as location-based services. Some location-based services have been around for a long time, e.g., over-the-road trucking services offered by OmniTRACS, a Qualcomm company.

Major corporations, including FedEx, UPS and most freight companies, have been using location-based services for many years, as have many public safety agencies, including police, fire and EMS squads. The ability to determine where a vehicle is at any given moment proves invaluable to many companies. It enables less-than-load trucking companies to route their vehicles in the most efficient way to pick up additional loads of freight, it enables police dispatchers to send the closest unit to a scene, and it enables near-real-

PORTLAND, OR
PUERTO RICO
RALEIGH-GREENSBORO
RENO , NV
RICHMOND, VA
RIO GRANDE VALLEY
SACRAMENTO, CA
SALT LAKE CITY, UT
SAN ANTONIO, TX
SAN DIEGO, CA
SAN FRANCISCO, CA
SEATTLE, WA
ST. LOUIS, MO
TALLAHASSEE, FL
TAMPA, FL
TULSA, OK
WASHINGTON DC
WICHITA, KS

MANY COMPANIES
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time reporting of vehicle locations for many other applications.

Most of these large systems use expensive and sometimes cumbersome devices installed in the vehicles. Many companies that want and need location-based services to manage their mobile and/or fleet workforce could not afford them. However, with the advent of the technologies developed for E911 services, there are now a number of less expensive options available.

Nextel offers several ways for you to use location-based services for your company. Its mobile locator is one option. With this service you can locate an individual or group of employees on a PC-based map if your workforce is equipped with GPS-enabled wireless handsets. Nextel also offers a number of tracking and location services for fleets of vehicles. It has teamed with @Road to provide location-enhanced mobile resource management, as well as Televigation, which enables the analysis and optimization of fleet operations with real-time vehicle location tracking, reporting and automatic driver communications.

Several time and location stamping reports for your field force are available from Nextel, which is working with companies such as Xora, Gearworks and ActSoft. For individuals and/or small businesses, it has teamed with Trimble Navigation to enable your Nextel GPS-equipped phones to be used as GPS receivers for on- and off-road activities and turn-by-turn direction options powered by Televigation or MapQuest Find Me technology.

To find out more about Nextel's location-based services for fleet operations, visit its Web site (www.nextel.com) and fill out the questionnaire. A sales representative who is well versed in the various offerings will provide you with a proposal and cost information.

Nextel is not alone with offerings for business-oriented location-based services. Verizon also offers several solutions for locating, managing and monitoring your fleet of vehicles. Like some of the Nextel

solutions, some require the installation of GPS receivers and tracking devices in your vehicles or using certain wireless devices that are GPS capable. T-Mobile, Sprint and Cingular also offer fleet tracking and fleet management services, and all claim to provide easy-to-install and easy-to-use tracking solutions that are cost effective for small, medium and large fleet operations.

LBS ISSUES

There are a few issues that you will have to deal with when implementing LBS. One of the most common is that many within a fleet workforce feel that being able to locate a single person or vehicle gives the company the ability to keep tabs on them by knowing where they are and what they are doing. This can usually be handled by involving the mobile workforce in the decision to equip your fleet with LBS capabilities from the beginning and asking for their feedback as you move through the process.

Once they understand that LBS helps them to be more productive, and that it is not being used as a tool for monitoring performance, most field workers will come to accept the benefits of LBS as an additional tool for themselves and their company.

ADDITIONAL LBS TOOLS COMING SOON

One of the most exciting new LBS tools that will be introduced on wireless networks this year and into next is the ability to locate and track wireless phones on a network. This monitoring is non-invasive, as the system cannot identify individual phones. What it can and will do is report real-time traffic speeds on major freeways and secondary roads. One such system from IntelliOne is in trials in the Tampa Bay, Fla., area. Coupled with turn-by-turn directions, this reporting can be used to avoid congested areas.

CONCLUSION

Location-based services can help companies manage their fleets, keep track of time spent on a job, dispatch the nearest vehi-

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WIDE-AREA AND
WIRELESS LOCAL-AREA
(WI-FI) NETWORKS.**

cle to a pick-up location and give a quick view of the status of their fleets of vehicles or mobile personnel. Most if not all of the wireless networks are offering services from basic LBS to complete fleet management at reasonable rates.

Some networks make use of handset-based GPS receivers, some rely on infrastructure within the network and some use both technologies. Not all areas of coverage for a given network are capable of LBS yet, but since there are concrete deadlines for the rollout of E911 services, you can expect most of the networks to offer these services across the majority of their coverage area.

You can install equipment in your fleet of vehicles, use handheld devices or use a combination of both. You can use these systems to report and track your vehicles or personnel, report times they arrive and leave a location and determine which vehicle is closest to an address with a new pick-up request. Location-based services can also be used to summon help during an emergency and to reach destinations using the best route. Soon, they will provide real-time traffic reporting data.

You may have to update the wireless devices you have deployed, but the cost of doing so is reasonable when compared to the benefits of using these fleet management tools. Many of the LBS tools available to fleet operators today will come into the mainstream over the next year to 18 months and will be offered to the general public. This will drive down pricing for location-based services, and they will become even more affordable.

In the meantime, location-based services are available today and can be quickly and easily implemented. Do you know where your vehicles are? You can, quickly, easily and inexpensively.

MOVING IT INDOORS

Now that there are more wireless voice and data subscribers than wired phone cus-

tomers in the United States, the demand for wireless devices to work inside buildings as well as out on the street is greater than ever. This has become a topic of interest for customers as well as wireless service providers.

There are a number of ways in which voice and data services can be extended inside the walls and/or on the campus of a corporation. One of the most popular options is the use of combination devices—e.g., a device capable of wide-area voice and data service when outside the corporate campus and Wi-Fi access points when inside the building or on the campus. For notebook users, this means equipping the notebook computer with both Wi-Fi and wide-area wireless data capabilities. Since most of today's notebook computers have Wi-Fi built into them, the installation of a PC Card for wide-area access and software that can look for the best possible connection is all that is needed.

T-Mobile is offering the first phase of this connectivity. On T-Mobile's GPRS network today, when you move into a hotspot you can terminate the session on the wide-area network and re-establish it on the Wi-Fi service. Other network operators are also working on this type of hand-off between wide-area and local-area wireless networks. The Samsung i730 smartphone mentioned in the lead article of this issue is capable of Verizon's wide-area and Wi-Fi communications.

Broadbeam, located in New Jersey, is a leader in this field with IntelliSwitching middleware that provides seamless switching between wide-area and wireless local-area (Wi-Fi) networks. IntelliSwitching is a new component of its Mobile Solutions System, Smart IP 3.0 middleware platform. Users can predefine which networks to connect to and in what order. The program automatically detects available networks, seizes a network according to a user-defined order and authenticates the user. If a session is dropped, the software automatically re-authenticates the user and picks up the data flow from the point at

BEFORE YOU THROW AWAY ALL OF YOUR WIDE-AREA WIRELESS DEVICES AND REPLACE THEM WITH COMBINATION WIDE-AREA AND WI-FI DEVICES, THERE ARE OTHER OPTIONS YOU SHOULD CONSIDER.

which it was dropped.

All of the major wireless network operators are working on this type of hand-off between wide-area and local-area wireless networks, at least for data services, and plans for future implementations include voice hand-offs as well. This would require dual-mode wireless devices capable of wide-area and Wi-Fi service, and the voice on the Wi-Fi side would use the voice over Internet protocol (VoIP).

How would this impact a typical corporation? If you already have Wi-Fi access points installed inside your corporation, your workers would be able to move seamlessly between your in-house Wi-Fi network and the wide-area wireless network, first for data and later for voice.

You could also use the Wi-Fi side of this dual-mode device at access points around the country if you chose to do so. T-Mobile, Nextel, Sprint and other network providers are betting on combination connectivity to provide the best of both worlds for the customer base.

The problem with this method of moving back and forth between Wi-Fi and wide-area wireless is that it requires new devices for all of your users, and it is still in beta test mode. We are watching closely and will provide additional information as the industry rolls out more services. The “magic sauce” here is the backend infrastructure that enables the movement between two different networks. T-Mobile is in the forefront with this method of providing both wide-area and in-building coverage.

OTHER OPTIONS

Before you throw away all of your wide-area wireless devices and replace them with combination wide-area and Wi-Fi devices, there are other options you should consider. Many wireless network operators will install in-building systems designed to extend the range of their wide-area systems into a building. There are also devices you can purchase and install inside your facilities yourself.

A number of terms are used to describe

these devices including BDAs (Bi-Directional Amplifiers), in-building repeaters and as one company calls them, “coverage agents.” Some will enable you to relay signals from multiple wireless networks (these are expensive), and the more common ones are designed to relay the signal from a single wireless network into your building (less expensive).

The premise is simple. You mount an external antenna on your roof or other outdoor location, point it at the nearest cell site, run coaxial to an inside antenna and plug the inside antenna into a standard wall outlet. The power for the outside antenna is run over the connecting coaxial along with the radio signals. These systems are available for covering 5,000 to 50,000 square feet of interior space for businesses, and there are models available that cover up to 5,000 square feet for use in homes and small office complexes.

The outside antenna is smaller than a typical satellite TV dish, and the inside antenna is slightly larger than a smoke detector. In some instances, the outside antenna can feed several inside antennas thus enlarging the coverage area inside the building. Most of these systems are network-specific, so you need to order one that is designed and tuned to your wide-area provider's network.

Spotwave (www.spotwave.com), out of Canada, is one of the leading vendors of this type of equipment. Its products are flexible and easy to install. When I moved into my current home several years ago, my Verizon coverage was poor and a Spotwave Verizon device was installed for me. It was an easy installation and it works well. Outside my home I only have a single bar of coverage on the Verizon network but I have full coverage inside the entire house.

Many wireless network operators resell or simply provide Spotwave or other types of in-building network enhancers to their corporate customers. In fact, it is rumored that one nationwide network operator is offering to supply Spotwave devices free of

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charge to any company that signs up for between 50 and 100 new lines. Other network operators are providing them at a discounted price depending on the number of customers in a given location.

The devices can also be purchased by a company or individual directly from the manufacturers. There is one caveat here. Since wireless network operators employ spectrum licensed to them by the FCC, you cannot simply go out and buy one of these devices. You need concurrence from the wireless network operator before putting the unit into operation. Several of the companies that make this type of equipment, including Spotwave, have agreements in place with many of the wireless network operators to facilitate installation of their devices.

The current generation of network enhancers provides in-building coverage for both voice and data services. If you installed a Sprint network enhancer, for example, the device would provide in-building coverage for voice and both CDMA2000 1X and EV-DO. Most of the systems available on the Verizon network also support voice and data services, and some of the new units developed for Cingular include its next-generation high-speed data service, which will be launched in 2006.

One situation you should be aware of is since Nextel is in the process of moving a number of its existing channels to different parts of the 800MHz band due to a rebanding order by the FCC, it is not advisable at this point to purchase a Nextel network enhancer. In fact, while the rebanding is in process, the Sprint/Nextel merger should also be completed. Once this happens, we will have a better idea of Sprint (CDMA) and Nextel's (iDEN) band plans. It will be a few more months before this is sorted out. In the meantime, if you are a Nextel customer you might want to contact Nextel to see what types of network enhancers it is offering and if it will provide an updated version after the band changes are complete.

The two options discussed above are the

prime ways in which you can enhance your wireless service inside your home, small office or corporate buildings. If you have a campus situation, there is also the possibility of using fiber-optic network extensions to enhance coverage over the entire campus and into your buildings. NextG Networks of San Jose, Calif., is the leading provider of these systems, although some network operators offer their own fiber-optic network extensions. Typically, these systems run fiber optics from a nearby cell site and convert the RF energy to light. Low-powered cells on telephone poles or other structures convert the light back to RF energy.

Many large college and business campuses have installed fiber-optic systems. Usually, the fiber-optic contractor agrees to run the fiber and put in the radios and then leases the system to the various wireless network operators. In cases where network operators do the installation, they provide all of the equipment (usually at no charge) to the university or corporation. This may require a long-term exclusive commitment to the network since these systems are expensive to install.

CONCLUSIONS

While wireless network operators are doing their best to increase their network's coverage, it is not always easy. In many cities and counties, obtaining permits for new sites is a long, drawn-out, expensive process. Thus, the options discussed in this article make a lot of sense for companies that want the advantages of being able to use their wireless devices both inside and outside their corporate offices.

The wide-area/local-area wireless approach is seen as a way of combining the best of both worlds, but it means having to outfit your mobile workforce with new devices, and you will probably have to wait some time before they function in a truly seamless manner.

Network enhancers are available off-the-shelf today and they are reasonably priced. They support voice and data serv-



ices and provide a quick and easy fix for increasing in-building coverage. My own experience with these devices has been positive, and having a single phone, with a single phone number, whether you are at your desk or in your car, makes life simpler for your clients and customers. And customer service is still the most important part of doing business today.

COMMAND AND CONTROL

There is a lot of talk within the wireless industry about wireless devices being used for command-and-control functions. What is command and control? Well, think about your TV and home theater remote control. If you use it to control several components (TV, stereo, DVD, etc.), you are using a single device for command and control of your audio-visual system.

Another way to look at command and control is to observe communications during a major fire or other emergency. Those in command of the incident usually operate on a different radio channel—called the command and control channel—so they do not interfere with communications between emergency personnel working on the scene.

When this term is applied to commercial wireless devices, it takes on both of these meanings and some new ones. Several wireless device vendors, as well as others within the industry, are talking about the fact that we have three (or four) screens in our lives. In the four-screen model they are the: movie screen, home TV or home theater screen, PC screen and wireless device screen. If you subscribe to the three-screen model, you leave the movie theater screen off the list. In any event, the idea is that at some point in time we will be using our wireless devices to purchase content and direct that content to any one of our screens or perhaps the screens of a colleague or a friend. A number of device, network and applications companies are gearing up for this, and in

some parts of the world elements of command and control are already in evidence.

In Japan, for example, wireless devices are quickly becoming an alternative to credit cards and other forms of payment. This has been true in Europe for a while, but the Japanese, as they typically do, have taken this to a new level. In Japan you can use your wireless device to pay bills, order content and even move money from one account to another. In the United States, several companies are in the process of enabling money transfers from one country to another using wireless phones. For example, instead of going to Western Union each week, immigrants from Central and South America will be able to send money back home to their loved ones using their wireless phones.

COMMAND AND CONTROL CORPORATE STYLE

How will this affect the corporate workforce? It already has through bar-code scanners built into wireless devices. When salespeople visit a store and inventory their product on the shelves, they scan in items and enter the quantity on hand. This information is sent back to the company, and a recommended order for products is returned to the salesperson in the field. The salesperson then meets with the store manager who types in a code and the order is placed automatically. This process cuts hours and days off the normal restocking and reordering process and keeps stores' product offerings up-to-date.

The next wave of this type of command and control will be to blend our wireless devices with RFID (radio frequency identification) tags that are beginning to appear on products. Using our wireless device, we will be able to track shipments from the factory to the warehouse to the store, keeping tabs on all the items and making sure that none "walk away." The RFID tags will also help stores prevent theft, because any item that contains an RFID chip will set off an alarm if it is not



ANOTHER WAY TO LOOK
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DURING A MAJOR FIRE OR
OTHER EMERGENCY.

ACCORDING TO THE
NEXTTEL WEB SITE,
OTHER ADVANTAGES
OF THIS SYSTEM
INCLUDE ACCELERATED
CASH FLOW,
INCREASED REVENUE
SINCE CUSTOMERS
TEND TO PURCHASE
MORE WHEN PAYING
WITH A CREDIT CARD,
REDUCED NEED FOR
BACK-OFFICE SUPPORT,
REDUCED WORRY
ABOUT BOUNCED CHECKS
FROM CUSTOMERS AND
FAXED OR E-MAILED
RECEIPTS SENT DIRECTLY
FROM THE NEXTTEL/
POWERSWIPE PHONE.

paid for at a point-of-sale terminal.

Nextel is offering a wireless device that can swipe credit cards at a job site. Its Creditel PowerSwipe is snapped onto one of several available Java-enabled Nextel phones. When a plumber, for example, unclogs a drain, the customer reviews the bill and gives his or her credit card to the plumber to be swiped on the PowerSwipe. The transaction is handled in a secure manner over the air and the charges are covered just as they would be in a store. The plumber does not have to handle cash and checks and the plumbing company is paid quickly for the work. According to the Nextel Web site, other advantages of this system include accelerated cash flow, increased revenue, since customers tend to purchase more when paying with a credit card, reduced need for back-office support, reduced worry about bounced checks from customers and faxed or e-mailed receipts sent directly from the Nextel/PowerSwipe phone.

Over the next few years, we will see more command-and-control applications coming to corporate wireless devices. There is already some activity in the area of using camera phones to report the status of a project from the field. While some companies do not want camera phones used inside their premises for security reasons, others are equipping their workforces with camera phones so they can document conditions of products, oversee projects being done in the field, help with the identification of products that may be new to the service staff and a host of other purposes.

NEW DEVICES

There are a number of new devices coming to a wireless phone near you. Some, such as the barcode scanners that are already available, will be built directly into the phone. Others, such as the Creditel PowerSwipe, will be add-ons. There is a move toward the adoption of USB ports on many wireless devices to replace proprietary connections. With this shift to standard USB, there will be a slew of add-

in and add-on products available for wireless phones, including handheld printers, additional types of barcode scanners, credit card readers, RFID adapters and better cradles for hands-free use and battery charging in vehicles.

We will see more products included in standalone wireless phones, and when cradled in a car kit (or truck kit), many will automatically attach to GPS, printers and other devices making these phones even more functional.

Wireless phones are not just for talking anymore. Nor are they only for voice and data services. They are becoming the connection hub for a variety of products that can be integrated into corporate fleets to improve the productivity of the mobile workforce, cut down on deployment costs, provide better customer service and improve corporate cash flow.

As you plan your next generation of wireless deployments, don't put limits on what your field force can accomplish with handheld wireless devices. By snapping-on, plugging-in or using Bluetooth, new devices will convert your wireless voice and data phones to command-and-control devices.

CONCLUSION

Well, that wraps up another issue of this report. I hope you enjoyed reading the articles as much as I enjoyed bringing them to you. Everyday, wireless is changing the way we work and play. I trust I have given you some ideas about what is possible today and a glimpse at what is coming tomorrow.

The world of wireless is ever-changing and advances are being made at break-neck speed. The focus of this report remains the practical side of what is real and deployable today, but with an eye toward the future. When speaking to people involved in the day-to-day implementation of their own corporate wireless projects and those considering wireless deployments, I give the following advice:

- The end-user experience is the most

WIRELESS TERMS AND CLAIMS CAN BE CONFUSING, BUT YOU DON'T HAVE TO BECOME A WIRELESS EXPERT TO TAKE ADVANTAGE OF THE RETURN ON INVESTMENT THAT WIRELESSLY ENABLING YOUR WORKFORCE WILL PROVIDE.

important part of deploying a set of wireless applications. It must be easy to use and something users can embrace. And it must provide a good return on investment both in dollars spent and increased productivity.

● Concentrate on the back-end and end-user aspects of deploying a wireless system. Think back to the early days of wired access via dial-up modems. Modem speeds increased over time, which permitted quicker access to the same information and the inclusion of larger files and information bases. Wireless networks are getting faster and they will continue to do so. Just as you upgraded your users' modems with faster ones, you will have to upgrade their wireless connections. Thus it is important to make sure that their experience starts out as a good one and gets better over time.

● As network speeds increase, information flow becomes smoother and customer support issues lessen.

● Move into a wireless implementation slowly. Do not attempt to wirelessly enable your entire corporate application portfolio at one time. Start small, prove out the concepts, involve your user community early and often and add capabilities over time.

● You do not have to rely on a single network or even a single technology. You can pick and choose what network(s) best suit your needs in various areas of the nation or the world. You can mix and match devices and technologies and put together a wireless plan that is best suited to meet your company's needs.

Wireless terms and claims can be confusing, but you don't have to become a wireless expert to take advantage of the return on investment that wirelessly enabling your workforce will provide. Others can provide the expertise. They may work for a wireless network operator or be consultants, systems integrators and independent software vendors who are knowledgeable about both wireless and corporate applications. You should make sure you have a needs assessment in place (see next quarter's report), and you should be able to convey what you hope to

accomplish by rolling out a wireless extension to your corporate information assets.

There are many resources available to you, including these reports. *Mobile Enterprise* magazine is a great resource, and there are conferences and seminars held throughout the nation that offer sessions hosted by people who have been there and done that. You will have an opportunity to mingle with these people in an informal setting and pick their brains. Most of the wireless network operators are spending a lot of time and resources on training and deploying salespeople who are knowledgeable about their company's products and services and who have been trained to help you conduct a needs assessment and make decisions about your options.

We have truly arrived at a time when the deployment of wireless access to corporate assets can be accomplished quickly and easily, and we know from previous deployments that wireless does not cost, it pays—both in terms of an actual monetary return on investment and in terms of better customer support and management of your mobile workforce.

Stay with us, and don't forget to let us know what you would like to see in these pages, what questions you have about implementing your wireless solutions and what you would like to see addressed in these reports! See you next time.

ANDY SEYBOLD
EDITOR-IN-CHIEF

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