›THIS IS **THE WAY**

TO TAKE YOUR OFFICE IN YOUR POCKET

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Solution Brief

Improving customer responsiveness with the Nortel Voice over WLAN solution

Delivering mobile IP voice and data services throughout the campus environment

How do you support an office environment where workers don't have a dedicated desk or a wired phone? How do you make sure that your workers have access to colleagues and clients while moving around the work environment? How do you avoid disruptive systems like intercom paging or walkie-talkies? How do you eliminate excessive cell phone and pager charges incurred to keep your employees connected?

Voice over WLAN delivers the solution you are looking for.

Erlanger Health System

"The Nortel VoWLAN handsets have been a 'God send' for the nurses. They are lining up outside my door to get them."

— John Haltom, Director of IT, Erlanger Health System

Introduction

Voice over Wireless LAN (VoWLAN) represents the coming together of two important and rapidly growing technologies — WLAN and IP Telephony. By seamlessly integrating the IP Telephony system with WLAN infrastructure, users are provided with high-quality mobile voice and data communications throughout the workplace.

Nortel's VoWLAN solution gives users the freedom to roam from floor to floor in a building, or around a campus, while still remaining accessible and connected through a powerful, discrete, lightweight device. With simple, multi-function handsets integrated into WLAN infrastructure, workers have the ability to stay in constant contact with customers, co-workers, clients and suppliers, cover more ground, answer questions quickly and make faster decisions. Communication is streamlined and business accelerates. And they can save on in-building cell phone usage fees by leveraging campus mobile handsets integrated into the company's existing LAN infrastructure to support mobile voice and data services.

Enterprise customers are quickly embracing the value of VoWLAN. Research done by the Yankee Group as part of their 2004 Enterprise Wireless Technology Survey, which surveyed U.S.-based enterprises, confirmed that 52 percent of respondents have either deployed, are piloting or plan to deploy VoWLAN solutions within the next 12 months.

How VoWLAN works

WLAN Handsets reside on the WLAN with other wireless devices using Direct Sequence Spread Spectrum (DSSS) radio technology. They operate over an 802.11b WLAN providing users with a WLAN IP Telephony extension off your existing PBX or IP Telephony Call Server. WLAN handsets are not the only way to provide VoWLAN. Soft-clients for handhelds extend mobile voice and data communications to a selection of personal communications devices that may already be in use in the enterprise.

Roaming

Connecting back to WLAN access points located throughout the LAN allows users to roam between floors or buildings while maintaining seamless coverage between subnets. By seamlessly integrating with the IP Telephony Call Server, wireless handset and soft-client users running on WLAN-enabled PDA devices are provided with mobile voice and data communications throughout the workplace.

Voice quality

But connecting to the WLAN is not enough. In the voice world, quality is king. Users expect mobile services without degradation in voice quality. Quality of Service (QoS) is supported through various tools including bandwidth management techniques supported by the WLAN infrastructure that prioritize critical, real-time applications like voice, while capping less important applications that are competing for bandwidth on the WLAN. QoS is also supported through the industry-leading SpectraLink Voice Priority (SVP™) in conjunction with IP Telephony Manager 2245. Emerging standards such as 802.11e are being ratified to help bring QoS to the next level. Once 802.11e is ratified, Nortel will adopt the new specification.

Delivering the solution

Nortel's VoWLAN portfolio provides similar features and functionality of the Nortel IP Phone 2004 IP desk phone while bringing communications to areas where no desk phone can reach. The solution is designed to support a broad range of enterprise applications, from general office to medical, retail, education and industrial environments.

The solution is comprised of the following components:

- Handsets
- Open Application Interface
- Soft Clients for handhelds
- Infrastructure

Handsets

VoWLAN handsets provide all the features and functionality of your desk phone in a discrete unit that fits in your pocket.

Nortel WLAN Handset 2210 — A lightweight, durable handset, specifically designed for mobile workplace use within a facility using the supported Nortel IP Telephony Call Servers and 802.11b access points (APs) in a Wireless LAN. The WLAN Handset can receive calls directly, receive transferred calls, transfer calls to other extensions and make outside and long distance calls (subject to class of service restrictions as they would with any other wired extension. The WLAN Handset is solely for use on-premises; they are not cellular or satellite phones and do not incur costly per-minute charges that other solutions would require. It has a standby time of 80 hours and talk-time of up to four hours.

The WLAN Handset 2210 was designed specifically for busy office environments. This compact handset offers features and accessories that address the needs of a variety of businesses at an attractive price.

The rugged monolithic design has no moving parts or external antenna so there is nothing to break or come loose. Batteries may be quickly swapped out without tools, for continuous service in critical environments such as healthcare. A complete set of accessories is available, including headsets, chargers and carrying cases.

Nortel WLAN Handset 2211 — The industrial-grade design of the WLAN 2211 handset is engineered for demanding environments such as healthcare and manufacturing. It has all the capabilities of the WLAN Handset 2210 and exclusive features such as push-to-talk (PTT) functionality, which allows broadcast communication between employees, eliminating the need for two-way radios or walkie-talkies. The PTT functionality uses IP multicast addresses, requiring that multicasting be enabled on the subnet.

Figure 1.
WLAN Handset 2210

Figure 2.
WLAN Handset 2211

Figure 3.
WLAN Handset 2212

W Hotel Seoul-Walkerhill

"This is the first W Hotel in Asia and it represents a new pinnacle in Starwood's tradition of innovation and excellence. It is only fitting that management and staff be provided with the latest in wireless mobile technology to support them in the prompt and efficient delivery of the very best quality of service to our guests, as well as enhance their availability to co-workers and suppliers." — Martin Jones, General Manager, W Seoul-Walkerhill

Nortel WLAN Handset 2212 with VPN security

The new WLAN Handset 2212 with VPN Security has the same form factor as the 2210 but extensive new features and functionality. For business applications in areas that require high degrees of security such as finance or federal government, VPN capabilities compatible with the Nortel secure remote access portfolio ensure critical communications are protected and secure. The integrated VPN client of the WLAN Handset 2212 will allow this device to be used in new environments such as public hotspots or home office environments while maintaining the same security and functionality as offered in the office.

The 2212 includes new features designed to meet the demanding needs of particular industries such as multi-shift and dimly-lit settings common in healthcare and manufacturing. Features include a vibrating ring option, which is ideal for both noisier, industrial and also quieter, healing environments.

In addition to the features available across all the WLAN Handsets, the WLAN Handset 2212 supports the following:

- Integrated VPN Client-compatible with Nortel VPN Gateways that can be used both within and external to campus
- Backlit display for 24-hour use
- Resistant to liquids

Open Application Interface

All three WLAN Handsets — 2210, 2211 and 2212 — offer more than just telephone communication. Utilizing Open Application Interface (OAI), the WLAN Handsets can function as two-way messaging devices, allowing integration with other enterprise systems to provide mobile workers with access to critical information.

Nortel Application Gateway 2246

An OAI that enables third-party software applications to communicate with Nortel WLAN Handsets. OAI is a messaging protocol interface that is open to any developer. Many applications are currently integrated with OAI such as nurse call systems, alarm and control systems and e-mail messaging applications such as Microsoft Outlook™, while others are continuously being developed to meet specific vertical market needs. Nortel offers a developer's package that provides the software necessary to easily integrate and test applications.

No matter what the business, through OAI an application can be created that keeps people informed, lets them react more quickly to emergency/mission-

WLAN Handset features

- Provides the features of an IP Phone 2004 wired telephone set
- Personal Directory, Corporate Directory
- Callers List and Virtual Office supported by Nortel CS 1000
- ACD Login/out and ACD Not Ready
- Secondary Directory Number (DN)
- Calling Line ID (CLID/CNPD)
- Call Forward
- Call Park/Call Park Retrieve
- Call Pickup
- DN/Directed/Group
- Call Transfer
- Conference
- Group Call
- Make Set Busy/ACD Not Ready
- Message Waiting Indication/ Voice Mail Access
- Multiple Appearance DN/Single Call/Multiple Call
- Multiple DNs on a Single Set
- Page
- Call Hold
- Last Number Redial
- Speed Call — System
- Signal Strength Indicator
- Battery Power indicator
- Quality of Service
- WMM subset of 802.11e support
- Up to 4 hours talk time/80 hours stand-by
- Open Application Interface (OAI) support for third-party application integration
- Superior voice quality on converged wireless networks
- Simple to operate without extensive training
- Seamless integration into Nortel communication server telephone system
- Soft-key feature access
- Supports digital and native IP interfaces to most major telephony switches
- Handsets are firmware upgradeable over the air
- Audible and vibrating ringers
- 802.11b standard-compatible
- UNIStim VoIP protocol support
- Text messaging support via OAI
- Push-to-talk mode (2211 only)
- Integrated TFTP client DHCP or static IP addressing

In addition, security is supported with 40-bit Wired Equivalent Privacy (WEP) as defined by the 802.11b specification in addition to Cisco Fast Secure Roaming, (FSR), WPA and WPA 2.

critical situations, reduces downtime, saves time and saves the company money. The open architecture of OAI means the potential business applications that can be developed are endless.

Soft Clients for handhelds

VoIP soft clients allow mobile workers to integrate voice functionality with real-time collaboration tools like instant messaging, click to call and presence capabilities.

Enhancing RIM handhelds with multimedia collaboration

The Nortel Multimedia Communication Server (MCS) 5100 enables businesses to augment existing voice and data infrastructures with advanced IP-based multimedia and collaborative capabilities. The wireless client for RIM handhelds supported in Multimedia Communication Server 5100 Release 3.5 brings new tools to the mobile worker with SIP-based multimedia communications including presence, instant messaging and click-to-call — together with the traditional RIM productivity services organizer and e-mail applications. This client is supported on BlackBerry 6xxx and 7xxx devices including the newly introduced 7270 for campus-based communications. Employees can now use their BlackBerry device to check if a colleague is available to consult on a project and, using instant messaging, send a quick note to get an immediate response.

Mobile Voice Clients

Like Nortel VoWLAN hard clients, Mobile Voice Client (MVC) 2050 takes Nortel IP Softphone 2050 features and brings these capabilities to Pocket PC handheld devices. Users can place, receive, transfer, park and forward calls, as well as conference parties. Calling Line ID and visual incoming call indication are supported. Speed dial or programmable line keys can even be set up to contact the colleagues you call most often. In fact, almost all of the business telephony features available to users of Nortel IP and Digital Phones are available with Mobile Voice Client. Access to features is simple as well — with easy-to-use touch screens supporting icons and/or text-based pull-down menus.

Supported platforms include Dell Axim X50v, Axim X5 Advanced, X3 and X3i, Hewlett Packard iPAQ 555x and Toshiba e75x and e80x series models.

To address sound quality, Nortel has equipped the Mobile Voice Client with Global IP Sound Software (GIPS) from NetEQ. This is packet loss concealment software that can improve voice quality when roaming across WLAN subnets in environments where up to 30 percent of packets are lost.

Infrastructure

A complete set of supporting back-end infrastructure ensures that users experience the same features, functionality and call quality that they expect from their traditional wired PBX.

Nortel WLAN IP Telephony Manager 2245 — A network appliance that works with the access point to provide QoS on the WLAN. UNIStim is a proprietary protocol developed by Nortel for communication between a Nortel IP Phone and a Nortel Call Server. All UNIStim packets to and from the WLAN Handsets pass through the IP Telephony Manager 2245 and are encapsulated for prioritization as they are routed to and from the supported Nortel IP Telephony solution.

Figure 4. BlackBerry Handheld with integrated Multimedia Communication Server Wireless Client

Figure 5. The Mobile Voice Client 2050 brings the power of IP Telephony to your Pocket PC.

The WLAN IP Telephony Manager 2245 leveraging SVP™ is required for QoS because the current IEEE 802.11b standard provides no mechanism for differentiating audio packets from data packets. The new standard being developed (802.11e) will provide all the functionality of the IP Telephony Manager 2245, thus ensuring high-quality voice in a mixed client environment.

Nortel Call Servers — Nortel Communication Server 1000, release 3.0 software or later, or BCM Release 4.0 are required as the call server interface. The WLAN Handsets communicate with the Call Server using the UNIStim protocol.

Access points — Access points (APs) provide the connection between the wired Ethernet LAN and the WLAN Handset. Access points must be positioned in all areas where WLAN Handsets will be used. The number

Did you know?

Approximately 70 percent of U.S. mobile phone calls emanate from inside buildings — homes and offices — and could easily be siphoned off the mobile network through Wi-Fi/ broadband.[1]

[1] RHK CTIA Report, March 2005

The Credit Valley Hospital

"Our clinicians absolutely depend on the mobility solution we have put in place leveraging wireless LAN technology and Voice over WLAN handsets. We're helping them be more efficient, more productive and to do more with less. You couldn't pry it away from them if you wanted."

— Leigh Popov, Manager of Technical Infrastructure and Capital Planning, Credit Valley Hospital

and placement of access points will affect the coverage area and capacity of the wireless system.

TFTP server — Used to distribute firmware to the wireless telephones.

Applications for your environment

With Nortel's solution, enterprises can have fast access to both people and critical information with one easy-to-use handset.

The following are just some of the ways different businesses are using Nortel WLAN Handsets to boost customer service and productivity.

Healthcare

A survey by Nortel partner SpectraLink showed that nurses lose over 900 hours per year due to paging delays and hold times. WLAN Handsets eliminate this wasted time. When a patient pushes the bedside emergency button, an application can trigger a nurse's handset to ring and show which patient is calling. With one push, the nurse can talk directly to the patient, or contact a physician and other team members while on the move, saving precious time and resulting in increased patient satisfaction. The phone's vibration feature provides discrete communication in a patient care environment and avoids intrusive overhead paging. The Group Calling and Paging feature allows immediate access to defined staffing groups, like trauma teams, to ensure all appropriate staff are contacted to resolve problems quickly. Additionally, leveraging the OAI for integration into various other systems including the nurse call system, patient monitoring systems and medical databases ensures staff has immediate access to real-time, critical information supporting faster patient recovery periods and reduced medical errors. Similarly, a doctor using a BlackBerry device equipped with MCS multimedia collaboration capabilities can check if a colleague is present, collaborate in real-time and expedite care decisions.

Retail

Customers have instant access to salespeople within the store to check availability of a product. Salespeople can use their WLAN Handsets to access inventory databases and check stock levels and prices, giving customers fast, on-the-spot service without walking them over to a computer terminal. When account managers and sales personnel carry WLAN Handsets or Pocket PCs, with integrated soft-clients, customers and clients can reach them to place orders or ask questions immediately without the frustration of being put on hold while staff is located. The net result is improved customer satisfaction, increased store productivity and increased sales.

Manufacturing

Multiple devices that were previously used to stay in contact on the shop floor — cell phones, pagers, radios — are now eliminated with one integrated device. Noisy overhead paging, which is often unheard, is controlled. An application can alert production and maintenance engineering managers when temperature limits are exceeded or parts are running low by ringing a supervisor's WLAN Handset and sending a text message. Supervisors can use their WLAN Handsets to access PCs that control machines, check the status of functions and make adjustments while on the move. Supervisors are free to manage from anywhere in the plant and still stay in constant communication with key personnel. Mean time to restore is improved as maintenance engineering resources are available anytime, anywhere — ensuring problems are resolved quickly and improving the bottom line.

Education

WLAN Handsets can provide quick and effective communication in crisis situations for teachers, administrators and coaches. The handsets can be tied to the school's alarm, control and security system to quickly alert all staff when an emergency condition exists, and do so discretely so students can be safely and efficiently managed in an emergency condition. Additionally, the handsets can be configured to be E911-aware, which means that in a crisis situation, emergency response personnel are able to locate the user through radio frequency triangulation.

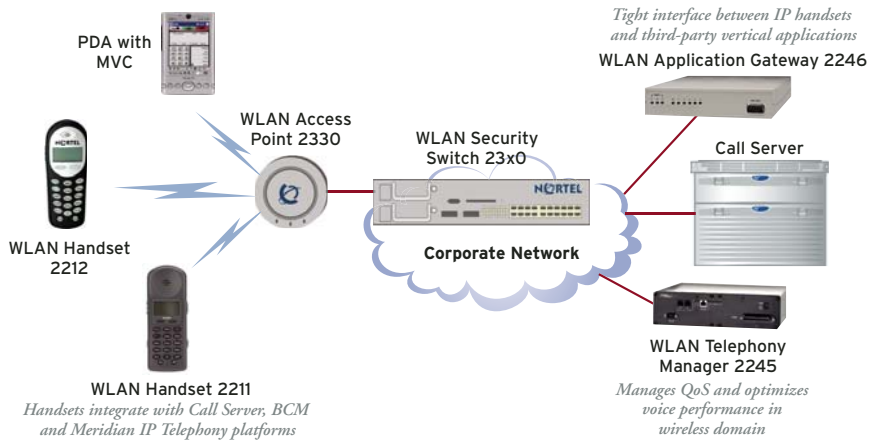
Having access to voice communications anywhere on campus allows teachers much greater control over their class, leading to safer environments for students. A study by a Texas-based Independent School District that deployed VoWLAN district-wide showed that teachers equipped with mobile handsets could save up to 14.5 days per year in productivity time. The handsets also provide for improved communications between colleagues, parents and the community. Ease of communications with parents and the community helps parents stay more involved in their children's education, supporting higher performance levels.

Hospitality

Equipped with WLAN Handsets, staff throughout the property can stay in constant contact with each other — without having to report back to a

physical location or person. This allows a much greater level of customer support — caterers with meeting planners, housekeeping with the front desk, even bellmen with guests. When a customer request is made, staff can be located immediately to fill the request in a timely manner. Supervisors are constantly on the move but can easily keep track of room availability and schedules by accessing the hotel's computer systems through their handsets. Maintenance supervisors can use their handsets to remotely control lighting, heating and alarms.

Figure 6. VoWLAN implementation



Taking VoWLAN beyond the enterprise — emerging Dual Mode devices

Nortel is uniquely positioned to address the emerging Dual Mode device market as it is a premier provider of infrastructure solutions to wireless carriers and enterprise customers globally. A Dual Mode solution will leverage private and public networks, allowing a single device to bridge the Wi-Fi and public cellular domains for both voice and data communications. These devices will enable enterprises to benefit from streamlined capital and operational expenses by optimizing hardware costs, coverage requirements, telephony features and service fees.

Ultimately, the solution will allow seamless access connecting between private Wi-Fi networks, outdoor wireless mesh networks and public cellular networks — giving users true mobility with the freedom to transparently roam from one network to the other. Nortel is an active participant in industry working groups developing standards for Dual Mode devices and supporting infrastructures that will reduce or eliminate technical limitations and address emerging regulatory issues.

Why choose Nortel's VoWLAN Solution

Nortel is the only vendor in the industry with the depth and breadth of experience in all networking technologies — voice, data, wireless, wired and security technologies — across both enterprise and service provider environments. With over 100 years building mission-critical voice and data networks for the largest customers in the world, our core strengths and extensive R&D expertise across the wireless, service provider and enterprise businesses are being leveraged to address the diverse market requirements. This experience uniquely positions Nortel VoWLAN as best-in-class for its ability to deliver a secure, adaptable, multi-service mobility solution.

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