

Wireless Update

1999 Issue 2

Wireless Internet A look ahead at the markets

By Pascal Debon, president, Wireless Solutions

Like a Siren call to our industry, Wireless Internet is sending us scurrying to collaborate on new standards, develop new technologies, and optimize current investments so we feel confident about moving to the next high speed, packetized network paradigm.

But while we lay these feverish plans, let us not forget also to plan our approach to the ultimate goal, which is not technology, applications or handsets, but the end user – your customer.

The mobile professional

The same people who started the cellular market booming – mobile professionals – also constitute the earliest market for Wireless Internet. Equipped with laptop computers, PDAs and digital wireless phones, these road and hallway warriors have already adopted today's 2G digital wireless data solutions. And they want more.

One survey showed that 63 percent of mobile professionals expected to be accessing their corporate intranets via wireless within two years.¹ Several developers are already offering end-to-end solutions that make it possible to track financial information and receive location-based services on mass-market handsets. Nortel Networks' Mobile Desktop is a similar product.

The bottom line is that mobile professionals are ready for Wireless Internet access and for enhanced applications that will allow them to take full advantage of higher bandwidths.

The Internet cohort

The 'critical mass' market for Wireless Internet services will arrive with the coming of age of today's 12-19 year-olds, who are growing up with the Internet. This huge group is nearing the time when they will have the means to demand services with new levels of wireless

convenience. For this 'Generation 3G' the benefits of ubiquitous Internet access do not need explanation. They will use it at college to access online lectures and to submit term papers while sipping a latte in the student café. They will use it while traveling to share favorite photos, music and videos with their friends. Wireless Internet? These kids will expect it!

The connected family

Perhaps the least understood market for Wireless Internet will be one of the biggest, and that is the connected family. Multimedia wireless communications devices could soon be as prevalent as toasters and TVs. Once people get a taste of the freedom of being able to relate with others in rich multimedia formats no matter where they are, I doubt they will ever look back.

In the home, networking multiple desktop computers is only the beginning. The family-sized network could well include the TV, telephones, various portable wireless devices, and a 'command control' center that monitors and operates the heating and cooling, security, and a variety of other systems and appliances. Imagine being able to use your wireless handset to visually scan your home through a remote, wireless connection to security cameras set up in key locations. Or being able to interact with your daughter as her science fair entry wins a blue ribbon, even if you have to be overseas at the time.

These are all market spaces that will draw many visionaries with creative ideas and advanced technologies. Nortel Networks is in the lead position with our strategy and solutions for Wireless Internet. We invite you to join us.

¹ *Cabners In-Stat, September 1998*

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NORTEL NETWORKS™

How the world shares ideas.

Cutting costs across the board

Wireless Internet – it's the next big thing, but one big question hangs over our industry: how can we make it affordable?

True enough, delivering next generation Wireless Internet effectively will require an evolution in end-to-end infrastructure. The goal is to be able to provide flexible delivery of voice and data at higher speeds and much lower costs than today's networks. To this end, Nortel Networks has taken the industry lead¹ in devising a strategy that will reduce significantly the operating costs of wireless and converged networks.

The new Wireless Internet network paradigm has four parts:

1. It starts off with a commitment to an evolutionary wideband radio program.
 - For GSM and TDMA networks Nortel Networks is investing in **GPRS** (General Packet Radio Service) and **EDGE** (Enhanced Data for GSM Evolution). These will deliver over-the-air data rates of up to 170 kbps for GPRS and 384 kbps for EDGE radio systems.
 - For CDMA networks, Nortel Networks is investing in **1xRTT**, which enables data rates of 144 kbps over the air.
 - Next, we will evolve to **third generation radio standards (3G)** while optimizing your core network to handle the increased traffic the evolution to 3G services and applications will generate.
2. In the service provider's core network, the objective is to realize a fundamentally new paradigm in network design. This paradigm delivers the following:
 - A single, **consistent network architecture** for voice and data communications.
 - Reduction of facilities costs through **distribution of access, transport, and switching functions** into the MAN/WAN, using packet routers and switches.
 - **End-to-end carriage of voice payload in packetized format**, driving a reduction in network elements and links relative to a circuit switching architecture. This in itself recovers transport bandwidth for the deployment of data services over existing facilities.
3. Utilizing an open applications and services architecture, we will enable wireless operators to harness the power of Moore's Law by migrating new service development and control functions to **IP-based, commercially standardized computer platforms**:
 - Voice/HLR/Mobility servers will displace MSCs, saving on maintenance and other costs.
 - New Data IP Services (Personal Communications Portals, Hosted Apps, Extranet/Intranet) will lead to new revenue opportunities and models.



You've got G-Mail!

In Europe, the take-up of GSM's Short Message Services (SMS) has been nothing short of a phenomenon. The GSM Association announced that a staggering one billion 'G-Mail' (GSM text messages) was sent over the airwaves by global GSM mobile phone operators in April 1999. The Association confidently predicts that G-Mail will grow at a rate of 40-50 percent this year.

4. Through a flexible Internet-style back office, wireless operators will realize reduced OAM&P costs by consolidating **service and management functions** on a MAN/WAN. This will result in up to a sixty percent reduction of OAM&P. The robust opportunity of this new environment will lead to:

- Network management optimization.
- New opportunities in billing and server administration.
- Data mining.

Of course, Nortel Networks is making revolutionary strides across the entire Wireless Internet value chain, not just the infrastructure components. Nortel Networks is also leading the way for Wireless Internet in the areas of applications and services and professional services, covering everything from portals to service bureaus to compression to filtering.

That's the big picture. Now, here are some ideas to get you started down this path today.

A wealth of unified solutions is available now

As the boundaries blur between data and telephony, wireline and wireless, Nortel Networks is uniquely positioned to offer integrated solutions that work powerfully in the new environment. Not surprisingly we already offer a rich portfolio of enabling product and service offerings that allow you to begin offering Wireless Internet to your customers today while opening the door to tomorrow's packet-based services.

Why not start realizing some of the cost reduction benefits of Wireless Internet infrastructure right now?

- Leverage your legacy voice gateways with the Succession* and Passport* solution families. You can create the data infrastructure for new services and customer care applications on your common core backbone through a Succession Network with the Versalar Switch Routers and Passport ATM Switches.
- Create mobile office applications including extranet and intranet, utilizing the Contivity* Extranet Switch.
- Implement the Wireless Internet killer app with our e-mobility* family of hardware, software and network management tools that are optimized for IP.

Our Unified Networks* solutions really let you think out of the box and enter new markets. For example, you could provide a high speed, reliable and secure wireless extension of any Ethernet network using Nortel Networks BayStack 600 Series Wireless LAN products, based on Netwave's AirSurfer™ technology. Or, bring high speed communications to any location with Nortel Networks Reunion* broadband wireless access portfolio.

As you start planning network changes, your best first step may be to consult Nortel Networks Wireless Professional Services, where our experts can evaluate network evolution options to help determine the best path to a core packet backbone based on your specific needs.

¹ According to both the Yankee Group and Herschel Shostack

One first after another Record-setting 3G trials from Nortel Networks

Deploy revenue-generating Wireless Internet solutions today

Wireless Internet is not just a vision for the future. You can start delivering it right now with solutions that provide wireless data today, and prepare the way for packet-based solutions in the near future.

Wireless data

This year we are adding second-generation wireless data and two-way short messaging capabilities to our wireless solution set. The tremendous success of Personal Digital Assistants (PDAs) and other portable devices with wireless communication capabilities is indicative of the market potential of these 2G services.

- 2G wireless data turns downtime into productive time by enabling mobile professionals to access their corporate intranet using notebook computers or PDAs.
- Two-way short messaging transforms a wireless handset into a device capable of sending and receiving e-mail, requesting information interactively (stock quotes, flight schedules, traffic and weather reports) and mimicking a pager. The Mobile Messaging Gateway (MMG) allows users to compose a short text message on a web page or e-mail client and send it via SMS to a wireless device. With this feature you can offer text or numeric paging capabilities, bypassing the typical expensive message center and delivering messages directly to the MTX switch and other MSCs.
- e-mobility services open the door to an exciting array of advanced and popular new subscriber services. Built on a distributed IP computing architecture, e-mobility services push the envelope in Wireless Intelligent Networking and mobility management. Services can be deployed faster and at a lower cost in an environment based on IP, which prepares you for the coming boom in data services. And since e-mobility services integrate seamlessly into your existing PCS network, your network will migrate easily to the packetized IP-driven voice and data network of the future. Available e-mobility services include Group Conferencing, Wireless Prepaid, Information Management and much more. For more information please visit www.nortelnetworks.com/servsup/emobility.

Industry's first Wireless Internet call

AirTouch Cellular (www.airtouch.com) and Nortel Networks completed the industry's first wireless phone call over a packet-switched, IP-based next generation core network in March.

The data-optimized network, which is air interface independent, enables seamless interworking with existing voice and data networks and extends the benefits and cost savings capabilities associated with Wireless Internet systems. The call was completed between Nortel Networks' Wireless Internet lab in the Dallas area and AirTouch Cellular's headquarters in San Francisco.

"AirTouch and Nortel Networks have worked together to better understand the dramatic change that is ahead for the wireless networks of the future and the architecture required to meet the challenge – networks that will move away from traditional switched-based platforms to networks that will utilize a more efficient and cost effective IP-based architecture," said Arun Sarin, president, AirTouch Cellular.

The call demonstrates our capability to deliver on our commitment to reduce the present cost of carrying a megabit of traffic over a service provider's network from 37 cents to four cents in 2004.

North America's first live 3G call made with GSM Alliance

The GSM Alliance and Nortel Networks completed North America's first 3G wireless telephone call, using a wideband CDMA (W-CDMA) trial network under live conditions.

André Tremblay, president and chief executive officer of Microcell Telecommunications Inc. (www.microcell.ca) placed the historic call from Montreal to John Roth, vice-chairman and chief executive officer of Nortel Networks, in Toronto.

The trial network is being used to test next generation voice and high-speed wireless data services under a developmental radio license from Industry Canada.

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3G

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“These tests will help ensure that today’s network operators have a clear, evolutionary path to the next generation of wireless services,” Tremblay said. “Industry Canada is to be congratulated for its forward thinking in providing Microcell with a developmental license so that these important tests can take place.

Nortel Networks and Panasonic® are providing the network hardware, software and terminals under an alliance formed last year to develop 3G wireless voice and data solutions.

Trial participants will be able to test a variety of advanced wireless services – including high-bandwidth Internet browsing, video conferencing, file transfer and voice-over-IP – using prototype personal phones, wireless modems, digital cameras and other innovative consumer devices from Panasonic. An advanced data network backbone from Nortel Networks will deliver these services at speeds up to 384 kilobits per second.

Demo sets a brisk pace for Wireless Internet

Sprint’s wireless division and Nortel Networks have provided a glimpse of future Wireless Internet services by demonstrating high-speed data, voice and video applications using cdma2000 3G radio technology.

Staged this spring at the Nortel Networks Wireless Solutions Lab in Richardson, Texas, the demonstration included voice over IP, web browsing, data transfers and video conferencing at speeds up to 384 kilobits per second (kbps) – more than 25 times faster than today’s typical 14.4 kbps wireless data services.

This was accomplished using an advanced wireless system prototype using Nortel Networks CDMA Metro Cell base stations, and Nortel Networks wideband software radio technology based on 3XRTT – phase two of the cdma2000 3G evolution.

End-to-end 3G solution planned for 2000

Nortel Networks and Samsung Electronics Co., Ltd. (www.samsungelectronics.com) are collaborating to help wireless service providers evolve their networks quickly and cost-effectively to third generation radio technology for delivery of enhanced voice and data services.

Nortel Networks and Samsung are initially developing solutions for transition to 1XRTT – the first phase of the proposed cdma2000™ 3G standard – which can support 144 kbps data transmission and enable operators to increase radio capacity as much as 100 percent.

Trials incorporating 1XRTT with IP-centric, packet-based Unified Networks solutions from Nortel Networks and advanced terminals from Samsung will be conducted globally beginning early next year.

Exploring market and technology drivers for UMTS

France Telecom and Nortel Networks will conduct France’s first trial of a 3G mobile communications network – based on proposed standards for Universal Mobile Telecommunications Service (UMTS) – to gain insights into the market and technology drivers for future Wireless Internet data and voice services.

France Telecom Mobiles will be able to test a variety of innovative data and voice services using actual size prototype terminal equipment representative of the first 3G devices expected to be commercially available. These will include W-CDMA voice terminals and PC cards capable of transmitting and receiving data at speeds up to 64 kbps. A prototype mobile device capable of transmission speeds up to 384 kbps will also be available.

The trial is expected to include both consumer and business services. Participants will be able to conduct high-speed mobile communications sessions including Internet access and video conferencing.

A high-speed IP data backbone – featuring Nortel Networks’ multiservice Passport platform – will connect the trial equipment to a France Telecom intranet, allowing concurrent streaming multimedia data sessions at speeds up to 384 kbps.

setting new
high-speed
standards

Going all-out for BellSouth Chile

Nortel Networks Wireless Solutions and BellSouth have had a long and successful history together. In 1991 BellSouth in Chile became the first BellSouth subsidiary in Latin America to deploy a wireless network from Nortel Networks. From this relatively small beginning, the relationship between Nortel Networks and BellSouth has grown to encompass leading digital networks in Latin America and elsewhere, including two of the largest all-TDMA networks on earth with Cellcom Israel and BCP in Brazil.

Fierce competition

Chile has one of the most competitive telecommunications markets on the continent. Until 1997, there were only two wireless operators per region, mostly with AMPS technology and some TDMA technology. BellSouth was one of the two, operating in the 800 MHz B-band in Santiago and Region V – the most densely populated area of the country. In 1998, two more competitors operating in the 1900 MHz band started up with GSM and CDMA. Today, there are four wireless operators per region in a country of 14 million people.

BellSouth has thrived in this in highly competitive market by employing a strategy that emphasizes customer service, operational efficiency, expanded coverage and strategic marketing. Recently, the company's efforts to become a leader in the Chilean telecommunications market were rewarded when it acquired a license allowing BellSouth to operate nationwide.

A partner that responds

According to Fernando Vergara, Director, Cellular Services, BellSouth de Chile, "We see Nortel Networks not only as a network equipment supplier, but as a strategic partner. Given the Chilean market's competitiveness and the increasing demands, we expect continuous support and contribution from Nortel Networks in many of our business lines that go beyond the mere technological aspects."

In order to help BellSouth take on the competition in Chile, the dedicated team at Nortel Networks reaffirmed its commitment through a plan of action. The goal of "Team Chile" was to contribute true value to the

relationship and, in critical moments, demonstrate to BellSouth that the trust placed in Nortel Networks goes beyond commercial agreements.

In order to support BellSouth in Chile, Nortel Networks has

- revitalized the leadership in account management
- reinforced local presence
- drawn extensively on resources in Sunrise and Richardson
- worked to achieve extraordinary delivery times from the factories.

The concept of 'customer first' truly comes to life in Team Chile. Coordination between the companies has been brought to a peak. Nortel Networks is involved in departments ranging from executive, marketing, and financial to operations and engineering. Nortel Networks sometimes assumes the role of a consultant, identifying competitive opportunities that will help BellSouth achieve market differentiation. Direct contribution in marketing programs and unreserved availability has brought about changes and improvements that contribute to the success of the customer.

The value in Customer Value Management

During the third quarter of 1998, Nortel Networks brought the Customer Value Management (CVM) program to BellSouth Chile. Customer feedback made Team Chile aware of areas that needed improvement, and corrective measures were begun at once. These issues are also followed up on a regular basis.

Today we see a BellSouth Chile that is improving its competitive position in the market and offering the best quality of service in the market. Team Chile is more motivated than ever, ready and willing to take on any challenge, and do everything possible, to deliver value to the customer.

BellSouth has expressed its confidence in Nortel Networks by awarding us a three-year contract to build its country-wide TDMA network as part of BellSouth's national expansion program.

www.bsi.bellsouth.com

A winning relationship

BellSouth operator	Country	Service commenced	Type of network	Number of subscribers today
BellSouth Comunicaciones	Chile	1991	AMPS/TDMA	Over 250K
Cellcom	Israel	1994	TDMA	Over 1 million
BellSouth Nicaragua	Nicaragua	1997	AMPS/TDMA	Over 25K
BCP Region 1	São Paulo, Brazil	1998	TDMA	Over 1 million
BSE Region 10	Brazil	1998	TDMA	Over 200K

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The Zone Phone

Giving customers freedom and choice

The Zone Phone – is it a cordless phone for the home or a wireless phone for mobility? In a word, it's both. And it's a smart concept from CenturyTel that leverages the quality and coverage of Nortel Networks TDMA to break new ground in their market.

In the Michigan cities of Grand Rapids, Lansing, and Kalamazoo, wireless operator CenturyTel has introduced a new product category, enabling subscribers to have one phone that serves multiple needs.

They call it the Zone Phone. It is a digital PCS service that uses zone-based billing to attract a new segment of subscribers who might not have bought a standard PCS calling plan. In fact, over 50 percent of Zone Phone sales are to new customers.

CenturyTel's Zone Phone users receive 600 digital wireless minutes per month included in a low flat rate, for calls that originate within their local zone – a generous area that covers the whole city. Additional use is billed at 15 cents per minute within the zone. Out-of-zone calls are billed at 99 cents per minute.

As Chris Pieri, PCS Sales Manager of CenturyTel, explains it, "The Zone Phone is a low mobility product when you compare it to a cellular phone, but it's a high mobility product when you compare it to a cordless phone. It has the advantage of becoming a cellular phone when you go outside your home area."

According to Pieri, "when we started selling it, the zones were smaller and the full coverage package was an option. However, response was so high that now we offer full metro coverage with cellular access included. And that strategy has actually increased our sales."

A practical choice at home

CenturyTel's marketing efforts began with the residential subscriber in mind. They promoted it as a second line alternative to wireline, with prime features included in the base price, such as caller ID, voice mail with message waiting indicator, and various custom calling features.

The concept proved very popular among home users, from busy parents to people working in home offices. CenturyTel's research shows that parents use the Zone Phone to stay in touch with family, service and repair people, schools, and appointments. Some entrepreneurs have elected to use the Zone Phone as their primary contact number, to help them manage their communications efficiently wherever business takes them.

Demographically, CenturyTel reports, the Zone Phone appeals to families with four members or fewer, and with incomes over \$50K.

A prime business application

Business usage of the Zone Phone is also on the rise, as it directly addresses the anomaly that today's office worker is mobile but the desk phone is not. The Zone Phone can act as a Virtual Private Network, extending or even replacing the PBX with its call management features and mobility options.

With the Zone Phone, workers can stay in touch from any location on or off the corporate premises; and even if they don't have an assigned desk, wherever they sit, they can keep the same phone number. Specific applications that have proven highly successful include supplying building maintenance staff, systems administrators, and other key employees who need campus-wide mobility with Zone Phones.

An innovative use of Nortel Networks TDMA

CenturyTel created the Zone Phone concept while working with Nortel Networks to overlay their existing TDMA 800 MHz network with a 1900 MHz network. In-zone coverage is provided by the 1900 MHz network, while the 800 MHz network provides digital backup as well as the normal wireless service available out of the home zone.

Chris Pieri points out that since many of the 1900 MHz cell sites were co-located with existing cell sites, CenturyTel realized numerous economies when deploying the new system. In addition, both networks run off the same switch, and calls are handed off smoothly between them, minimizing the incidence of cold spots.

The zone-based billing that gave the Zone Phone its name is made possible by Nortel Networks' Private System Identifier/Residential System Identifier PSID/RSID capabilities in the MTX07 and 08 software loads. The PSID/RSID validates all call originations on the PCS 1900 network. Subscribers' handsets provide a readout that alerts them to whether they are in or out of the home zone, so they have control over costs.

Pieri sees a bright future for the Zone Phone, especially when it becomes coupled with wireless data capability: "To be able to scroll through your e-mail messages and respond – or to search the Web for information when you are in front of a client – that's the future. Wireless communication is just going to continue to keep growing.

"I have seen the future – and it's the Zone."

www.centurytel.com/zone/

ZONESM

CENTURYTEL

Major hotel works best in the Zone

"The employees aren't sitting there waiting for a phone call"

CenturyTel supplies one of the top rated hotels in Grand Rapids, Michigan with Zone Phones. Hotel employees stay on the move, picking up guests from the airport, providing room cleaning and grounds maintenance, delivering room service . . . and much more. Equipped with Zone Phones, everyone from the maid to the maître d' is reachable in real time. The hotel continues to find more uses for the Zone Phone and finds it to be an integral part of its superior customer service plan.

Telstra resolves to ring in changes with the New Year

December 31, 1999 marks the beginning – and the end – of an era of telecommunications in Australia.

On New Year's Eve, while much of the world celebrates the transition from the old Millennium to the new one, a quiet yet highly significant event will be taking place behind the scenes: the transition from analog to digital wireless service. On December 31, Telstra will initiate a year-long program to close down its analog systems, beginning primarily with the major metropolitan markets.

Telstra's old system will be replaced by a new Nortel Networks CDMA digital network with some of the most advanced features and widest coverage available anywhere. The new network will begin commercial operation a few months before the targeted analog shutdown, to ensure continuity of service.

Digital coverage for wide open spaces

One of the challenges faced by Telstra in its nationwide digital conversion is the need to provide high quality coverage in a part of the world that is known for its wide-open spaces. To address this issue, Nortel Networks introduced an extended coverage base station called the Rural Cell, or, as it has affectionately become known in Australia, the 'Boomer' Cell.

Normally, CDMA range is limited to no more than 62 km by mobile and base station hardware and software. The 'Boomer' Cell removes this artificial limitation on range, extending coverage to the point beyond which the curvature of the earth interferes with radio signals. Thus the 'Boomer' Cell will meet the requirements of regional and rural customers currently relying on the analog network for extended coverage.

The Boomer rang phones over 120 km away

Telstra is the only Australian carrier building a national CDMA network, and they are committed to ensuring that the network's coverage and performance are of an extremely high standard. To prove it, Telstra has been putting the 'Boomer' Cell through some tough field trials in New South Wales – one in a remote rural location and the second in a marine environment.

The first test was conducted from a 'Boomer' Cell situated on Mt. Dowe, a mountain top located 1,500 meters above sea level in the Kaputar National Park, Northern New South Wales.

Testing in this rural environment was conducted using vehicles equipped with both analog and CDMA handsets. This was to compare the network coverage and voice quality of both networks over very long distances from Mt. Dowe.

The tests conducted from Mt. Dowe achieved coverage at distances over 120 km from the base station. The test demonstrated that coverage and voice quality of CDMA compared favorably with that of analog in this area.

Noise suppression a bonus in marine environments

Testing was also conducted in a marine environment in Southern New South Wales, from a base station located on Peak Alone, another mountain-top site 1,000 meters above sea level, around 25 km inland from Narooma on the NSW coast.

The Peak Alone analog base station is configured with high power 50 Watt transmitters and omni-directional antennas. This type of analog configuration is common in many locations around Australia.

The test installation, equipped with a 'Boomer' Cell, is co-located and configured as follows:

- Omni-directional antennas
- High power transmitter amplifiers
- Extended cell capability
- High performance tower-mounted
- Low Noise Amplifiers

Testing took place on a boat off the coast of Ulladulla, over a range of distances using a standard car kit, without any booster. Calls were achieved at distances in excess of 130 km from the base station over land and water.

According to Telstra's Managing Director of Mobiles, Jonathan Marchbank, "During the testing the network maintained excellent voice quality, and with its background noise suppression, it will be particularly useful in a marine environment to help suppress the noise from engines, wind and waves at sea."

The digital network will provide customers with a high quality replacement network that compares favorably to the existing analog network, and brings additional features not currently available on that network – including call security, calling number display, and in the future, wireless data applications such as text messaging and data and facsimile transmission.

A dramatic improvement in coverage

The industry's longest-range 800 MHz cdmaOne base station is now commercially available – the Nortel Networks CDMA Rural Cell.

The Rural Cell (nicknamed 'Boomer' Cell for its dramatically extended range) provides a coverage radius in excess of 200 kilometers from an airplane – more than 10 times the range of a typical CDMA base station. This can significantly reduce the number of cell sites required to provide rural coverage, making it more economical for operators to deploy, operate and maintain service for residents and roamers in sparsely populated areas.

Nortel Networks pioneered the development of extended coverage for CDMA base stations, beginning in March with the first 200-kilometer demonstration in Ottawa, Ontario.



Sneak Preview MTXo8 ready for prime time

MTXo8 in a nutshell

The highly anticipated release of Nortel Networks MTX08 software is right around the corner. Packed with new wireless data features, superior subscriber services, and a host of capacity, cost and performance enhancers, you won't want to miss the debut! Following are a few highlights of this powerful package.

- Enables new revenue streams with MTX- and HLR-based services and applications
- Delivers network management cost optimizing functionality
- Continues to provide highest audio quality in the industry
- Offers higher level of ANSI-41D (IS-41C) compliance to make services available while roaming

Mobile Call Management Solutions

MTX08 narrows the gap between wireline and wireless, in terms of the productivity and security features you can offer. Some of the call management features available in MTX08 include:

Distinctive Call Screening

- Anonymous Call Diversion
- Selective Call Screening
- Distinctive Ringing
- Text Messaging to Mobiles

Voice Mail Companions

- Call Forward Default
- Voice Mail Deposit and Retrieval
- Call Forward Rollover

Do Not Disturb

Durable Cancel Call Waiting Service Code Dialing Abbreviated Dialing

Market Opportunity

- Wireless as a second line
- Wireless Office application
- Growing personal and business user market

Market Strategy

- Target university, corporate or hospital campuses
- Target SOHO vertical segments
- Promote ability to separate private and professional responsibilities by adding communications flexibility
- Call Management Value

Wireless Internet Applications

With MTX08 you will also be able to offer subscribers the ability to send digital data across their TDMA digital network. Key applications enabled by the TDMA Circuit Switch Data functionality include:

TDMA Circuit Switched Data

- Wireless E-mail Access
- Wireless Internet/Intranet Access
- Wireless Fax (non-analog)
- Wireless Database Access
- Wireless File Transfer
- Other Wireless Office applications

Operator Benefits

- Data capability increases revenue potential
- Enhances competitive position
- Promotes subscriber loyalty by meeting all of their communication needs – voice and data

- Leverages existing network equipment
- Delivers consistent coverage for voice, data and fax

Wireless Solutions Networking

MTX08 introduces several new features for network management flexibility and network optimization.

Enhancements

- Handoff
- Digital Control Channel
- Signaling/Access
- TRU III Radio

Network Strategy

- Economize on Forward Control Channel and increase system capacity
- Support international dialing
- Increase call processing capacity
- Operations cost containment

Plus!

EFRC Noise Conditioning and EFRC Noise Reduction, working together to help you offer the highest TDMA audio quality.

ANSI-41D (IS-41C) compliance

Superior IS-41C compliance in MTX08 will help you have easier interoperability with your roaming partners, and more service offerings.

Features created to comply with ANSI-41D

- Call Forwarding Default
- Selective Call Acceptance
- Do Not Disturb
- Voice Mail Retrieval

New features which work in any ANSI-41D network

- Call Forward Rollover
- Durable Cancel Call Waiting
- Selective Call Diversion
- Anonymous Call Barring
- Anonymous Call Forwarding
- Voice Mail Deposit

Some existing MTX features have been enhanced to bring them up to ANSI 41D

- Calling Number Identification Restrictions
- Cancel Call Waiting
- Mid-call Feature Control

While the city sleeps, you can expand the scope of your business

Now you can leverage your existing wireless switching facilities to pursue revenue opportunities in the Competitive Local Exchange Carrier (CLEC) market. Overnight, we can convert your DMS-MTX to the leading unified wireline/wireless platform in the market, the Nortel Networks DMS-100 Wireless switch. The DMS-100 Wireless offers a flexible and cost-effective way to establish a single point of presence in both traditional wireline and wireless markets.

Since the DMS-100 Wireless supports all the features of the DMS-100 local wireline switch, you'll be able to offer advanced services such as Digital Subscriber Line (xDSL) data, IP Telephony, ISDN PRI and BRI, CLASS residential services, CENTREX business services and more.



Explore a host of new opportunities

The DMS-100 Wireless is a multifunctional switching system that integrates the DMS-100/200 (Class 4/5 wireline switch) and the DMS-MTX digital wireless switching system capabilities onto a single hardware platform. Once your network is converted, you can:

- Exploit opportunities in the exploding CLEC market with feature-rich wireline voice and data offerings
- Migrate existing wireline business onto a more reliable, unified platform while also reducing costs such as real estate, hardware, and power consumption
- Pursue wireline opportunities in service areas being sold off by the ILECs and other telcos
- Provide integrated wireless/wireline services as a competitive differentiator, such as Integrated Wireless Centrex, Integrated Voice Mailbox, and Simultaneous Ringing

Basic Conversion Considerations

- Supports MTX07 to equivalent DMS-100 Wireless load (LWW00005)
- LWW00005 integrates wireless MTX07 and wireline LEC00012
- INODE, CDPD, and international functionality currently not supported on DMS-100 Wireless

More new products to boost your business

e-cell GSM Microcellular Base Station

Operator Benefits

- Cost effective, high performing microcellular solution
- Provides the capacity you need in dense, urban areas
- Allows you to keep up with exponential subscriber growth
- Industry's first EDGE-ready base station

Features

- Integrated, compact packaging
- Maximizes trunking efficiency
- 15-minute installation
- Generate extra revenue with high value data services

Fast Forward Solutions

Customized software solutions that

- make your network more productive
- create services which attract and retain active subscribers
- deliver significant bottom-line cost savings to your wireless network

Nortel Networks' expert team

- helps you identify potential network enhancements
- analyzes operational feasibility and assesses the cost/benefit balance of proposed features
- delivers a fast, workable software solution that gives you a competitive edge

For more information please contact your
Nortel Networks representative.



Contracts Quick View

Nortel Networks is bringing advanced wireless solutions to companies around the world, helping to solve pent-up demand for high quality communications and to introduce new high speed wireless voice and data services.

For more details please visit our web site at www.nortelnetworks.com

Sprint PCS USA	cdmaOne™ (IS-95 CDMA)	\$520 million over three years
Bell Mobility Canada	cdmaOne (IS-95 CDMA)	\$200 million
Haitel Haiti	cdmaOne	\$86 million
Shaanxi Telecom Great Wall Mobile Communications People's Republic of China	cdmaOne	\$10 million
Microcell Connexions Canada	GSM	\$60 million over three years
PTK Centertel Poland	GSM 1800	\$20 million
African Wireless Democratic Republic of Congo (DRC)	GSM 900	Three-year expansion agreement
Guizhou Telecom Administration Liaoning Mobile Communications Ltd. People's Republic of China	GSM 900 GSM 1800	\$35 million
C&W Optus Australia	GPRS	\$33 million over three years
BellSouth Comunicaciones Chile	TDMA IS-136	\$90 million over three years
Norte Brasil Telecom Brazil	TDMA IS-136	\$60 million over three years
Antel Uruguay	TDMA IS-136	\$21 million initially

The contract represents the continuation of a successful relationship, with Nortel Networks providing solutions for all three phases of Sprint's wireless network deployment.

Nortel Networks will supply and install CDMA network infrastructure equipment and services, including the flexible, 3G-ready multi-carrier Metro Cell base station. www.sprintpcs.com

This agreement is expected to bring Bell Mobility's six-year investment in Nortel Networks wireless infrastructure equipment to more than US\$400 million. It includes Nortel Networks DMS-MTX* SuperNode* digital switching equipment, Nortel Networks CDMA Metro Cell base stations, and Wireless Prepaid, a Nortel Networks e-mobility service. www.bellmobility.ca

Haiti's largest ever private investment ultimately will provide phone service to 500,000. Haitel will deploy voice switch-based services such as call waiting, caller ID, credit card calling and call forwarding and will feature Wireless Prepaid, a Nortel Networks e-mobility service. Nortel Networks will implement a complete digital wireless fixed and mobile telephone network using advanced cdmaOne technology.

This expansion contract will include the first deployment in China of Nortel Networks' CDMA Metro Cell high-capacity, multi-carrier, 3G-ready base stations. Subscribers on the Great Wall network can roam on CDMA networks in Beijing and Shanghai, and on analog networks in Lanzhou, Urumqi and Xian. This network is the fastest growing network for Shaanxi Telecom.

Nortel Networks is already a major supplier of GSM digital switching and radio base station equipment for the Microcell Connexions nationwide network. Nortel Networks also provides Microcell Connexions with GSM IN (Intelligent Network) services using the Nortel Networks ServiceBuilder* platform, and a service gateway for AMPS roaming.

The new agreement will enable Microcell to increase network capacity and coverage, and to introduce new wireless services on their digital network. www.microcell.ca

Poland's PTK Centertel will use the network expansion to add capacity and prepare their network for future wireless data services. Nortel Networks will supply, install and commission additional radio base station equipment, including the Nortel Networks S8000 BTS, in several cities in southern Poland.

African Wireless, a U.S. company, provides mobile telecommunications services in the DRC through its subsidiary, Congolese Wireless Network. The expansion agreement calls for supply and installation of new cell sites and associated radio and switching equipment which are expected to triple the capacity and significantly increase the coverage of the network already in Kinshasa.

The Guizhou Telecom Administration is expanding the capacity of its existing Nortel Networks GSM 900 system. Guizhou Telecom will add four DMS-MSC* SuperNode digital switching systems and a stand-alone Home Location Register.

Liaoning Mobile Communications intends to provide China's first commercial, province-wide GSM 1800 service. The Nortel Networks solution features unique 1*3 fractional frequency re-use technology for the industry's highest receive sensitivity.

In an Asia Pacific first, Cable & Wireless Optus selected Nortel Networks for the deployment of its General Packet Radio Service (GPRS) network solution in the year 2000 – enabling the delivery of such high-speed data services as rapid wireless Internet access – as well as a major enhancement of C&W Optus' advanced IN (Intelligent Network) services platform and a significant expansion of its current network capacity. www.optus.com.au

Nortel Networks will supply DMS-MTX SuperNode digital switching equipment, TDMA radio base stations, new subscriber services and network engineering to BellSouth, which recently acquired an existing "B" band license to offer nationwide coverage in Chile, as of December 1999. www.bellsouth.com

Nortel Networks will build a TDMA IS-136 digital wireless network in the Amazon region, the largest in Brazil, covering five states. When the Norte Brasil Telecom project is completed, Nortel Networks infrastructure equipment will provide wireless service to 84 percent of Brazil.

Administración Nacional de Telecomunicaciones (ANTEL) will provide additional subscriber capacity for both mobile and fixed services throughout Uruguay including urban areas such as Montevideo, Canelones, Maldonado, Colonia and others.

DMS: still the industry's best

Data from the FCC's 1998 ARMIS Service Quality Report (www.fcc.gov/ccb/armis/), which provides information on switch performance and outages, shows that the Nortel Networks DMS* system leads the industry in switching reliability as it has for the past three years.

The ARMIS database contains key financial, operational, infrastructure, and service quality information from the largest incumbent local exchange carriers.

Our analysis of the raw data provided in the ARMIS Report shows the Nortel Networks DMS Family of switching systems to be 99.9999 percent reliable, or "Six Nines." Our DMS Family switches lead the industry with 18.24 seconds of average downtime (including scheduled and unscheduled outages), versus 25.5 seconds for the 2,221 switches from Nortel Networks' nearest competitor during 1998.

Nortel Networks is proud to bring the same industry-leading reliability to all our networks, including wireless, Internet, and data networks.

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Year	Host Switch	#switches	Actual seconds/ system	Year	Nearest Competitor	#switches	Actual seconds/ system
1998	Nortel Networks DMS	2,225	18.24 seconds	1998	Nearest Competitor	2,221	25.5 seconds
1997	Nortel Networks DMS	2,182	28.8 seconds	1997	Nearest Competitor	2,152	53.8 seconds
1996	Nortel Networks DMS	2,090	20.5 seconds	1996	Nearest Competitor	2,092	45.5 seconds

Upcoming events

SEP	20-21	CDMA Technology Conference	New Orleans, LA
	21	Wireless Analyst & Consultant Preview @ PCS '99	New Orleans, LA
	22-24	PCS '99 (www.pcs99.com)	New Orleans, LA
	27-29	In-Building Europe	London, UK
	28-30	COMDEX (www.comdex.com)	Miami, FL
OCT	28-Oct 1	Expo Comm Argentina 99 (www.ejkrause.com/expocomm/latin)	Buenos Aires, Argentina
	4-8	Nortel Networks Wireless User Group (CDMA/TDMA)	Dallas, TX
	10-17	World Telecom '99 (www.itu.int/telecom-wt99)	Geneva, Switzerland
	12	CDG Analysts Forum (www.cdg.org)	Geneva, Switzerland
	20-22	Nortel Networks GSM North America User Group	Colorado Springs, CO
NOV	27-29	Andicom '99 (www.cintel.org.co/congreso.htm)	Cartagena de Indias, Colombia
	2-4	Wireless IT 99 (www.wow-com.com/convsem/wit)	Santa Clara, CA
	8-9	GSM North America Show	San Francisco, CA
	9-12	Expo Comm Brazil	São Paulo, Brazil
	9-13	PT Wireless	Beijing, China
	28-Dec 1	CDG Americas Congress	San Francisco, CA

<http://www.nortelnetworks.com>

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