



NORTEL

The Future Made Simple

According to Nortel estimates, by 2010 there will be 10 devices connected to the network for every person using them and the network will need to support five billion connection points. The complexity created by this explosion of new devices, nodes and network applications is creating challenges never before faced by businesses. This issue of *The Future Made Simple* will highlight the opportunities created by those challenges, and the innovative technologies that Nortel is developing to support this emerging and exciting era of Hyperconnectivity.

Nortel's Business Made Simple approach is resulting in technologies designed to simplify networks and eliminate barriers to speed, efficiency, and performance. Simply put, Nortel's technology and innovations are connecting people to what, and who they need, when they need it. By extending this approach to carriers and the enterprise, to both wireless and wired technologies, and by applying it at both the network infrastructure and application levels, Nortel is transforming the way we work and live.

This is an exciting time, and a time filled with great promise for the future of communications. As we cast an eye toward 2008 and beyond, join me in taking a closer look at some of the behind-the-scenes innovations and research activities at Nortel. Projects that will help us prepare for, and benefit from this mega-trend called Hyperconnectivity.

John Roese
Chief Technology Officer
Nortel



The Future Made Simple

> Our Vision for the Future...The Hyperconnected and Unwired Enterprise

Today's consumers demand more wireless connectivity in their personal and business lives. According to recent [research](#) compiled by Nortel and consulting firm CSMG ADVENTIS consumers are willing to pay extra for faster wireless connections in more places.

The research confirms Nortel's vision for the emerging era of [Hyperconnectivity](#) where anything that can be connected will be connected, radically transforming communications by eliminating the wired ties that bind productivity.

Already, today's innovative wireless and unified communication technologies that span both the enterprise and telecom worlds, are giving workers the freedom to communicate and collaborate remotely or on the go, making the days of being stuck, immobilized at a desk in the office a thing of the past.

We are quickly moving to the future of hyperconnected offices, hospitals, hotels and sporting facilities which allow everyone and everything to be completely unwired and connected. Enterprises are embracing wireless, unified communications, security and other technologies to link the entire business to omnipresent network access that lets workers, guests, customers and others communicate and collaborate anywhere, anytime.

Nortel's vision for the [Unwired Enterprise](#) focuses on delivering a campus wireless solution with the performance to allow voice and unified communications over the wireless network. The Unwired Enterprise removes today's gaps between wired/wireless networks, and between on-site/off-site mobility. It simplifies the network by removing redundant functions and overlay networks, and provides seamless universal mobility for continuous connectivity.

Hyperconnectivity is being driven by the growing number of wireless-equipped devices that are able to connect to multiple wireless networks. Research indicates 1.6 million mobile phones are being added to networks worldwide each day. At the start of 2006, there were approximately 10 mobile handsets that supported both cellular and Wi-Fi connectivity. These dual-mode wireless devices will allow users to use the same handset at home, in the office and other locations. This has risen to approximately 25 handset models in 2007 and is expected to grow to one in five of annual shipments by 2012, according to IMS Research.

In addition, nearly 75 percent of organizations are making their business applications available remotely, according to a recent TechRepublic study. Over the next few years, Nortel expects this trend to grow, resulting in office campuses that are more unwired than ever. This will help improve worker productivity, customer/client relations and build competitive advantage.

Nortel wireless innovations are helping to drive changes in business practices and procedures within the several vertical industries, including healthcare, hospitality and entertainment /sports facilities just to name a few.

Connected Healthcare

For example, one Nortel customer, [Baylor Hospital](#) in Dallas, is using wireless connectivity to change the way radiology technicians receive their next assignment from any floor in the hospital. Nortel's technology allows physician orders to be sent via instant messaging (IM) to radiology technicians equipped with unified communication-enabled BlackBerry devices. This ensures technicians are able to rapidly receive order requests, including patient location and priority. In addition, by using presence technology, the "dispatcher" is able to send orders to the radiology tech that is "available" and physically closest to the patient. Baylor saves approximately 45 minutes of staff time for every three hours of work by decreasing the amount of time it takes to locate and dispatch the right equipment or medical specialist needed for each.

Hotels of the Future

Detroit's new [MotorCity Casino•Hotel](#) and [Hilton Beijing](#) are leveraging Nortel's innovations to improve guest services and employee productivity by providing seamless and integrated multimedia communications. For example, as Beijing counts down to the opening of the 2008 Games, the Olympics-designated Hilton Beijing – which offers more than 360 rooms and suites in the heart of the city's commercial and diplomatic district – has been upgrading its network with a hospitality solution from Nortel that integrates the hotel's in-house phone system, front-desk management system and broadband Internet services to provide unified communications for its guests and staff, anywhere, anytime.

And, MotorCity Casino•Hotel provides guests and staff with WLAN handsets so they can make and receive calls from any location on the hotel property. In addition, the hotel's thermostats automatically adjust the room's temperature when a guest leaves their room which helps conserve energy and save up to \$500 a year per room.

In the future, hotels can personalize the guest experience even more by building an intelligent hotel network that instantly and seamlessly adapts to the guest's personal preferences. For example, based on a guest's profile, the room's television will highlight the guest's favorite programming and movies and set the in-room PC and phone with the same desktop environment that they're used to on their PC and phone at home or in the office. The hotel network could also be set to monitor the guest's presence (or status), knowing the moment they leave the room, automatically forwarding their calls from the room phone to their mobile device.

Futuristic Fan Experience

Sports facilities and stadiums like Jobing.com Arena in Glendale Arizona, home of the NHL's [Phoenix Coyotes](#), are also improving staff productivity and customer service through technology. Jobing.com Arena is using Nortel's technology to let guests view information on future events via IP phones and multimedia screens in the box suites. In the future, guests can use these phones to purchase tickets, merchandise and meals which will help improve the guest experience and streamline the ordering process for the Arena staff.

Technology will also enable stadiums to provide fans with access to instant replays and video clips of a game in progress, participate in live chats, contests, virtual games and even order and pay for food and merchandise via their mobile device –without having to leave their seat and miss a moment of the action.

These are just a few examples of ways that businesses can lay the foundation and benefit from Hyperconnectivity.

>> Five Essential Technologies to the Hyperconnected and Unwired Enterprise

1. **802.11n and 4G** mobile broadband technologies (WiMAX and LTE) will give users faster mobile communications and allow more wireless-equipped devices to connect to the network seamlessly and securely.
2. **Unified communications** allows workers to easily access their personal and work-related files, address book, calendar and corporate data – securely and seamlessly, from one device.
3. **SOA** (software oriented architecture) enables any applications developer to take different building blocks of functions and put them together in various ways to build new, intelligent communications applications, services and business processes.
4. **Wireless mesh networks, sensor technologies, location-based services and RFID tags** can be used to automatically heat or cool a room, to close an open window or to power down lights in an empty room, based on whether anyone is present or not. And, once workers enter the office, their device will instantly establish which colleagues are present, check their schedules against their priority team members/staff and organize the day's activities, meetings and rooms accordingly.
5. **Fixed-Mobile Convergence** technologies like **IMS** give users seamless, universal mobility in and out of the office. IMS helps converge all communication networks (wireless, wireline, cable), computing applications and content so users no longer have to worry about which device to carry or which network to connect to or which password to enter.

>> 802.11n – A Closer Look:

Wireless LAN (WLAN) technology has dramatically improved over the years and businesses around the world have embraced WLANs with increasing enthusiasm. Today, many workplaces use WLAN technology to provide omnipresent network access that allows employees to use converged applications anywhere throughout office buildings, warehouses, and other sites. The Wi-Fi Alliance - the trade group responsible for the testing, certification and promotion of 802.11 WLAN devices - has certified more than 1,000 new devices under the 802.11n draft version in the last 15 months, with about **20 percent being non-traditional devices** such as set-top boxes, portable gaming device digital cameras, portable music players and more than 100 different dual-mode handsets.

To improve enterprise mobility, businesses will leverage 802.11n for transmitting data over the airwaves at speeds significantly more than the maximum of just 54 Mbps that current WLAN technology (802.11a and 802.11g) provides. It has the potential to deliver up to five times the throughput and up to twice the range of previous-generation WiFi gear. This means that companies using 802.11n will be able to provide richer, more intelligent applications that link machines and people in ever more sophisticated ways.

802.11n is based on the [OFDM-MIMO](#) which employs multiple receivers and transmitters to transport two or more data streams simultaneously in the same frequency channel. MIMO also helps make devices less susceptible to interference.

802.11n will also fuel the mainstream deployment of WiFi and dual-mode handsets and allow more wireless-equipped devices like iPhones, Internet tablets, and sensors to connect to the enterprise network. It will also allow businesses to move their key data and communications services off of the wired network altogether.

According to Dell'Oro Group's Wireless LAN Five-Year Forecast Report from January 2007, the Enterprise WLAN market is forecasted to be US\$2.9B in 2009, with more than half of the access point revenue coming from 802.11n.

In fact, as WiFi and RF technologies continue to evolve over the next few years, WLANs will become reliable and secure enough to **replace wired Ethernet** as the primary LAN access technology in the enterprise. This means that businesses will no longer hard-wire their offices and workers will have even greater freedom to work remotely with reliable, secure and seamless connectivity, from any location.

The [value cornerstones of 802.11n](#) are in the new wireless applications it can enable, such as wireless VoIP and multimedia. Now truly unconstrained by the limitations of wired networks, the Unwired Enterprise will be able to truly embrace the possibilities of anywhere, anytime unified communications and applications. Only Nortel brings the solutions experience and services expertise combined with UC partnerships to deliver the complete solution to our customers.

>> The Future Desktop Phone will be the “Intelligent Hub” of the Office

The Unwired Enterprise of the future will also see some changes in hardware equipment like the PBX, a “box” that supports basic telecom applications and capabilities – such as voice services, voice mail, audio conferencing, and contact center functionality. Over the next couple of years, businesses will deploy SOA technology which will allow these applications and capabilities to become modular software components that can be reused, reassembled, or combined with other components to create new and improved service offerings.

As wireless handsets and mobility become the dominant form of access, the role of the enterprise PBX or “desk phone” will change. For example, the desk phone of the future will become an “intelligent hub” which will automatically sense the user's presence and coordinate among, and link to, the corporate network. All of the user's personal devices will be connected, including laptops, wireless handsets, iPhones, and Internet tablets - even though these devices all use different access technologies.

The intelligent hub will marry a rich set of short-range technologies (ultra wide band, sensors, RFID) with in-building longer-range WiFi -based technologies to automatically connect a worker's personal devices with the office of the future which will have a wide range of embedded communications capabilities, such as sensor networks, video walls for worker collaboration/white boarding, data conferencing and peripherals.

Nortel's R&D Lab and Partner Highlights

- To support its [Unwired Enterprise vision](#), Nortel has increased its R&D investment and is working to create performance-leading technologies and working on ways to: improve RF coverage and throughput for next-generation WiFi networking, deliver more secure wireless connectivity and create more resilient and self-optimizing systems with carrier-grade performance.

Nortel is working with [Franklin W. Olin College of Engineering](#) in Needham, Massachusetts to identify new ways that families can stay connected across varying levels of technology expertise, ranging from basic for pre-schoolers or grandparents to advanced for tech-savvy college students and parents. One idea is to extend today's refrigerator-door "concept" where families post pictures, lists, calendars or reminders to a simple interactive web-based "bulletin-board" so that geographically dispersed families can easily interact and stay connected in real-time, regardless of the device they find simplest to use. This could include a regular computer or PDA for parents, a drawing tablet for pre-schooler or simple touch-screen functions for grandparents.

- Nortel is working with [Upper Austria University](#) to study and conceptualize remote conferencing solutions of the future that allow workers to remotely collaborate in more interactive and effective ways. For example, Nortel will leverage the university's expertise in multi-touch, pen-based interactive collaboration techniques like virtual whiteboards, table tops and walls to create a prototype in one of its Ottawa conference rooms. This could include multiple whiteboards in multiple remote conference rooms, and individual users using table laptops to interact on a live multi-touch pen based whiteboard and shared design space.
- Nortel and Qualcomm [tested](#) an application that allows mobile phones to seamlessly switch calls between cellular and Wi-Fi networks. This will allow mobile users to continue conversations uninterrupted and avoid additional roaming charges when moving between different wireless networks.

Technologists in the Spotlight

- Nortel's First Visiting Fellow, [Dr. Andy Lippman](#) will work with Nortel's CTO Office on a number of advanced technology directions and programs. Dr. Lippman is the co-director of M.I.T.'s Communications Futures Program, and an expert in viral communications with more than 11 patents. He has been at the forefront of personal communications and computing for over thirty years, having done early work on human interface technologies, HDTV and MPEG, and communication technologies beyond telephony.

Quotable quotes

"The true promise of a hyperconnected world is to transform our business and personal lives and make them more connected and simple," said John Roesse, Chief Technology Officer, Nortel. "With more people, devices and applications connected together, every business and individual will have the opportunity to be a catalyst for change. The world of tomorrow will be dramatically different than it is today."

What's Nortel talking about where and when?

- Jan. 9-11 – NTCA Wireless Symposium in Phoenix, Arizona. Nortel's Matt Broda, a security expert from the CTO Office, will speak on Wireless Security. <http://www.ntcawirelessymposium.com/>
- Jan. 14-16 – Society of Cable Telecommunications Engineers (SCTE) tradeshow in Los Angeles. Nortel's expert, Dr. Michel P. Belanger will speak about Retaining Network Agility in the Evolution to 40Gbps and 100Gps <http://www.scte.org/devams/cgi-bin/eventsdll.dll/EventInfo?sessionaltcd=ET2008>
- Jan. 20-24 – IBM Lotusphere in Orlando. <http://www-306.ibm.com/software/lotus/events/lotusphere2008/>
- Jan. 23-25 – Internet Telephony Conference & Expo in Miami. <http://www.tmcnet.com/voip/conference/>
- Feb. 5-8 – MPLS Ethernet World Congress in Paris. Booth 104. http://www2.nortel.com/go/events_detail.jsp?cat_id=-8005&oid=100232352&block=8&locale=en-GB
- Feb. 11-14 – Mobile World Congress in Barcelona. Booth 8B145 in Hall 8. http://www2.nortel.com/go/events_detail.jsp?cat_id=-8005&oid=100230730&block=8&locale=en-GB
- Feb. 21-22 – Unified Communications Summit in Singapore. <http://www.uninetintelligence.com/pdf/UCSalesBrochureFirstpageonly.pdf>
- Feb. 24-28 – OFC/NFOEC Optical Trade Show in San Diego. <http://www.ofcnfoec.org/>
- Feb. 24-28 – Healthcare Information and Management Systems Society (HIMSS) Trade Show in Orlando. <http://www.himssconference.org/index.aspx>
- March 17-20 – VoiceCon 2008 in Orlando. <http://www.voicecon.com/orlando/>
- April 1-3 – CTIA 2008 in Las Vegas. <http://www.ctiawireless.com/>
- April 27- May 2 – Interop in Las Vegas. <http://www.interop.com/>

Nortel resources...

- Nortel's latest Technical Journal that focuses on next-generation applications and services http://www2.nortel.com/go/news_detail.jsp?cat_id=-10002&oid=100218786&locale=en-US
- Please contact Jamie Moody (moodyjam@nortel.com or 972-684-7167) for additional information and with any comments or suggestions regarding this newsletter.