



NORTEL GLOBAL
PRODUCT AND SOLUTION
REFERENCE GUIDE
VERSION 5 – JULY 2005

NORTEL

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Introduction

Welcome to the Nortel Global Product and Solution Reference Guide. This publication has been specifically designed to provide brief product, solution and industry application overviews including pertinent specifications and examples of how those solutions can be applied in the marketplace. The guide is published for end-user customers, analysts, consultants, Nortel partners, resellers and sales account teams who need a broad, high-level overview of Nortel Enterprise products, but at the moment do not have access to Nortel's Web site, Nortel.com at www.nortel.com.

Because this book is updated periodically, there are likely to be new products and solutions not included in this edition. Please be aware that not all products and/or solutions outlined in this publication are available or applicable to all global regions. For additional and more detailed information and assistance, please contact your local Nortel representative or visit our Web site at: www.nortel.com.

We hope you find this publication helpful and easy to use.

We want to hear from you!

Nortel is always eager to improve upon what we do, therefore we invite you to participate in our reader survey. In updating subsequent versions of the Reference Guide, your feedback will help us to better understand and meet your information needs, and will assist us in improving the publication to become a more effective tool for you.

To express your opinions and comments on this edition of the Nortel Global Product and Solution Reference Guide please go to: www.nortel.com/refguidesurvey.

This is Nortel

With more than a century of experience in shaping the evolution of communications, Nortel continues its tradition of innovation today by providing secure solutions that ignite and power global commerce while helping solve the world's greatest challenges. Nortel's leading portfolio of solutions spanning packet, optical, wireless and voice technologies are at the very foundation of the world's economy, powering global commerce and delivering innovative network capabilities to connect rural and underdeveloped regions.

Working together with its customers in 150 countries, Nortel is improving the human experience by fundamentally changing how the world works and how people communicate, creating unique capabilities for business, education, entertainment and security through reliable data and voice technologies.

Drawing on its fundamental understanding of the network – both voice and data - Nortel is delivering capabilities to secure computing, network applications and end-user environments while maintaining five 9s of reliability. Nortel helps governments, businesses and individuals stay ahead of threats including hacker intrusion, worms and denial-of-service attacks by protecting personal information and by delivering enhanced network management capabilities.

Whether supporting billions of transactions by a financial institution, providing vital information services for healthcare or helping education heighten learning experiences through the most advanced technologies, Nortel solutions are at work wherever reliable data and voice communications are most critical.

Our Organizational Structure

Nortel's focus areas address needs of multiple customer markets. We have aligned our organization into business units that allow us to understand and address the unique requirements of our customers:

- **Carrier Networks** provides secure, carrier-grade, converged network infrastructures that enable service providers to deliver the next generation of services. Whether wired or wireless, our network solutions are expanding business potential in voice, data, IP and multimedia services. While providing investment protection and eloquent migration strategies to enable new revenue opportunities, our solutions also enable reduced network costs. Carrier Networks solutions for service providers include wireless networks that support all major current wireless standards, voice over packet, multiservice packet switching, multimedia services platforms, ultra-broadband access and optical transport and services.
- **Enterprise Networks** focuses on delivering highly reliable, secure, innovative solutions that enterprises can be confident will enable their success with increased productivity, enhanced customer service and lower costs. The company's enterprise vision focuses on enabling enterprises to meet the challenges and constraints they are faced with by facilitating anytime, any where, any medium communications. Enterprise Networks provides businesses of all sizes with solutions in IP Telephony, Ethernet switching, WLAN and mobility, security, multimedia, customer contact and voice portal solutions. In addition to our direct relationships with enterprises, we collaborate closely with channel partners to deliver our solutions to a wide variety of businesses and other organizations. Nortel customers are further supported through our global presence. Our sales and support staff, including senior executives, are located close to our customers and are organized to focus on:
 - Asia Pacific
 - Caribbean and Latin America
 - Europe, Middle East and Africa
 - Greater China
 - United States and Canada

Our Global Presence

Nortel has a strong global presence. We have staff located across North America, Europe, Asia and Latin America, and customers in more than 150 countries worldwide. Headquartered in Brampton, Ontario (near Toronto), the company has other key locations across Canada. Ottawa, the capital of Canada, is home to the Nortel's largest R&D center. We also have sales and support offices throughout Western and Central Canada, Quebec and the Maritimes.

The company expanded into the United States in 1971. Today, we have employees in more than 100 locations in the United States, with state-of-the-art research and development, software engineering and sales centers in many states, including California, Florida, Georgia, Maryland, Massachusetts, North Carolina, Tennessee, Texas and Virginia.

Nortel has a substantial presence across Europe, the Middle East and Africa. The company first established a joint venture in Turkey (Netas) in 1967. We now operate in 32 countries in the region, in 25 languages. The company recently reinforced its commitment to Europe, the Middle East and Africa by establishing 100 percent ownership in Nortel Networks France and Nortel Networks Germany.

Nortel has been active in the Caribbean and Latin America since the mid-1960s and serves countries from Bermuda to the Southern tip of South America. The company has its regional headquarters in Sunrise, Florida, offices in Argentina, Brazil, Chile, Puerto Rico and Mexico, and offers local support in several other markets.

Nortel has been active in Asia Pacific for more than 30 years - making its first sale into the People's Republic of China in 1972. Today, Nortel delivers network infrastructure and communications services to customers in 17 countries across Asia Pacific, including China, Hong Kong, Korea, Japan, Singapore, Thailand, Malaysia, India, Pakistan, Australia and New Zealand. Nortel conducts research and development at three centers across the Asia Pacific – Wollongong in Australia; and Beijing and Guangzhou in the People's Republic of China – and currently has three joint ventures in China.

Nortel Leadership

Nortel has established a large footprint and achieved leadership positions in many markets:

End-to-End Broadband Solutions

- We have deployed more than 40,000 multiservice switching systems in more than 1500 customer networks worldwide (Nortel).
- We are ranked #1 globally for multiservice switches (Synergy Research Group, 2003 and First Half 2004).
- We are ranked #1 in worldwide metro DWDM, metro WDM Ethernet and metro WDM SAN extension (IDC 2003).

Wireless Broadband

- Hundreds of millions of people around the world rely on Nortel for wireless communications (Nortel).
- Nortel was the first supplier with wireless data networks operating across all air interfaces (GSM/GPRS/EDGE, CDMA 1X/EV-DO, UMTS and WLAN) (Nortel).
- We have designed, installed and launched more than 300 wireless networks in more than 50 countries (Nortel).
- Our WLAN solution was awarded "Best of Show" VoiceCon, March 2004) and Superquest Award for Application Layer Systems (Supercomm 2004).

Voice over IP

- Nortel was the first to deploy full-featured, end-to-end VoIP solutions to every segment of the Service Provider market as well as Local, Long Distance and Cable/Multiple System Operator (Nortel).
- We are ranked #1 in the worldwide carrier packet voice market (Synergy Research Group, 2003 and First Half 2004).
- Nortel is ranked #1 in Softswitches (Synergy Research Group, 2003 and First Half 2004).
- Nortel is ranked #1 globally in total system and line shipments of PBX, KTS and IPTelephony (Dell'Oro Group, 2003 and First Half 2004).

Multimedia Services and Applications

- Nortel has made secure connectivity available to more than 100 million users worldwide (Nortel).
- Nortel is ranked #1 in Global IP Services switching (Synergy Research, 2003 and First Half 2004).
- Nortel is ranked #2 in Enterprise VPN Gateways (Synergy Research, 2003).
- Our Multimedia Communications Server (MCS 5100) was awarded the "Blue Ribbon" award (Network World Fusion, December 2003).

Did you know?

- Hundreds of millions of people around the world rely on Nortel for wireless communications.
- The world's largest and most important stock exchanges – supporting billions of transactions in New York, Australia, Sao Paulo, Buenos Aires, Shanghai, Bombay and Seoul – use Nortel solutions.
- More than 80 percent of the top 100 U.S. banks rely on Nortel every day.
- You'll find Nortel in each of the world's top 20 airlines.
- More than 500 state or provincial agencies, 5,000 local city and county agencies, and numerous federal and international government agencies throughout the world rely on Nortel solutions. That includes the U.S. Department of Defense in all 50 states and more than two dozen countries around the globe.
- Nine out of 10 of the largest U.S. public school districts run on Nortel, serving more than 3.5 million students.
- Every single one of the top 10 largest universities in North America relies on Nortel, serving more than 500,000 students.
- Over 93% of the Top 100 Manufacturing companies, including those in Aerospace, Pharmaceuticals, Automotive, and IT, run on Nortel networks.
- Nortel is the only vendor to have deployed 50 million telephony lines and 50 million Ethernet ports. We've made secure connectivity available to more than 100 million users worldwide.

Global Industry Recognition

2005 Highlights

Nortel Awarded 5 Star Rating for its Partner Programs by VARBusiness Magazine VARBusiness, March 2005

Nortel has once again been recognized by CMP's VARBusiness Magazine* as one of North America's top vendors based on the support it provides to its value-added resellers (VARs). Nortel received a Five-Star Rating, reflecting the excellence of its channel partnering programs. This is the second year Nortel has been awarded this honor.



Nortel Executive Recognized as one of North America's Top 75 Channel Executives VARBusiness, March 2005

Nortel's Perry McDonald, Leader, Channel Marketing, has been named by the editors of CMP Media's VARBusiness as one of North America's Top 75 Channel Executives. VARBusiness "Top 75 Executives" is a who's who of the women and men minding North America's information technology (IT) distribution channels.



Nortel wins 6 ContactCenterWorld.com Members' Choice Awards* ContactCenterWorld.com, February 24, 2005

Nortel has won several awards for the Best ACD/Switch and Best Self-Service Solution at the 3rd annual 2005 ContactCenterWorld.com Members' Choice Awards. Nortel won three awards for Best ACD/Switch in EMEA, Asia Pacific and Overall best in the world. Nortel also won three awards for Self-Service Solution in EMEA, Asia Pacific and Best in the World. These awards are unique as there are no judging panels – the winners are voted for by their customers.



Roxann Swanson Named Frost & Sullivan's 2005 Enterprise Applications Executive of the Year* Frost & Sullivan, January 12, 2005

Roxann Swanson, Vice President and General Manager, Multimedia Applications at Nortel, received the 2005 Enterprise Applications Executive of the Year Award from Frost & Sullivan.



2004 Highlights

Nortel's Symposium Call Center Server wins 2004 Product of the Year Award

Technology Marketing Corporation (TMC®)'s Customer Inter@ction Solutions® magazine has awarded Nortel's Symposium Call Center Server the 2004 Product of the Year Award. This annual award is bestowed on companies that have demonstrated excellence in technological advancement and application refinements, and products that help improve both the customer experience and the ROI for the companies that use them.



Nortel receives two awards from Frost & Sullivan

Nortel was awarded the 2004 Frost & Sullivan Award* for Market Leadership (from study 6974-62 US IVR Systems Market), and the 2004 Frost & Sullivan Award for Best Bang for the Buck (from study B840-62 EMEA ACD Systems Market) at the annual Excellence in Information & Communications Technologies Awards Banquet on January 12, 2005. These awards are another testament of the market leadership of Nortel's Customer Contact and Self-Service Solutions.

BCR awards Nortel Networks MCS 5100 Best Multimedia Application *Business Communications Review, September 2004*

Business Communications Review awarded Nortel Networks Multimedia Communication Server 5100 the Best Multimedia Application in a test comparing the application package offerings of seven leading IP telephony vendors.

Nortel Networks MCS 5100 wins CNET UK's Telecoms Product or Service of the Year Award* *CNET Networks UK, September 2004*

CNET Networks UK (publisher of silicon.com) named Nortel Networks Multimedia Communication Server 5100 the Telecoms Product or Service of the Year. MCS 5100 was also a finalist for Enterprise Technology Product of the Year.



Nortel Networks receives Frost & Sullivan "Speech Solutions Competitive Strategy" Award* *Frost & Sullivan, August 2004*

Nortel Networks has been presented the 2004 Frost & Sullivan Speech Solutions Competitive Strategy Award for its outstanding ability to advance its market position through innovative product offerings.



Nortel Networks WLAN Solution Wins SuperQuest Honors at SUPERCOMM 2004 *SUPERCOMM, June 2004*

Nortel Networks Wireless Local Area Network enterprise solution received the SuperQuest award in the "Application Layer Systems" category at SUPERCOMM 2004 in Chicago in June. WLAN 2200 Series won the award based on its ability to provide voice, data and integrated multimedia applications seamlessly over the WLAN with secure mobility for end-users.



Nortel Networks receives Frost & Sullivan "Business Development Strategy" Award* *Frost & Sullivan, March 2004*

Nortel Networks has been presented the 2003 Frost & Sullivan Award for Business Development Strategy, recognizing the success that Nortel Networks has achieved in the IP-PBX market.

Nortel Networks Contivity 5000 receives Network Computing's "Tester's Choice" award *Network Computing, March 2004*

Nortel Networks Contivity 5000 Secure IP Services Gateway Virtual Private Network (VPN) solution received the highest rating and was awarded "Tester's Choice" in a comprehensive, industry-wide VPN evaluation conducted by Network Computing.



Nortel Networks Awarded 5 Star Rating for its Partner Programs by VARBusiness Magazine* *VARBusiness, March 2004*

Nortel has been recognized by VARBusiness Magazine* as one of North America's top vendors based on the support it provides to its value-added resellers (VARs).



Nortel named a 2004 CRN Channel Champion* *CRN Channel Champion, March 2004*

Nortel Networks was named a 2004 CRN Channel Champion in the technical criteria category of VoIP at an awards ceremony in Nashville, Tennessee, on March 9, 2004.



Nortel Networks WLAN 2200 Series wins "Best of Show" award *VoiceCon, March 2004*

Nortel Networks WLAN 2200 Series won the "Best of Show" award at the 14th annual VoiceCon event that took place in Orlando, Florida, in March. Awarded by popular vote by the attendees, the WLAN IP Telephony solution and WLAN infrastructure elements of the 2200 Series, which were announced at VoiceCon, beat 14 other contestants in the competition.



MCS 5100 wins "Best of Show" at Internet Telephony Conference & Expo Miami 2004* *Internet Telephony, February 2004*

Nortel Networks Multimedia Communication Server 5100 has been awarded "Best of Show" at the INTERNET TELEPHONY® Conference & EXPO, Miami 2004.



For more detailed information on each of these awards please go to www.nortel.com/corporate/awards/.

* All product and brand names are trademarks or registered trademarks of their respective holders.

Nortel Home Page

Our home page is found at www.nortel.com. The Nortel home page provides customers, investors and the general public with the latest information on Nortel Products, Services & Solutions; Ordering Tools; How to Buy; Support; Training & Certification; Channel Partners; Communities; News and Events; Careers; Corporate Information; Media Center; Investor Relations; Country/Region.

Nortel Enterprise & End User Communities

Nortel offers and supports several user groups for its enterprise and end user customers. Some of these groups include:

- Centrex Users Group
- Contivity IP Services Users Group (CIPSUG)
- Inform Community
- INSIGHT 100
- International Nortel Networks Users Association (INNUA)/Global Connect
- Nortel Networks Anwendervereinigung (NNAV)
- Packet Voice & Multimedia Users Group
- Passport Multiservice WAN Users Group

A number of communities are available for customers with special interests and more are continually being developed. If you are interested in joining a community, please contact your Nortel Account Manager for more information.

Nortel Technical Support Portal

Nortel's 24X7 eService capability allows our customers to access key Nortel technical documentation in a simple and easy-to-use Web portal. The Technical Support Portal (www.nortel.com/support) is a personalized Web environment that dynamically delivers technical content for Nortel products such as technical product documentation, software, technical solutions, bulletins and online tools such as the Knowledge Base, Service Request Tool, etc. The most common accessed content includes product documentation such as Nortel Technical Publications (NTPs), Release Notes, User Guides and Configuration Guides. Users can access the Nortel Knowledge Base, which contains over 20,000 technical support articles, to find answers to technical questions. Customers are also able to open Service Requests with Nortel via the Service Request Tool. Users may also open, query, update, track and request closure of their Service Requests directly on the Web.

Personalization features for content is available, allowing you to customize the content you want to see as well as to be automatically notified when new content is posted. Customization includes showing content based on preferred products, interests and language, resulting in a very easy-to-use Web portal.

Partner Information Center

The Partner Information Center (PIC) is a password-protected Web portal available only to Nortel enterprise channel partners who sell and support Nortel enterprise products and solutions. The site consists of exclusive content and tools to enable partners to perform all functions of the sales cycle. Access to regionally specific information within the main Partner Information Center site exists to meet the differing geographic needs of Nortel's business partners.

Who may access the Partner Information Center?

- Enterprise channel partners who participate in regional Nortel partner programs
- Nortel Global Solutions Partners (GSPs)
- Consultants who participate in the Nortel Consultant Liaison Program
- Nortel stocking distributors

All requests for access to the Partner Information Center are verified for eligibility prior to access being granted. Registered users of the Partner Information Center can access different types of restricted content depending on their entitlement level. Levels are assigned to users when they register according to their relationship with Nortel.

How to access the Partner Information Center

Please note that only partners who have completed and fulfilled Nortel registration process requirements will be granted access to the Partner Information Center.

To access the Partner Information Center home page, go to: www.nortel.com/prd/picinfo/. From here:

- Channel partners with an existing Secure Access Manager (SAM) user ID and password should select the "Log in" option in the left margin of this page.

Alternatively, partners with an existing SAM user ID and password can go directly to the Partner Information Center log in site at: www.nortel.com/pic.

- If you are a new user to Nortel or an existing Nortel channel partner without a Secure Access Manager (SAM) ID, registration will be required before you can access the Partner Information Center. Registration is a simple process that allows a partner to create a personalized account with Nortel. Registration must be completed in order to access secured tools and services. If you encounter any issues or are required to register as a "Guest," you will need to contact the call center in your region and request access to PIC.

Go to the Partner Information Center home page www.nortel.com/prd/picinfo/ and select the "Log in" option in the left margin of the page. Then, at the log in page, select the "New User/Register" option in the left margin.

Alternatively, new users can go directly to www.nortel.com/register to register their information.

Nortel Training & Certification

Nortel Training and Certification Program information is available at www.nortel.com/tc. You may view complete course descriptions, detailed certification descriptions and on-line registration and scheduling either globally or by region.

Find a Reseller/Channel Partner

Finding the right Nortel partner requires just a few “clicks.” Whether yours is a small to medium business or a global enterprise, there is a Nortel channel partner ideally suited to meet your requirements. Using the Nortel Partner Locator tool, you can find a Nortel channel partner almost anywhere in the world who can deliver voice/telephony, data networking products or integrated solutions.

From www.nortel.com, under Products & Services, choose “How to Buy” and click on “Find a Channel Partner,” then follow the prompts.

Partner Business Guide

The Partner Business Guide is a comprehensive online reference guide created especially for channel partners that provides summaries of the most current marketing and support information needed to conduct business and be profitable with Nortel. This guide features direct links to detailed information contained on the Partner Information Center (PIC) and other Nortel Web resources.

Because of the wealth of information and resources available to channel partners, it can sometimes be difficult to find the exact information you need. The Partner Business Guide is a comprehensive reference publication created especially for Nortel enterprise channel partners. It has been designed as a consolidated, easy-to-use, quick reference tool that provides summaries of the most current business, marketing and support information you need, as well as links to detailed information contained on the Nortel Partner Information Center (PIC) and other Nortel Web resources.

Nortel

SOLUTION GUIDE

Mobility: Office Anywhere Around the Campus/Office

Business Needs

- Do you need to convert dead time into productive time – when employees are away from their desks, either roaming about a building, between buildings in a campus environment, or in meetings?
- Do you need to provide seamless indoor/outdoor coverage – when employees move from an indoor environment to an outdoor environment and cannot lose their connection or their service?
- Do you need to keep workers connected and available to ensure delivery of optimal customer service – when employees are roaming about the campus but need to remain accessible so that customers, peers and partners can reach them at any time?
- Do you need to provide cost-effective, on-premise mobile phone service – when employees are roaming about the campus and need to place on-net calls vs. using cell phones?

Nortel Solution Overview

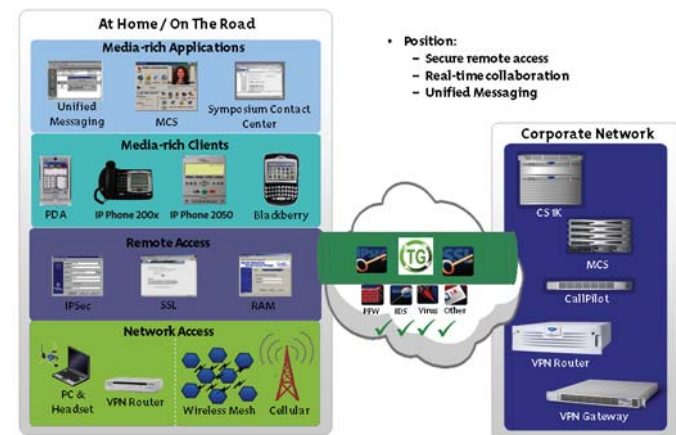


Figure 1: Office Anywhere Around the Campus/Office

The Office Anywhere Around the Campus/Office solution addresses the campus mobile worker while roaming in a building or between buildings on a campus. This campus mobile worker needs to stay fully in touch when away from the desk or when visiting other locations.

The pivotal glue is WiFi – whether that's indoor Wireless LAN with our 2300 series solution or outdoor Wireless LAN with our Wireless Mesh Network solution. Wireless LAN and Wireless Mesh technologies enable employees to move from floor to floor on to nearby buildings without disruption to the corporate applications and communications services.

The overall benefit of this solution is providing greater accessibility to the mobile campus/office worker which results in:

- Improved productivity via seamless wireless indoor/outdoor access to corporate applications;
- Improved customer service via consistent availability to customers (via wireless LAN and voice over wireless LAN handsets);
- Reduced cell phone expenses by seamless capability to place on-net calls (voice over wireless LAN);
- Improved productivity by eliminating dead time and remaining accessible and productive when moving between meetings or when mobile around the campus; and
- Consistent secure connectivity with IPsec Mobility.

Solution Components:

- Wireless LAN – WLAN 2300 Series
- Wireless Mesh – WLAN 7200 Series
- VoWLAN Handsets 2210/2211/2212
- Nortel Mobile Voice Client and Nortel 2050 Soft Client
- Digital Mobility (Norstar and BCM)
- Real-time collaboration – Nortel MCS 5100
- Unified Messaging – Nortel CallPilot
- Secure Access via IPsec or SSL VPN Mobility – Nortel VPN 3050/3070 Gateway
- Network Management – Nortel Enterprise Network and Services Management, Nortel Enterprise Policy Manager, Nortel Enterprise NetID
- Services offered by Nortel Networks and Channel Partners
 - Network assessment
 - Network and operations cost-modeling
 - Network design and installation

Solution Value Proposition

The Office Anywhere Around the Campus/Office solution provides your employees the ability to stay fully in touch when away from their desks and while seamlessly roaming the premises (indoor/outdoor), increasing their accessibility for improved productivity and customer service while maintaining a secure connected experience.

Mobility: Office Anywhere At Home or On the Road

Business Needs

- Do you need to replicate the office environment for employees at home or on the road – when teleworkers and road warriors need access to corporate applications and need to be available and accessible to their peers, customers and partners?
- Do you need to provide secure, private access to important applications and communication systems – when road warriors need access from unpredictable locations such as airports, cars, customer sites, etc.?
- Do you need to reduce the cost of supporting road warriors and teleworkers – when you need to deliver advanced services across cell phones, PCs, SIP terminals and wireless internet devices?
- Do you need to convert dead time into productive time – when road warriors are mobile such as while waiting at the airport, between customer meetings or at the hotel?

Nortel Solution Overview

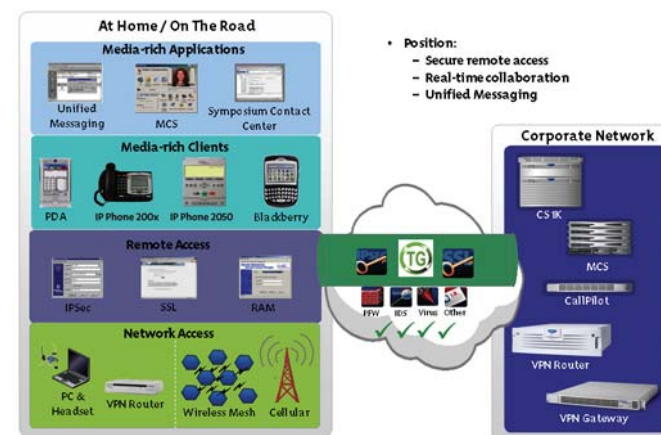


Figure 1: Office Anywhere At Home or On the Road

The Office Anywhere At Home or On the Road solution enables the teleworker and the road warrior to conduct business virtually anywhere – at the home office or around the world. Whether in a hotel room, a client office, “hotspot” or an Internet Café, employees can be present and productive while still enjoying the same secure applications experience, unified messaging and

multimedia communications – just as if they were sitting in the corporate office.

The pivotal glue for this solution is SIP – or Session Initiation Protocol. With SIP, real-time collaboration becomes a reality – providing the ability to replicate the people contact aspect of employees’ work environment by making it appear as if they were

down the hall in the corporate office when they are actually on the road.

How do you replicate this connected experience when on the road or working from home? You do it with collaboration: instant messaging, video conferencing and presence indicators so you know who is available in real time.

The overall benefit of this solution is delivering a consistent communications experience for the teleworker and road warrior that results in:

- Pushing the envelope on customer service by being accessible anywhere, any time to address their needs.
- Increasing productivity of the road warrior by minimizing travel dead time with secure access to information and real-time collaborative communications through a variety of devices.
- Delivering flexible work environments and attracting talent from any region by making the remote home office an extension of the main office.
- Ensuring the most cost-effective, secure and consistent remote access for the teleworker and the road warrior (IPSec/SSL-VPN).

Solution Components:

- Secure Access – IPSec or SSL VPN Mobility via Nortel VPN Gateway 3050/3070 and Nortel Remote Access Manager (RAM)
- Hard and soft clients – Nortel IP Phone 2000 Series, PDA
- Real-time collaboration and presence – Nortel MCS 5100
- Unified Messaging – Nortel CallPilot
- Network Management – Nortel Enterprise Network and Services Management, Nortel Enterprise Policy Manager, Nortel Enterprise NetID
- Services offered by Nortel Networks and Channel Partners
 - Network assessment
 - Network and operations cost-modeling
 - Network design and installation

Solution Value Proposition

The Office Anywhere At Home or On the Road solution provides your employees a consistent experience as if in the office. It provides secure access to information any time, anywhere and on any device. It also ensures the availability of real-time collaboration and presence – the ability to replicate the people contact aspect of your work environment, from any location or device, as if you're in the corporate office.

Security: Nortel Secure Information Access Solution

Business Needs

- Do you have concerns about the safe transmission of confidential and proprietary information across your network?
- Are you experiencing disruption of service due to viruses and computer worms attacking your network?
- Do you have concerns about the loss of sensitive corporate intellectual property in your network?

Nortel Solution Overview



Figure 1: Secure Information Access Solution

Nortel's Secure Information Access solution allows customers to access their business information from any location, over any IP network using a wide variety of devices – securely and with a high degree of reliability. They can reduce the costs of implementing network connectivity with their business partners and overall complexity in their network by reducing the number of network components. With trust in their secure communications infrastructure, they can deliver more and new applications to users with ease and a higher degree of speed. In addition, application availability is protected from disruption by worms, viruses and denial-of-service attacks.

The Nortel Secure Information Access solution leverages a layered defense approach to security. Using endpoint integrity, encrypted data paths and award-winning hardware, Nortel's Secure Information Access solution maintains the security of information – protecting it from unauthorized users, regardless of what network it passes through.

The Secure Information Access solution uses a strong encryption-based security with full firewall and endpoint security (Nortel Secure Network Access Solution) as well as early detection/warning against today's threats to provide the following benefits:

Privacy

- Ensures safe information transit across any network

Reliability

- Reduces application and network disruption through denial-of-service (DoS) and threat protection
- Systems designed to meet organizational security policy and prevent viruses and worms

Protection against theft

- Prevents loss of confidential information across networks via strong authentication, policy enforcement and data encryption
- Minimizes toll fraud and unauthorized access via strong authentication, authorization and policy enforcement

Solution components:

- Nortel VPN Gateway 3050/3070
- Nortel VPN Routers
- Nortel Switched Firewall
- Nortel Secure Network Access Solution
- Nortel Threat Protection System
- Nortel Security Professional Services

Solution Value Proposition

Nortel's Secure Information Access solution improves operational efficiency, integration simplicity and security adaptability to unforeseen events – so enterprises can realize reduced total cost of ownership and increased return on investment. By using standards-compliant services and strategic partnerships, Nortel's product and solutions are easily integrated into even the most mature networks. Nortel's Secure Information Access solution provides the enterprise with distinct competitive advantages such as the ability to offer new services to clients, respond quickly to changes in networking technology and maintain business operations when disaster strikes.

Nortel's Security Mission:

"We secure communications, information and applications anywhere, any time."

Security: Secure Multimedia Solution

Business Needs

- Are security concerns preventing you from full deployment of multimedia applications and VoIP?
- Do you have privacy worries about unauthorized access to your communications?
- Do you have concerns about the reliability of providing communications due to potential cyber attacks?
- Do you have concerns about loss of information due to eavesdropping across your network?
- Do you have concerns about service theft, toll fraud, authorization and security policy enforcement?

Nortel Solution Overview

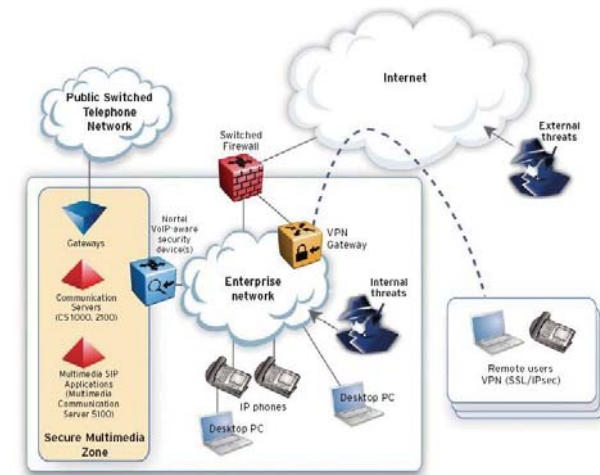


Figure 1: Secure Multimedia and IP Telephony Solution

Nortel's Secure Multimedia Solution secures multimedia and VoIP communications, allowing distributed and mobile workers to communicate with greater efficiency and reliability without worrying about security problems.

Freed from worry about the security of their communications, enterprises are free to deploy multimedia communications, driving down operations costs and increasing productivity by providing innovative means for these distributed

work forces to collaborate more efficiently than ever before.

With Nortel's Secure Multimedia Solution, organizations can achieve privacy and reliability and minimize both service and identity theft. Our solution offers high-grade encryption technologies that ensure privacy, regulatory compliance and intellectual property protection – eliminating the threat of eavesdropping and tampering. In addition, our solution provides strong threat

protection and high-availability systems, featuring redundant, survivable components and networks that ensure reliability and business continuity. Lastly, our solution addresses service theft by minimizing the risk of toll fraud and identity theft through strong authentication of endpoints.

Nortel's Secure Multimedia Solution provides the Secure Information Access Solution with additional protection for VoIP and Multimedia traffic.

Nortel's security solutions are VoIP-aware, and Nortel's multimedia communication solutions are security-aware, providing strong security without degrading user quality of experience. The Secure Multimedia Solution applies the Layered Defense approach to multimedia communication through its use of endpoint, perimeter, core security and secure communications components.

From a business perspective, Nortel's Secure Multimedia solution provides:

Privacy

- Shields communication from unauthorized access

Reliability

- Maintains service availability via attack protection, geographic redundancy and survivability

Protection against theft

- Prevention against loss of business information due to eavesdropping
- Minimizes toll fraud and unauthorized access via strong authentication, authorization and policy enforcement

Solution Components:

- Nortel Application Switch
- Nortel Switched Firewall
- Nortel Secure Network Access Solution
- Nortel Threat Protection System
- Nortel VPN Gateway 3050/3070
- Nortel VPN Routers
- Nortel Security Professional Services

Solution Value Proposition

Nortel's Secure Multimedia and IP Telephony solution ensures the reliability and integrity of your business-critical VoIP and multimedia applications allowing your business to take full advantage of these cost-effective, productivity-enhancing applications.

Nortel's Security Mission:

"We secure communications, information and applications anywhere, any time."

Multimedia Communications Solution

Business Needs

- Need to update network infrastructure to improve performance and support new customer-centric services and multimedia applications?
- Need to simplify management of complex network and minimize disruption of implementing new technology and applications?
- Need to lower cost of business operations?
- Do you desire to improve productivity for increasingly mobile work force?
- Need to adapt infrastructure security to address an emerging threat environment or safeguarding customer data and intellectual property?

Nortel Solution

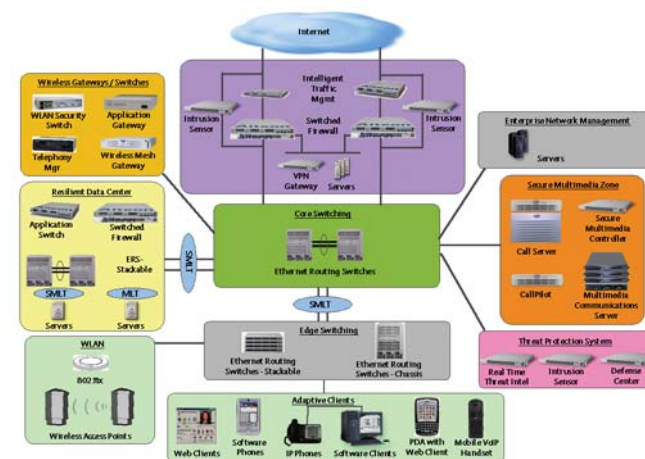


Figure 1: Multimedia Communications Solution

Solution Overview

Multimedia Communications is more than Voice over IP (VoIP) - it is the delivery of voice, data, and applications over one network whether wired or wireless. At Nortel, you can realize your business objectives with multimedia communications solutions that can be implemented at your pace - by adopting a revolutionary or evolutionary approach to best meet your needs.

Solution Features

- **IP Telephony** - Reliable feature-rich communication services for campus or branch locations, implemented in the best manner for your organization - evolutionary or Greenfield.
- **Data networking** - Resilient and reliable IP devices for network edge and core - wireless and wired - serving up megabytes and gigabytes, while offering load-balancing,

content-aware switching, server acceleration, server/storage consolidation and more

- **Multimedia communications** – Powerful new applications, such as virtual tours, real-time video broadcasts, live training demos and “meet me” conferencing lower costs – now as easy to use as placing a phone call
- **Security** – Intrinsic to the network and operating across Layers 1-7, including VPNs, SSL acceleration, stateful firewalls for perimeter defense, integration with leading intrusion detection systems, and more
- **Mobility** – Nortel’s solutions provide “any time, anywhere, any device” access to corporate applications and the voice infrastructure, and offer 40 to 60 percent savings over industry alternatives
- **Customer contact** – Pure-IP and IP-empowered customer contact centers with skill-based routing, advanced speech processing, Computer Telephony Integration (CTI), Web self-service, custom scripts, remote agent monitoring and more
- **Network, subscriber and service management** – Unified across platforms with Enterprise Network Management System for proactive problem isolation and recovery, rapid provisioning of QoS and security, service and policy configuration and more

Solution Value Proposition

Nortel Networks Multimedia Communications Solutions offer unprecedented flexibility in building a communications network that seamlessly combines traditional and IP-based telephony, along with uncompromised resiliency, security and performance to help enterprises reduce operational costs, drive revenue and boost employee productivity.

Converged Branch Office Solution

Business Needs

- Streamline network management costs - A single converged network and intuitive, browser-based tools allow you to manage branch solution elements from anywhere on the network.
- Investment protection - Solutions grow with the branch and enable you to support the desktop options (IP, digital, analog) that meet your needs and to implement applications as your needs evolve. In addition, smooth migration paths allow you to retain up to 70% of your initial investment.
- Reduce network costs - Optimize network bandwidth and curtail network costs with comprehensive management for a single converged network for voice and data.
- Reliability and availability - Secure access control, performance and traffic management and options for redundancy reduce network vulnerability and ensure reliability.
- Increase productivity and ability to serve customers - IPSec client support enables cost-effective, secure access for remote workers. Applications such as unified messaging, mobility and call center allow employees to be more efficient and accessible to customers.

Nortel Solution

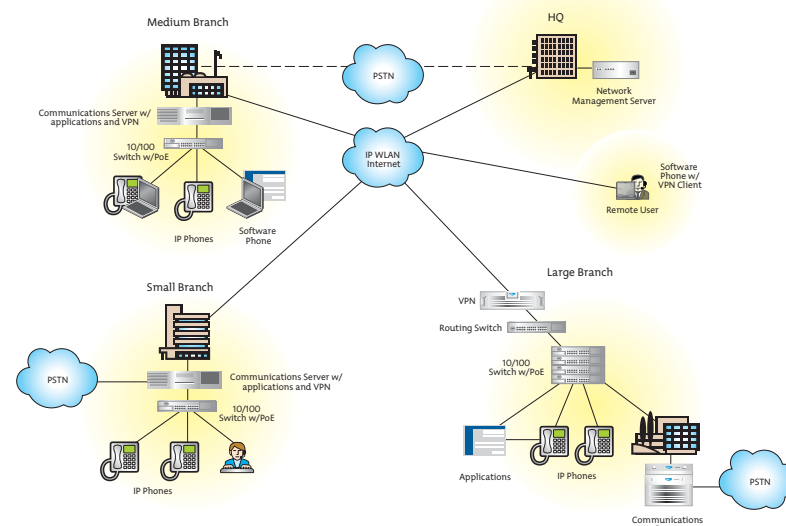


Figure 1: Converged Branch Office Solution

For the independent branch that operates like a separate business unit, the converged branch solution delivers a network infrastructure to

securely access centralized resources and deliver an array of services.

Solution Components:

Type of Branch	Description
Small independent branch office (<30 stations)	• Business Communications Manager (BCM 50/200) – telephony, applications, IP routing, IP firewall, remote office DHCP services and branch/client VPN • Nortel Ethernet Switch 460-24T-PWSR Power over Ethernet Switch • Mix of Nortel IP Phones 200x, digital phones and possibly analog phones • Nortel Enterprise Network Management System browser access
Medium independent branch office (30-80 stations)	• Business Communications Manager (BCM 200/400) – applications, IP routing, IP firewall, remote office DHCP services and branch/client VPN telephony, branch office • Nortel Ethernet Switch 460-24T-PWSR Power over Ethernet Switch • Mix of Nortel IP Phones 200x, digital phones and possibly analog phones • Nortel Enterprise Network Management System browser access
Large independent branch office (80-400 stations)	• Nortel Communication Server 1000 – telephony • Nortel VPN Router 1700 – IP routing, IP firewall, remote office DHCP services and branch/client VPN • Nortel Ethernet Routing Switch 1600 • Nortel Ethernet Switch 460-24T-PWR Power over Ethernet Switch • Mix of Nortel IP Phones 200x, digital phones and possibly analog phones • Nortel CallPilot Unified Messaging • Nortel Enterprise Network Management System

Solution Value Proposition

Nortel Networks Converged Branch Solutions help enterprises leverage convergence to reduce operational costs and network management, boost employee productivity and provide secure, reliable any time/anywhere access. Nortel's branch solutions offer:

- Unsurpassed features and powerful applications that boost productivity and improve customer reach;
- Intuitive management tools and end-to-end performance and traffic management; and
- Migration paths that offer unrivalled investment protection.

Converged Campus Solution

Business Needs

- Flexibly transform the network at the organization's pace - Organizations can fully deploy IP telephony or use a hybrid approach for their unique business needs.
- Improve performance and support new applications - Highly resilient solutions have the quality of service (QoS) and performance management required to deliver "five 9s" communication service availability.
- Investment protection - Leverage current infrastructure and provide a smooth migration to next-generation technologies.
- Lower operating costs - A unified network reduces operational resource requirements. IP phones reduce administration cost of moves/adds/changes. Communication services extend easily and cost effectively to remote offices and mobile workers.
- Simplified administration - Consistent user access and experience is provided no matter how users enter the network.
- Improved employee productivity - Feature-rich business telephony applications help improve overall productivity.
- Greater interoperability through standards compliance – The total cost of ownership is lowered.

Nortel Solution

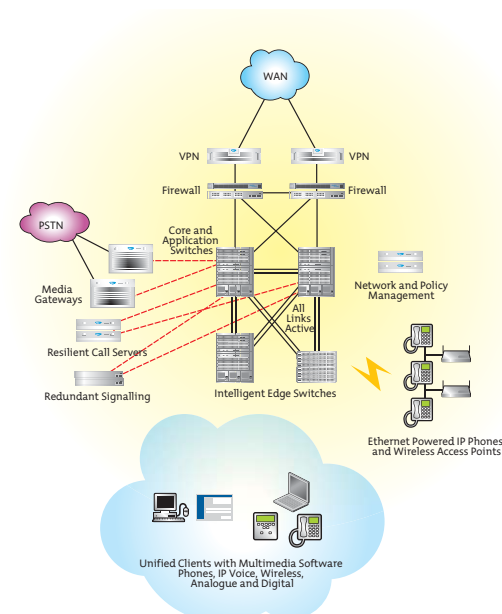


Figure 1: Converged Campus Solution Components:

The converged campus solution combines a highly available network infrastructure with proven, feature-rich business telephony and applications. Our solutions provide a strong foundation for innovative converged applications such as IP telephony and multimedia.

Solution Features:

- Resilient infrastructure
- Secure communications
- Policy-based traffic management
- Flexible delivery of communication services

Function	Description
IP telephony	• Nortel Communication Server 1000 • Nortel IP Phones 2002, 2004 and 2050 • Nortel CallPilot
Core switching	• Nortel Ethernet Routing Switch 8600
Application switching	• Nortel Application Switch
Edge switching	• Nortel Ethernet Switch 460-24T-PWR Power over Ethernet Switch; or • Nortel Ethernet Routing Switch 8300
Security	• Nortel VPN Routers 2700/5000 • Nortel Switched Firewall System 6414
Network management	• Nortel Enterprise Network Management System • Nortel Ethernet Policy Manager

Solution Value Proposition

Nortel Networks Converged Campus Solutions offer unprecedented flexibility in building a communications network that seamlessly combines traditional and IP-based telephony, along with uncompromised resiliency, security and performance to help enterprises reduce operational costs, drive revenue and boost employee productivity.

Integrated Self-Service Contact Center Solution

Customer Needs

- Create a tightly integrated customer contact center that seamlessly combines agent-assisted and self-service technologies, evolving easily and cost effectively in line with business requirements.
- Optimize the use of skilled resources in handling customers' queries.
- Ensure that the customer is served by the agent with the right knowledge every time.
- Deliver personalized one-to-one service to differentiate your business and increase profitability.
- Provide 24/7 access to services via Nortel's self-service solutions that tightly integrate with Web and CTI applications.
- Comprehensive, easy-to-use management tools provide managers and supervisors with the real-time information required to monitor performance and react immediately.
- Detailed reports provide historical information to measure contact center and agent performance, to track trends and to plan.
- Provide self-service applications that free up agents from repetitive and tedious tasks in order to deliver superior customer service to valuable clients and more complex calls.
- Customer information input is displayed on the agent's desktop, eliminating the need to ask the customer twice for information.
- Gain the ability to operate more effectively, reduce operating costs and build customer loyalty in today's highly competitive world.

Nortel Solution

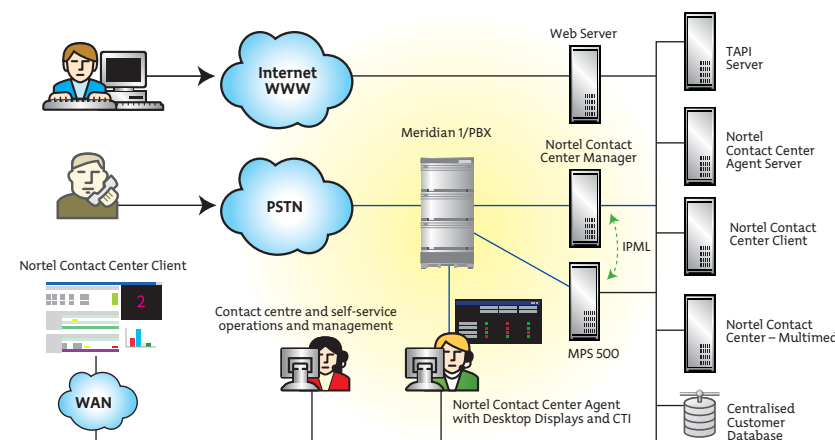


Figure 1: Integrated Self-Service Contact Center Solution

Nortel's Integrated Self-Service Contact Center Solution offers powerful technologies designed to enhance business effectiveness and to offer superior, personalized seamless customer service, anywhere and in any way. In some Nortel regions, solutions can be combined with professional services to create a customized solution that meets individual business needs.

The components in this solution include:

- Symposium Call Center Server and Symposium Express Call Center, which ensure callers are delivered to the best available service representative with the right skills the first time and provide real-time and historical management tools.
- Nortel self-service platforms (MPS 500, MPS 1000 or VPS/is) offer self-service options using either touchtone or advanced speech.
- Nortel's CTI suite, which includes Symposium Agent, is used to maintain the complete context of a customer interaction as it moves between self-service and service rep assistance. CTI capabilities are used to deliver specific information to service representatives' desktops, to interact with CRM and other business applications and to customize contact routing and handling.

Solution Value Proposition

- Allow agents to deliver faster, more personalized customer service. With the customer information readily available on the agent desktop, agents can more easily cross-sell and up-sell to the existing customer base.
- Provides a choice to the customer of self-service or agent assisted, with the option to switch between the two without losing transaction details.

- Tightly integrated CTI interfaces permit the sharing of information between the MPS platforms and Nortel Meridian 1 PBX, Symposium Call Center Server and CTI Communications Server. Through these interfaces the IVR will pass information collected via an IVR session to the contact center and conversely, the contact center passes queue information to the IVR so that it can be communicated back to a caller through the IVR script.
- Reduce the cost of recruiting, training and managing contact center agents by moving routine transactions to an automated system.
- Increase revenue by maximizing the volume of transactions. Since many routine transactions can be offloaded to an automated system, businesses can greatly increase the volume of calls handled without additional agents in the contact center.
- This is a scalable solution that can be easily networked on an as-needed basis to accommodate future growth.
- Powerful, skill-based routing means that businesses can intelligently route callers based on their needs and to the agent that is best suited to fulfill the customers' needs.
- Rich, flexible scripting language allows businesses to customize call routing decisions and treatment based on their business processes.
- Managers gain the decision-making tools they need, from up-to-the-second, real-time displays to comprehensive reporting capabilities showing contact center activity, traffic fluctuations, agent performance and work characteristics.

For further information please contact your local Nortel representative.

IP Contact Center Solution

Business Needs

- Converge voice and data infrastructure in the contact center for increased savings and reduced operating costs.
- Optimize resources by creating a virtual contact center with skills distributed across a wide geographic area.
- Extend the reach of a contact center and harness the unprecedented potential of the Internet.
- Provide reliable and cost-effective remote solutions to individual agents and supervisors at home and in branch locations.
- Improve overall customer satisfaction through better utilization of distributed or virtual resources.
- Enhance contact center flexibility to manage peak and seasonal loads and provide 24x7 service.
- Allow customers to do business any time, anywhere, while enjoying seamless access to the best possible service.
- Create a virtual contact center using IP that spans wide geographic areas and crosses multiple time zones, ensuring the best agent available handles each caller's needs promptly.
- Evolve gracefully, or move immediately, to a VoIP environment without compromising the existing Meridian 1 and Symposium Contact Center capabilities.
- Migrate to a VoIP environment with absolutely no disruption to the daily operations of the existing contact center.
- Move immediately to an all IP environment, keeping an existing Symposium Call Center Server or Symposium Express Call Center without losing any contact center features.
- Maintain telco-grade reliability in a mission-critical IP contact center environment with fallback to PSTN and fully survivable local calling capability.

Nortel Solution

Organizations can use either Symposium Call Center Server or Symposium Express Call Center with an IP-enabled Meridian 1 (Figure 1) to leverage the power and performance of Internet telephony. Regardless of the business environment – single site or geographically dispersed – organizations can use VoIP (Voice over Internet Protocol) to simplify management and administration, and to extend contact center capabilities to agents. This flexibility results in lower operating costs and increased employee retention, both of which improve profits.

Organizations that wish to maintain an all IP environment can use Symposium Call Center Server or Symposium Express Call Center with any Nortel CS 1000 (Figure 2). The CS 1000 is a server-based, IP-distributed communication system that delivers an unprecedented level of performance and range of system features. It allows customers to implement IP telephony without sacrificing the quality of business communications that an enterprise requires.

With IP Contact Center solutions from Nortel, a business can choose the technology solution it needs to conduct business today without having to overhaul or invest in completely new communications infrastructures.

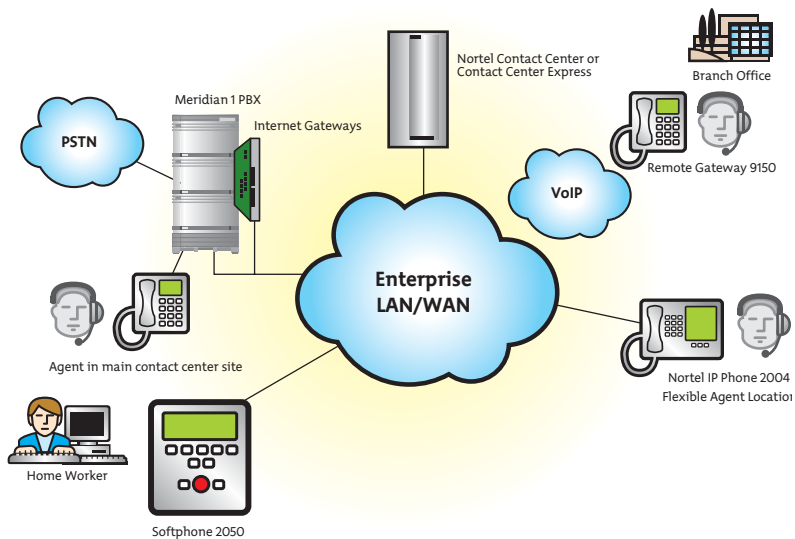


Figure 1: Meridian 1 IP Contact Center Solution

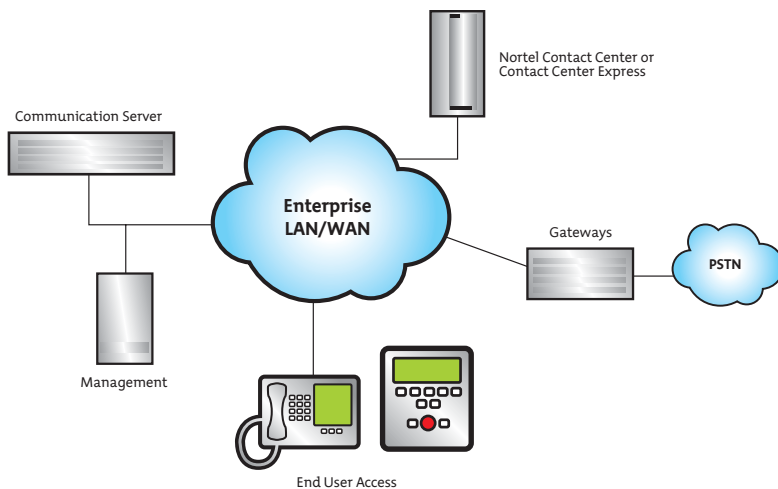


Figure 2: CS 1000 IP Contact Center Solution

Nortel IP Contact Center Solution Building Blocks

The underlying network infrastructure in the contact center can be built on either IP or circuit switched technology or a combination of the two. The IP Contact Center solution building blocks are:

- Infrastructure based on Meridian 1 PBX 11 to 81 or CS 1000 product lines, including Meridian IP Trunk or IP Line Card and IP Phone 2002 or IP Phone 2004, Internet telephone sets and IP Softphone 2050
- Contact center functionality is based upon Symposium Call Center Server 4.5.0 + or Symposium Express Call Center 4.2
- CTI using CTI Communications Server
- Voice services based on CallPilot 2.0+, Meridian Mail or Symposium Express Call Center voice services card
- Self-service applications using telephone keypad entry or speech enabled based upon the MPS/VPS platform

These Nortel IP Contact Center solutions have been pre-tested and verified to work with Meridian 1 Internet Enabled (IE) and CS 1000 configurations. New products in the portfolio have also been tested and verified to work with existing applications (e.g. CTI control of the IP Phone 2004 sets). This removes integration risks when deploying these solutions.

Solution Value Proposition

Nortel IP Contact Center solutions enable businesses to unleash the unprecedented profit potential of the Internet, offering unparalleled choice and customizable solutions for integrated business communications. With Internet telephony, businesses can extend their contact centers to agents anywhere, while still providing a seamless experience for customers and suppliers. This flexibility can help attract and retain customers by making it easier to conduct business with them – anyway and any time. The benefits of the Nortel IP Contact Center solution include:

- Build more profitable customer relationships by giving remote agents the powerful, feature-rich applications they need to deliver superior service.
- Speed up answering and extend hours of service to meet the high expectations of today's customers.
- Increase savings and reduce operating costs by converging voice and data infrastructures and simplifying contact center management.
- Extend the contact center to reach the most appropriate agents by distributing calls to company branches and even home offices via reliable, cost-effective voice over IP (VoIP) solutions.
- Deploy VoIP technology for a business today without overhauling or buying entirely new communications infrastructures.
- Improve employee satisfaction and staff retention by addressing the needs of a geographically dispersed work force.
- Simplify contact center expansion to support seasonal business or new program requirements.

For further information please contact your local Nortel representative.

Multimedia Customer Contact Center Solution

Business Needs

- Create a tightly integrated multimedia contact center that empowers a business to “Web-enable” its contact centers and expand the way it does business with customers – any time, anywhere, anyway.
- Make optimum use of skilled resources in handling customers’ queries by applying skill-based routing to telephone, email and Web queries, ensuring that the customer is served by the agent with the right knowledge every time.
- Automate the multimedia contact center, bringing applications such as CRM together with CTI, automating tasks and empowering agents with critical customer information.
- Deliver personalized one-to-one service that differentiates the business while at the same time increases profitability.
- Equip customer service representatives with powerful tools to provide outstanding customer service, delivering seamless, personalized and consistent responses to customers for email, Web requests or telephone transactions.
- Provide 24/7 access to services via Nortel self-service solutions using IVR or speech that tightly integrate with Web and CTI applications.
- Transform the traditional call center into a powerful, unified, multimedia customer contact center.
- Respond to customers’ constantly changing demands by delivering superior personal service over the Web.
- Direct customers to the right help, right away, regardless of the contact method with skill-based routing.
- Comprehensive, easy-to-use management tools provide managers and supervisors with the real-time information required to monitor performance and react immediately.
- Detailed reports provide historical information to measure contact center and agent performance, to track trends and to plan.
- In today’s highly competitive world, take advantage of the ability to operate more effectively, reduce operating costs and build customer loyalty.
- Give customers the reassurance that agents are available should they need help or if something goes wrong with their Web-based order.
- Offer sophisticated customer guidance through Web collaboration and page sharing with a choice of voice or text chat.
- Provide self-service applications using IVR or speech that free agents of repetitive and tedious tasks so they can deliver superior customer service to valuable clients and more complex calls.
- Customer information input can be displayed on the agent’s desktop, eliminating the need to ask the customer for information twice.

Nortel Solution

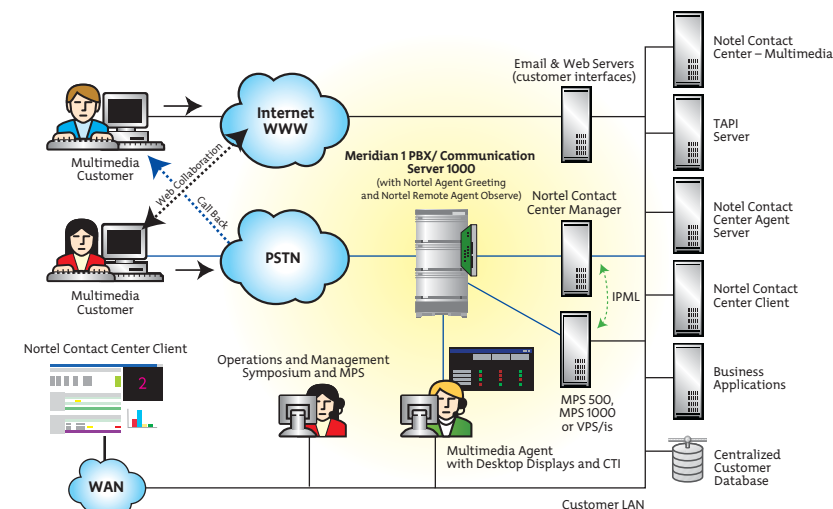


Figure 1: Multimedia Contact Center Solution

The Multimedia Customer Contact Center Solution incorporates several products to create a powerful portfolio of customer-focused business applications. No longer “just call centers,” the Multimedia Contact Center provides comprehensive multimedia-based interaction processing. Capabilities used to create the Multimedia Contact Center include:

- **Symposium Web Center Portal** facilitates email and Web-based communications that enable companies to optimize contact center effectiveness and enhance customer service with a comprehensive set of modular Web-based business applications.
- **Symposium Call Center Server** offers skill-based routing in combination with highly flexible call routing and treatment, comprehensive management and reporting, and real-time displays for supervisors and managers with a complete communication solution for dynamic contact centers.

Or

Symposium Express Call Center Server delivers skill-based call routing with tailored call routing and treatment and easy-to-use management reporting to departmental or small to medium enterprise customer contact centers.

- **Symposium Call Center Web Client** offers superior management tools that better equip contact center managers using Symposium Call Center Server Release 4.0+ to make improved business decisions and respond faster to customer needs.
- **CTI Communications Server** enables a business to bring together disparate systems and multiple customer touch points, such as phone, email and the Web. The CTI Communications Server also makes integration with business applications like CRM easier.
- **Communication Control Toolkit** offers an excellent desktop computer telephony framework that takes full advantage of industry standard desktop and server components to increase agent productivity.

- **Symposium Agent Greeting** automates the agent's greeting enabling an agent to pre-record a standard greeting that can be played to the customer before the agent handles the live call.
- **Remote Agent Observe** delivers a simple, cost-effective enhancement to the contact center observe function with powerful remote observe and supervision capabilities - simplifying quality assurance activities and enabling outsourcers to provide a flexible monitoring solution to their clients.

Media Processing Server 500 or MPS 1000 or VPS/is offers scalable multimedia, self-service platforms that provide sophisticated self-service solutions. The Media Processing Server series offers a full range of advanced speech recognition capabilities including natural language understanding, speaker verification and text-to-speech. It provides tight integration with Symposium Call Center Server and Symposium Express Call Center via IPML.

Solution Value Proposition

With an increasing number of organizations choosing to support multiple types of interactions, the Nortel Multimedia Customer Contact Center Solution can help companies capture new customers and deliver higher levels of service to customers who choose to interact over the Web, e-mail or by traditional means, such as the telephone. By blending phone calls and Web inquiries into the same queue, customers can choose to interact with a service center through traditional or Web-based channels and can expect high-caliber service with each contact.

- Phone calls and Web inquiries blended to the agent's desktop to make full use of an organization's customer care resources
- Helps improve customer satisfaction and loyalty through online self-service and live interactions in a highly collaborative environment
- Skill-based routing to ensure both voice callers and Web visitors are routed to the right agent
- Enables an organization's customers to use their preferred form of communication – email, Web, phone or fax – for contact 24 hours a day, 7 days a week
- Handles Web interactions and email with the same ease and effectiveness as telephone calls, improving an organization's overall customer service
- Helps to increase job satisfaction and staff retention by making agents more productive and adding variety to their work
- Reduces costs and increases efficiency by automating responses to email queries and routing customers to agents with the most appropriate skills
- Helps improve agent productivity and address customer concerns effectively using superior management tools including real-time and historical reporting that unify information on managers' and supervisors' desktops
- Adapts and grows with evolving business needs and easily integrates with other contact center solutions and third-party solutions such as CRM applications from Siebel, SAP, Oracle and others

For further information please contact your local Nortel representative.

Virtual Contact Center Solution

Business Needs

- Provide 24-hour access to services via a geographically dispersed network of contact center resources.
- Achieve cost effective ways of operating a virtual contact center operation without compromising voice quality.
- Create a distributed yet tightly integrated customer contact center, evolving seamlessly in line with business requirements.
- Reduce operational complexity while operating a mission critical, highly reliable international contact center.
- Create new revenue opportunities in outsourced contact center operations while reducing costs and complexity.
- Use advanced voice transport technology to extend customer service operations into geographically diverse locations where skilled, stable and less costly human resources are available.
- Make optimum use of skilled resources in handling customers' queries, ensuring that the customer is served by the agent with the right knowledge every time.
- Provide comprehensive, easy-to-use management tools to give managers and supervisors the real-time information required to monitor service level agreements and performance levels with the ability to react immediately.
- Utilize detailed reports to provide historical information for purposes such as service billing, agent performance, trend tracking and planning.

Nortel Solution

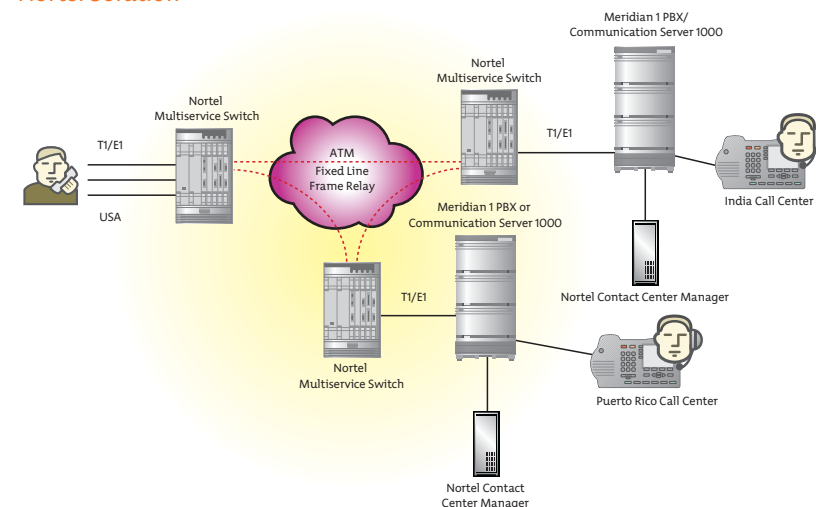


Figure 1: Virtual Contact Center Solution

Nortel solutions for virtual contact centers are based on Multiservice Switches, Meridian 1 IP Enabled PBXs or CS 1000 platforms and Nortel Customer Contact and Self-Service Solutions. The individual products interwork seamlessly to provide an end-to-end voice networking and contact center solution that is unique to Nortel.

The Nortel Multiservice Switch 7400 delivers industry-leading technology with voice compression, dynamic downspeeding and priority queuing, which significantly reduces bandwidth consumption without compromising voice quality. Using bandwidth optimization and intelligent voice networking, Nortel customers have reduced leased line costs by as much as 79 percent. In addition, Nortel ensures customer satisfaction by increasing network reliability and resiliency by rerouting calls around failures without disruption. Today, more than 400 Multiservice 7400 switches are deployed around the world in networks that rely heavily on contact centers to offer superior customer service.

Meridian 1 is the world's number one PBX, renowned for performance and reliability with a long history of application development focused on business profitability. The flexible and feature rich design allows the Meridian 1 PBX to be easily configured for contact center solutions as well as general business requirements. The Meridian 1 PBX provides advanced voice features, computer telephony integration (CTI) and sophisticated information services for applications ranging in size from 30 to 16,000 ports. The CS 1000 builds upon this heritage for customers who prefer an IP communications server.

Agent phones are designed to satisfy the special needs of the most demanding contact center agents and supervisors, including a direct-connect headset for agents as well as a supervisor port, increasing customer service capabilities and productivity through efficient, professional call processing. Symposium Call Center Server provides networked skill-based routing, comprehensive management and

reporting, and real-time displays for supervisors and managers. Symposium Call Center Server integrates tightly with the Meridian 1 PBX to provide a solid foundation for the requirements of any enterprise contact center regardless of size, complexity or geographic distribution.

For more information and details on using VoIP (voice over IP) in the contact center, see the IP Contact Center Solution in this Guide.

Solution Value Proposition

- Reduces operating costs by directing calls to contact center locations that can cost effectively and efficiently handle the transaction
- Reduces leased line costs by compressing calls without compromising voice quality
- A scalable solution that allows new contact centers to be added and easily networked on an as-needed basis to accommodate future growth
- Powerful skill-based routing so callers are intelligently routed based on the needs of the business and to the agent that is best suited to fulfill customer needs – anywhere in the global network
- Rich, flexible scripting language allowing businesses to customize call routing decisions and treatment based on their business processes
- Provides managers with the decision-making tools they need, from up-to-the-second, real-time displays to comprehensive reporting capabilities showing contact center activity, traffic fluctuations, agent performance and work characteristics
- Highly reliable contact center solutions based on more than 40,000 contact centers worldwide depending on Nortel Contact Center and self-service solutions, and more than 400 relying on Nortel Multiservice Switches.

For further information please contact your local Nortel representative.

Symposium CTI and CRM Integrated Contact Center Solution

Business Needs

- Provide faster, more accurate and personalized customer service through powerful contact center capabilities.
- Minimize CTI and CRM deployment risks, ensure shorten deployment times and reduce cost of ownership.
- Call center personnel can immediately focus on addressing customer needs by automated screen pops of current customer information maintained by the CRM system, delivered to the most qualified agent based on business rules and processes.
- Maximize agent productivity by eliminating the need to waste time and annoy the caller to repeat customer data already collected previously via an IVR session.
- Simple, automatic login to agent skill sets assignments in Symposium Call Center Server or Symposium Express Call Center when logging into the CRM application.
- Utilize the CRM CTI toolbar (e.g. Siebel 7) so that agents can place, receive and transfer calls while accessing customer records through the CRM interface.
- Transfer and conference calls with attached call data from agent to agent to facilitate context-sensitive screen pops of Siebel 7 applications within a local or networked Siebel 7 environment.

Nortel Solution

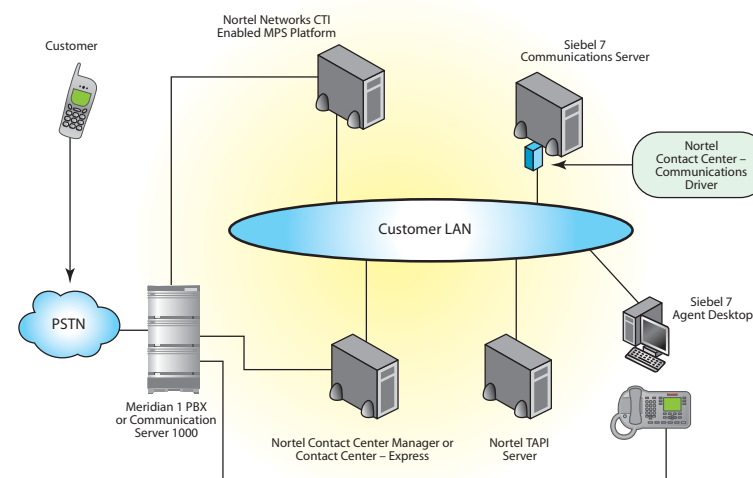


Figure 1: Symposium CTI and CRM Integrated Contact Solution

The Nortel solution consists of several elements that ensure the smooth passing of call-related data between all the elements of the contact center including the Symposium Call Center, the Nortel IVR (formerly known as Periphonics IVR) and the organization's chosen CRM system, for example, Siebel.

To improve agent productivity and customer satisfaction, customers should only be asked for information once and this information should then be available to each agent or IVR that subsequently handles the call from that point forward, independent of the order (IVR/SCCS/agent1/agent2/IVR/agent3) or the location (local/remote). When the call arrives at the agent, the available information for that customer could be screen-popped to the agent simultaneously. The solution can be provided and adapted to the organization's environment without requiring custom development.

CTI Communications Server – The CTI Communications Server is an industry-standard CTI environment using Microsoft TAPI to allow applications running on Windows desktops to control the functionality of the telephone sets and monitor all calls. Nortel has extended this capability to add call data networking where the call data relating to the call will be passed to a CTI Communications Server on a distant site when the call is transferred to that site. CTI Communications Server is making integrations with business applications even easier with Symposium Communications Driver for Siebel 7 and SAPphone R/3 compliancy from SAP, as well as compliancy with Oracle and others.

Periphonics IPML – IPML provides an integration module to Nortel IVR for Symposium contact centers. Using IPML, the IVR has access to all CTI functions (e.g. transfer and conference), can share information with SCCS (e.g. position in queue) and can pass IVR-collected customer information to CTI Communications Server, allowing customer records to be screen-popped to the agent with the call.

Symposium Communications Driver for Siebel 7

– Nortel provides this integration module for Siebel allowing companies to CTI-enable their Siebel CRM into a Symposium Call Center Server without the need for custom development. Simultaneous to the arrival of a call on the agent's telephone set, the agent will receive a Siebel screen pop with the Siebel customer information based on the telephone number of the caller, the number the caller rang or the data collected by the IVR. The agent has soft keys for all telephony operations and can simultaneously conduct call and data transfers to other agents in the contact center. Nortel is also compliant with a number of other CTI and CRM applications including SAP and Oracle. The Symposium Communications Driver Siebel 7 has been officially Siebel 7 validated.

Symposium open interfaces – Symposium Call Center Server provides several open interfaces that allow third-party products to integrate into a Symposium Contact Center. In this solution, IPML has built-in support for these interfaces. The IVR has access to numerous real-time statistics such as expected wait time and position in queue and can, for example, announce to the customer the likely queuing time to expect. Also using the host data exchange (HDX) interface, Symposium Call Center Server can use any information collected by the IVR to route the calls via skill-based routing and make other call treatment decisions.

Typical call flow – The caller is answered by the Nortel IVR, which asks for the customer account number and provides the customer with the ability to carry out some tasks (e.g. credit balance). If the customer decides to speak to an agent, the IVR provides a menu on the type query, then using IPML to access the Symposium Call Center Server a real-time interface (RSM) informs the caller of the expected wait time. The IVR then transfers the caller to Symposium Call Center Server and the caller's data to TAPI. If necessary, the IVR advises Symposium Call Center Server about the caller (using HDX).

Symposium Call Center Server then queues the caller to the skill set for that query type and while the caller is waiting, provides suitable announcements that may include their position in the queue. The skill set may be a network skill set so targeted agents with that skill may be found at multiple locations. The first available agent in the network with the appropriate skill set will receive the call. The caller's data has followed the call across the network and is used on the agent's desktop to screen pop the appropriate Siebel customer record. The agent answers the call with "Hello, Mrs. Young, sorry that you were waiting for 2 minutes. I see you have just made a tentative booking using our automated booking system and you have exceeded your credit limit. How may I help?" The agent is fully informed on every aspect of this and previous transactions, appearing knowledgeable, helpful and able to assist the customer. The customer in turn is highly satisfied with the experience – he or she has not been asked to repeat any information – saving time and effort.

Solution Value Proposition

- Improves customer satisfaction and loyalty by providing better service, keeping customers informed, lowering frustration and eliminating the need for customers to repeat any transactional information.
- Decreases costs through improved agent efficiency with automated screen pops – saving time and effort while supporting faster, more accurate and personalized customer care.
- Frees employees from repetitive and tedious tasks by populating the Siebel desktop with telephony and customer data provided by the caller's dialing information and/or collected via an IVR/speech recognition application.
- Delivers a unified desktop for increased agent productivity with Siebel 7 customer information and full screen-based telephony capabilities such as answer, hold, transfer and conference.
- Extends IVR functionality, agent resources and agent tools such as screen pops to be available network-wide.

- Smooths call transferring with no loss of customer data between agents and contact center sites.
- Provides tight integration between the contact center, self-service and CRM components when using Nortel CTI/CRM integrated and validated contact center solutions. Siebel 7 module pre-configuration and testing minimizes deployment risks, reduces or eliminates the need for custom developments, shortens deployment times and reduces deployment and total cost of ownership.
- Maximizes the overall efficiency of the contact center by providing a consolidated view of the business and the customer through real time and historical data reporting and consolidation.

For further information please contact your local Nortel representative.

Speech Enabled Self-Service Solution

Business Needs

- Providing a differentiated customer care application that operates more effectively, reducing operating costs and building customer loyalty in today's highly competitive world
- Providing 24/7 access to services via Nortel IVR (formerly known as Periphonics IVR) self-service solutions that tightly integrate with Web and CTI applications
- Creating a tightly integrated contact center that converges agent assisted and self-service technologies, evolving seamlessly in line with business requirements
- Providing self-service applications that free agents from repetitive and tedious tasks in order to deliver superior customer service to valuable clients and more complex calls
- Opening a database to be accessed by customers, using speech as the navigation tool, not touch tone

Nortel Solution

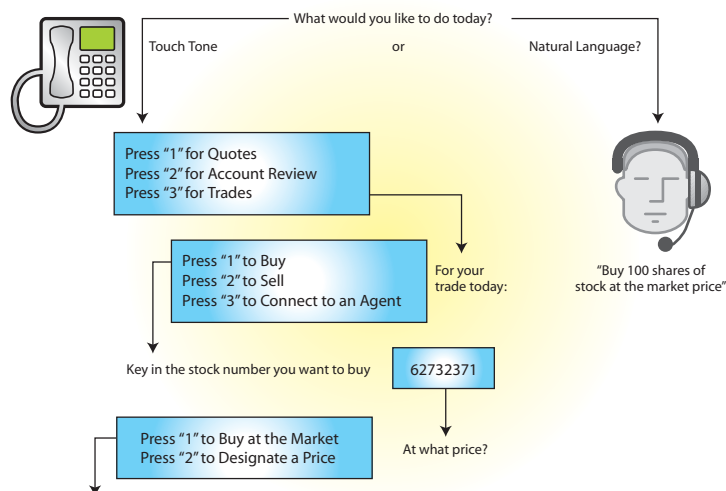


Figure 1: Speech Enabled Self-Service Solution

- Unmatched experience in speech recognition solution deployment and the most deployed advanced speech applications in the industry
- Lower risk, thanks to Nortel's industry-leading experience in making speech recognition work in real-world situations
- A range of speech processing platforms for every business need:
 - MPS 500, MPS 1000 or VPS/is for a modular, resilient and scalable foundation
 - Nortel Speech Server (formerly known as OSCAR [open signal computing and analysis

resource) architecture designed to support advanced speech-processing applications in an open and scalable environment

- Best-in-class technology with industry-leading large vocabulary speech recognition (LVR), natural language understanding (NLU), text-to-speech (TTS) and speaker verification technologies:

– **Natural language speech recognition** is one of the core enabling technologies available with the Nortel speech processing platform. Nortel advanced systems are able to adapt to the channel characteristics of telephone connections and recognize tens of thousands of words with very high recognition accuracy. Natural language understanding (NLU) capabilities allow customers to speak in complete sentences, using a variety of phrases to relay the same information. This more natural flow to customer transactions and the ability to simplify complex menu choices results in shorter calls, an improved customer experience and savings in call time and agent interaction.

– **Text-to-speech (TTS)** converts ordinary text into intelligible speech. This core technology works well when information to be spoken to callers is drawn from large numbers of items or from multiple diverse sources that change regularly. It is used for very large databases of information where pre-recording is impractical or not possible.

– **Speaker verification** – This biometric technology confirms a claimed identity on the basis of voice characteristics. Speaker verification compares live speech samples against a stored voiceprint – a pre-recorded sample of the user's speech – to either approve or deny the caller's claimed identity. In addition to boosting security, it can lower an organization's operating costs by reducing the amount of agent-based customer service required to verify a caller's identity.

- **Web-Centric Self-Service (WCSS)** – This new architectural model brings the advantages of Web-based development and content delivery to self-service applications. WCSS is more than a VoiceXML browser, it also encompasses Call Control XML (CCXML), a

portable application framework and application development suite to facilitate development and administrative tools.

Solution Value Proposition

- Expand services to provide more accessible and cost effective customer service 24x7.
- Automate additional transactions to reduce talk time, which results in decreased overhead costs and staffing requirements.
- Create significant opportunities for revenue-enhancing offerings.
- Deliver information consistently to customers in a speedy, secure and private manner.
- Enhance customer experience to build customer loyalty.

Nortel advanced speech processing solutions allow customers to do the talking and dramatically enhance a company's ability to provide the highest levels of personalized service. Callers perceive a better experience because they are able to accomplish more in less time, while using a more natural method of communication. Speech processing solutions allow callers to conduct complex transactions that were not possible with touch-tone input. The result is the opportunity to build strong, long-term relationships that are based on increased customer satisfaction and loyalty.

The Nortel speech technology portfolio also brings significant benefits to the internal organization of a business. These benefits include greater automation, as well as the ability to reduce call lengths and allow agents to focus on high-value transactions, sales opportunities and complex customer issues. The result is greater agent job satisfaction, which reduces turnover. Nortel solutions also improve employee productivity, lower operational costs and increase revenue, all of which lead to a rapid return on investment. In fact, organizations report up to a 50% reduction in transaction costs as a result of deploying a Nortel speech recognition solution.

For further information please contact your local Nortel representative.

Nortel
**INDUSTRY
APPLICATIONS GUIDE**

K-12 Education Solutions – Converged School

Business Needs

- Pressures to do more with less are increasing. Stretching precious financial and human resources is a priority.
- Technology is helping to transform the face of education, enhancing productivity, creating new efficiencies and enabling new services.
- Funding IT can be a challenge – leveraging available sources of government funding, reducing total cost of ownership and increasing return on IT investment is critical.
- Teacher professional development is a priority that requires ongoing effort and investment.
- Engaging technology-savvy students calls for continuous innovation and strategic deployment of IT.

Nortel Converged School Solution

- The Engaged Learning Community is connected through a converged network that supports voice, data and video services over wired and wireless infrastructures, facilitating improvements in network security, reliability, application performance and network operations. The Engaged Learning Community enables the delivery of new value-added services to students, teachers and staff, optimizing the total cost of ownership of the network infrastructure and maximizing its potential for new value delivery.
- The key elements of a Converged School Network are:
 - **Multimedia Communications & IP Telephony:** Nortel leverages the power of Session Initiation Protocol (SIP) to enable location and media independent, presence-based multimedia collaboration and communication through an integrated customer interface. This can enable distance learning via video conferencing and application sharing, enhancing student success and extending teacher talent across a school district.
 - **Mobility:** Nortel wireless LANs and universal access solutions enable cost-effective deployment of wireless communications on campus as well as secure access to school resources while off-campus. Real time RF management capabilities deliver self-

configuring, self-optimizing and self-healing capabilities, ensuring simplified network management and cost savings.

- **Converged Network Infrastructure:** Nortel Layer 2-7 Ethernet switching and optical network solutions provide high-performance reliable networking for always-on connectivity and total cost of ownership (TCO) advantages.
- **Centralized Data Center & Storage Area Networking:** Storage area networking and data center solutions enhance school application performance, disaster recovery and business continuity.
- **Security:** High-performance multi-layer security for all information, applications and services, protects institutional and user information assets.

Why Nortel?

- Nortel has thousands of Education (Higher Education and K-12 Education) customers globally.
- Nortel Converged School solutions offer high network reliability, simplified operational management, enhanced security and low total cost of ownership.
- Nortel is committed to being a leader in convergence enabling multimedia communications, IP Telephony and mobility securely and reliably. Nortel's leadership has been noted via numerous awards, including Network World Blue Ribbon Winner (MCS 5100),

VoiceCon 2004 Best in Show (WLAN), Best of Show Internet Telephony Conference & Expo 2004 (VoIP).

Solution Value Proposition

Nortel has developed a vision specific to K-12 Education of an **Engaged Learning Community**, which connects all stakeholders – students, teachers, parents and administrators – in a manner that improves school accessibility, accountability and effectiveness. The Engaged Learning Community responds to student demand for technology-enabled learning, enhancing the student learning experience, improving the productivity of teachers and faculty, and facilitating mobile communications, rapid emergency response and optimized campus security. The end result is a higher return on education: more engaged students, more productive teachers, more cost-effective school administration and a more collaborative, secure learning environment.

For more information, follow these links and references:

- External Website: Nortel Networks Education External Website www.nortelnetworks.com/solutions/education/doclib.html

- Nortel Multimedia Communication Server 5100 for K-12 Education: This application brief profiles how Nortel's Multimedia Communication Server (MCS) 5100 offers an integrated set of communication tools to enhance K-12 education and deliver new innovative applications that help solve key educational challenges.
- Wireless Telephone Systems for K-12 Education: This brief describes how Nortel Wireless Telephones provide communication access anywhere on the school campus, enabling educators and other school staff to stay in constant contact.
- Nortel LearnIT www.nortellearnit.org, the company's signature community relations initiative. This non-profit organization is dedicated to supporting teachers and students leveraging technology to enhance the quality of education. Nortel LearnIT, provides school districts with support integrating technology into the curriculum and delivers free technology professional development tools for teachers, as well as engaging online skills videos for students and classroom-ready learning resources to enrich the learning experience with the latest technologies.

Higher Education Solutions – Engaged Campus

Business Needs

- Student expectations are high: They want a flexible, convenient, collaborative learning environment.
- Higher education is competitive: eLearning is breaking down geographic barriers creating more competition for students.
- Funding IT is a challenge – Improving efficiency and reducing costs is critical.
- Traditional telephony services revenues have eroded: There is a critical need for new revenue-generating solutions.
- Attracting and retaining students and recruiting top notch faculty and researchers call for continuous innovation.

Nortel Engaged Campus Solution and Value Proposition

Nortel has developed a vision specific to Higher Education of a single, converged **Engaged Campus** network that supports voice, data and video services over wired and wireless infrastructures, facilitating improvements in network security, reliability, application performance and network operations. The Engaged Campus enables the delivery of new value-added services to students, faculty and staff, optimizing the total cost of ownership of the infrastructure and maximizing its revenue potential. The key elements of Engaged Campus are:

- **Multimedia Communications & IP Telephony:** Nortel leverages the power of Session Initiation Protocol (SIP) to enable location and media independent, presence-based multimedia collaboration and communication through an integrated customer interface. This can serve as the platform for many new value-added services, such as "Tutors on Call," which provides students with immediate access to tutoring services.
- **Mobility:** Wireless LAN and universal access solutions enable access to information and people, anytime, anywhere while maximizing security and operational simplicity.
- **Converged Network Infrastructure:** Nortel Layer 2-7 Ethernet switching and optical network solutions provide high-performance reliable networking for always-on connectivity and total cost of ownership (TCO) advantages.

- **Centralized Data Center & Storage Area Networking:** Storage area networking and data center solutions enhance application performance, disaster recovery and business continuity.
- **Security:** High-performance multi-layer security for all information, applications and services, protects institutional, departmental and user information assets.

Why Nortel?

- Nortel has thousands of education customers globally.
- Nortel Engaged Campus solutions offer high network reliability, simplified operational management, enhanced security and low total cost of ownership.
- Nortel has been a leader in storage over WDM connectivity for the last five years consecutively, according to IDC.
- Nortel is committed to being a leader in convergence enabling multi-media communications, IP Telephony and mobility securely and reliably. Nortel's leadership has been noted via numerous awards, including Network World Blue Ribbon Winner (MCS 5100), VoiceCon 2004 Best In Show (WLAN), Best of Show Internet Telephony Conference & Expo 2004 (VoIP).
- "Nortel is clearly a technology company that puts stock in creating and developing exceptional products. The combination of capability and reliability of their products made

selecting Nortel an easy choice.” Mike Vertefeulle, IT Director, University of Connecticut School of Business

For more information, follow these links and references:

- External Website: Nortel Networks Education External Website www.nortelnetworks.com/solutions/education/doclib.html
- Nortel Multimedia Communication Server 5100 for Higher Education: This brief describes how Nortel’s Multimedia Communication Server 5100 offers institutions of higher education a recruitment advantage and a facilitator for turning out the finest graduates that academia has to offer.

Financial Services Solutions

Business Needs

- Growing the business
 - Acquisition, retention and cross-selling
 - Organic/in-organic growth
- Improve productivity
 - Cut operating expenses
 - Improve processes and work force productivity
- Compliance and risk management
 - Fraud and security issues
- Align technology with goals

Nortel Solutions

I. Transforming the Branch: Secure Converged Branch Solution

- Control costs and increase flexibility
 - Centralize IT administration and maintenance
 - Consolidate voice and data networks where appropriate
 - IP telephony where/when there is ROI
 - Branch transfer to/from contact center
 - Reduce MACs, toll-charges
 - Leverage existing investments and applications
- Increased sales and service effectiveness
 - Local applications to support sales activity and improve customer experience
 - Staff and equip mobility
 - Unified messaging
 - Enable eLearning and video/audio conferencing to improve skill sets and productivity
 - Collaborative applications with presence

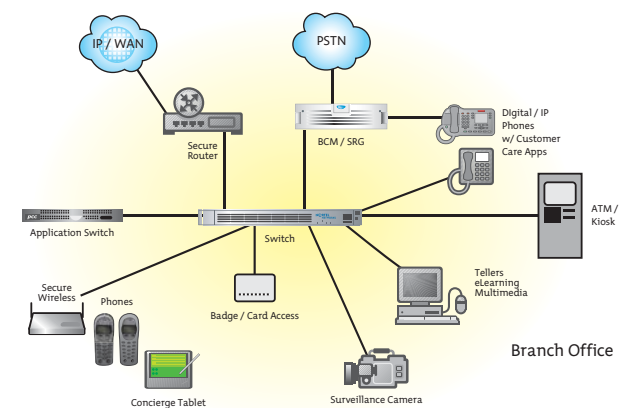


Figure 1. Transforming branches into cost-effective sales and service centers

II. Transforming the Front Office: Collaborative and eLearning Solutions

Challenges:

- Inadequate front-line sales training and coaching
- Need to improve customer responsiveness via any time, anywhere access
- Real-time access to decision makers and expertise
- Increased employee productivity

Solution Elements:

- MCS 5100 multimedia
 - Audio/video conferencing
 - Presence and personalization
 - eLearning and collaboration
- Secure remote access

Benefits:

- Increased productivity and reduced cost
- Faster access to decision makers
- Better responsiveness to customers



Figure 2: Enabling the Front Office: Collaboration, Mobility and eLearning Solution

III. Multi-Channel, Virtualized Customer Care: Contact Center and Self-Service Solutions

Challenges:

- Provide 24/7 service
- Lower cost of operation with better utilization of agents
- Increased employee retention
- Consistent customer experience
- Consolidation of contact centers
- Enhancing self-service via IVR, speech enablement and web-based self-service
- Speaker verification to enhance security



Figure 3: Multi-Channel, Virtualized Customer Care: Contact Center & Self-Service Solutions

IV. Compliance and Risk Management: Storage and Data Center Networking Solutions

Challenges:

- Business continuity and disaster recovery
- Impact to brand and 24/7 customer expectations
- Cost of downtime
- Regulatory compliance

- High-performance data center

Solution Elements:

- High-performance storage networking

Benefits:

- 99.999% availability
- Improve communication availability during disaster
- Supports consolidation and centralization
- Application and communication availability

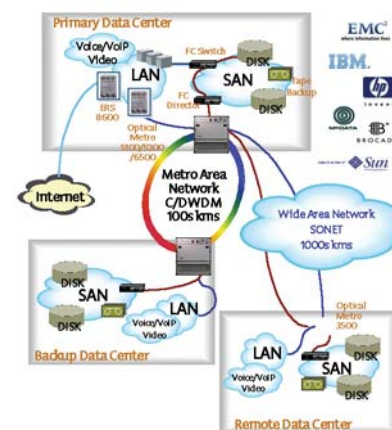


Figure 4: Compliance and Risk Management: Storage and Data Center Networking Solutions

V. Compliance and Risk Management: Survivability via IP Telephony

Challenges:

- Business continuity and disaster recovery
- Impact to brand and 24/7 customer expectations
- Cost of downtime
- Maintaining external numbers

- Converged desktop
- Secure access

Solution Elements:

- CS 1000 Release 4.0
- MCS 5100

Benefits:

- Minimize impact of business disruption – redundant architecture for fast recovery
- Fault tolerance and operational resiliency
- Anywhere, anytime access via IP

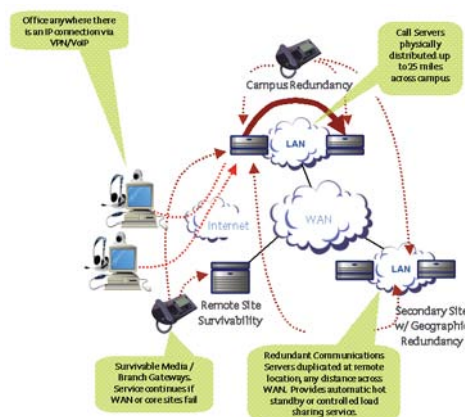


Figure 5: Compliance and Risk Management: Survivability via IP Telephony

VI. Compliance and Risk Management: High-Availability LAN/WAN

Challenges:

- Impact to brand and 24/7 customer expectations
- Cost of downtime
- Regulatory compliance

- Comprehensive architecture for no single point of failure

Benefits:

- Resilient network offers maximum network uptime, lowers complexity and less expensive than redundant networks
- Sub-second failover
- 99.999% availability

Solution Elements:

- High availability network solution
 - Ethernet Routing Switch R4.0
 - Ethernet Switches

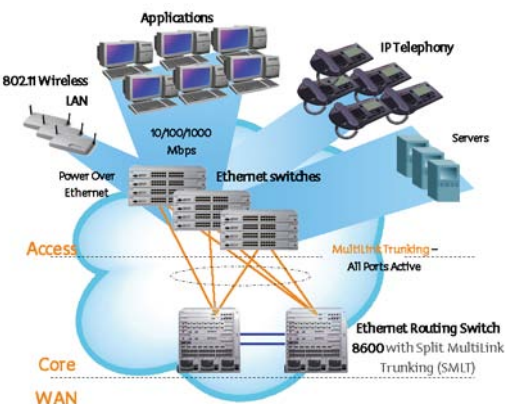


Figure 6: Compliance and Risk Management: High-Availability LAN/WAN

VII. Compliance and Risk Management: Layered security solutions

Solution Elements:

- Endpoint security
 - Tunnel guard for remote access: 802.1x enabled switches + Sygate
- Perimeter security
 - Switched Firewall, VPN Router Firewall, Application Switch, Threat Protection System
- Core network security
 - Threat Protection System, Ethernet Routing Switch 8600 SDM, Application Switch

- Secure communications

- VPN Gateway, VPN Router, Services Edge Router, Wireless Security Switch

Benefits:

- Proactive protection against internal and external attacks
- Compliance – protection and privacy of information and data assets

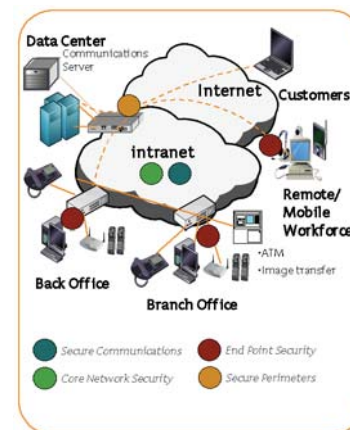


Figure 7: Compliance and Risk Management: Layered security solution

VIII. Converged Infrastructure Solution

- Proven, feature-rich communication services
 - More than 450 world-class telephony features
 - IP Contact Center
 - Unified messaging
 - SIP based collaborative communications applications
 - Video/Audio conferencing
- Service reliability
 - Resilient infrastructure (5 nines availability)
 - Eliminate bandwidth bottlenecks
 - Secure communications
- Efficient, easy to manage
 - Policy-based traffic management
 - Flexible delivery of communication services through choice of open, flexible and extensive communication clients
 - Converge infrastructure for voice, data, and video services
- Improved economics
 - Total cost of ownership leadership
 - Migrate at pace that is appropriate, leverage existing assets

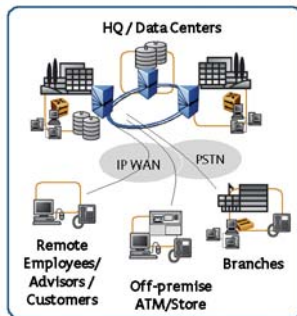


Figure 8: Converged Infrastructure Solution

Solution Value Proposition

Nortel solutions enhance the customer experience, enable the front office and integrate delivery channels while increasing efficiency and lowering costs. Nortel solutions enable the “virtual” bank by delivering secure, reliable and integrated voice/data/video communications, information, and applications anywhere, any time, and on any device.

Business Continuity and Disaster Recovery in Healthcare

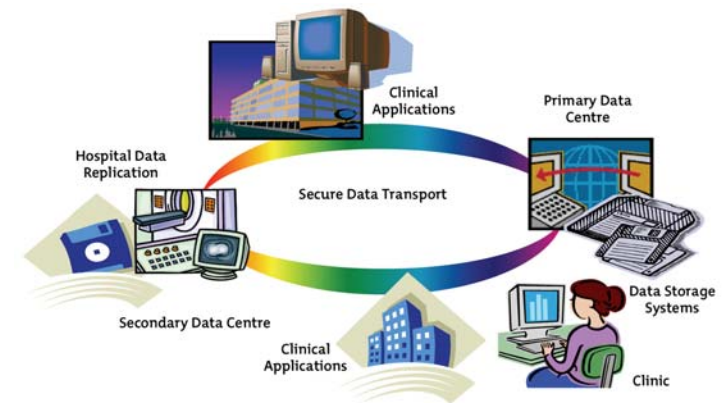


Figure 1: Business Continuity and Disaster Recovery Solution

Business Needs

In an industry that deals with human life and whose purpose is to protect it, the immediate availability of medical records and information is critical. An information infrastructure outage or failure that jeopardizes the quality of care a patient receives is not tolerable.

The healthcare industry is additionally dealing with ever-increasing healthcare services delivery costs and the complete digitization of all patient care information. During an outage, data can be lost or corrupted. Physicians and nurses can lose access to critical information, and worse still, patient life could be put at stake. The loss of patient records can impact both patient service and billing, two areas of vital importance to the operation of a healthcare organization. This is coupled with new regulatory requirements which, in many countries, mandate the implementation of plans for disaster recovery, patient privacy and emergency mode of operations.

To address these challenges, healthcare providers are looking at business continuity and disaster recovery plans to make sure information is always available when unplanned events occur or when physical access to a hospital facility is denied. To guarantee the recoverability and constant availability of the data to critical healthcare applications, optical storage connectivity technologies play an important role.

Nortel Solution

Nortel addresses healthcare requirements for business continuity and disaster recovery through its **Optical Storage Connectivity Solutions**, integrating storage islands by centralizing data to

a primary data center for secure retention of patient records. This reduces cost and complexity by consolidating servers, reducing the burden of operating several storage resources and ensuring standardized practices and procedures. Nortel's highly available Optical Storage Connectivity

solutions provide real-time, synchronous mirroring of applications, services and data between the primary and secondary data center, enabling multiple data centers to act as one. In the event of a disaster, information is automatically retrieved from an alternate back-up site with no need for manual restore or restart procedures, greatly reducing time to recovery and lowering costs. This eliminates disruptions to applications and significantly reduces the time to recover data.

As the environment in which healthcare providers work is becoming increasingly complex, they require heterogeneous data center solutions that can be linked across substantial distances. Nortel partners with industry-leading storage system and infrastructure providers to deliver storage extension solutions that ensure simple, scalable and secure replication and retrieval of data locally or thousands of miles away at a remote site.

"Enterprises increasingly need to find ways to integrate storage networks and crucial business data across the wide area network to support business continuity, disaster recovery and compliance with government regulations," said Jamie Gruener, senior analyst, the Yankee Group. "The combined, tested offering from Nortel, EMC and LEGATO provides a best-of-breed approach to simplifying the complex problem of tying multiple storage area networks (SANs) together between multiple corporate sites," Gruener said. "By bringing the three product sets together in a cohesive manner, deploying business continuity and disaster recovery strategies just got a lot easier for enterprises and service providers."

Solution Value Proposition

Nortel Optical Storage Connectivity solutions bring the maximum in resiliency to the healthcare network. Using high-bandwidth and reliable optical connections, the centralized data is readily accessible to all healthcare staff as needed. Nortel is extending the benefits of

networked storage and breaking through the barriers that limit widespread deployment of storage solutions: distance, interoperability, scalability, capacity and protocol transparency.

Solutions from Nortel offer the healthcare industry compelling cost and performance advantages. Institutions can use high-performance data center capabilities to implement higher quality bandwidth at lower cost, protect patient data and clinical applications from unauthorized access, maximize network performance and service availability, reduce operating costs and uncover new ways to use the Internet to advance patient care.

Our solutions are based on industry-leading optical products, including the Nortel Optical Metro 5000 platform and the Nortel Optical Metro 3000 next-generation SONET platform. Our complete portfolio includes storage over WDM for high-bandwidth connectivity, storage over SONET/SDH for mid-range bandwidth requirements and/or distance extension beyond the MAN and storage over IP for non-mission critical storage applications. Proven interoperability and alliances with leading storage/service systems and infrastructure providers such as EMC, IBM and Sun Microsystems, allow Nortel to deliver best-in-breed solutions that meet the rigorous demands of the healthcare industry for business continuity and disaster recovery solutions.

High Performance Networking in Healthcare

Business Needs

Healthcare institutions of all sizes are re-engineering healthcare delivery by developing and integrating a range of applications (e.g. patient flow, physician order entry, billing and claims processing, and other clinical, operational and financial systems), centered around computerized patient records. They are uniformly targeting IP-based client, networking, content distribution, switching and application-enabling technologies. This re-engineering is intended to make patient, clinical pharmaceutical and corporate data readily available to all users and applications that need them. This creates a non-negotiable need for network scalability, reliability and performance.

Network convergence - supporting voice, data, video and images on a single high performance network - is being pursued to make optimal use of precious capital investments and to lower operating costs. At the same time, network convergence is driving the need for networks that consistently, securely and reliably meet the connectivity, bandwidth and delay requirements of mission-critical healthcare applications.

Nortel Solution

Advanced business connectivity is about highly reliable, application-aware, adaptive networking to meet the data, image, voice and video needs of healthcare workers, medical office buildings, clinics and major hospital campuses.

Nortel's high performance networking solutions for healthcare are comprised of three complementary solutions:

- High-performance Layer 2-7 campus networks including access to servers
- Optical metropolitan area networks (MANs)
- Virtual private networks (VPNs) for non-optical sites

Nortel Campus Network Solutions, based on Nortel Ethernet Routing Switch Portfolio, Ethernet Switch Portfolio and Switched Firewall Portfolio, are optimized for a two-tier architecture consisting of quality of service (QoS) enabled stackable and chassis-based switches in wiring closets and very high capacity, fully redundant, Layer 2-7 campus core switches. Interconnection between these elements is provided via multi-homed multi-link trunking (MLT) with sub-second recovery from failures. This provides a highly reliable, highly scalable networking infrastructure for hospitals and healthcare research institutions. Virtualization

and content segregation across a healthcare institution's servers drives the need for application switching in the core, providing intelligent routing (at Layer 4 and above), of user requests to the correct content locations. These advanced capabilities enhance application and server performance through load balancing, content routing and caching.

High performance Nortel Optical Portfolio, based on the industry-leading Nortel Optical Metro portfolio, connect hospitals, clinics and other medical buildings within the city and between metropolitan areas. They eliminate bandwidth bottlenecks between the in-building and metropolitan networks, and open the door for remote clinical systems that exhibit the performance of being local. They are fast, highly scalable and ultra-reliable with optical technologies that automatically and instantly recover from failures. Huge files can be received in seconds, eliminating wasted time and lost files. Another major benefit of optical networking is that IT resources (such as servers, network attached storage and firewalls) can be centralized, better utilized and more easily operated, accessed and secured. This helps healthcare providers standardize procedures and reduce duplication of IT resources between medical facilities.

Virtual private networks serve non-optically connected clinics and medical office buildings as well as remote or mobile medical staff and clinicians. Nortel's site-to-site solutions are based on IPsec encryption and authentication and secure routing technologies, a unique capability that allows dynamic routing over secure tunnels. For remote users, both IPsec and SSL VPN solutions are provided to support network and application-based security respectively, both in client-based and clientless modes. Nortel's solutions are based on Nortel VPN Gateways and Routers and Nortel Application Switches.

Solution Value Proposition

Nortel understands the challenges faced by healthcare institutions and the critical role of IT in serving business objectives. As the new healthcare realities sink in, it will be increasingly recognized by all stakeholders that healthcare has to embrace IT as integral to healthcare delivery. The nature of healthcare IT will change from being back-office support and archiving to having front-line mission-critical contributions to make. In this expanded role, healthcare IT will rely on ubiquitous, high reliability, high quality, high integrity secure networks with advanced authentication and context-aware authorization – available all the way from the billing office to the point of care. This is the kind of network that Nortel has been delivering to its healthcare customers for many years.

Multimedia Collaboration in Healthcare

Business Needs

Secure remote access to information and people has become an integral part of healthcare:

- Clinicians are looking for the capability to consult with remote peers and share information in order to provide timely treatment.
- The public is looking for alternative means of access to doctors for consultation and follow-up to avoid time consuming office visits.
- Residents of remote communities need "televisits" from specialists who may be scarce in the region.
- Homecare nurses need the capability to use videoconferencing to care for their patients, saving time and costs and helping them cope with an increasing workload.

The medical profession around the world is trying to increase global information sharing to further patient care. Research institutes, hospitals and universities, combined with highly-skilled research and medical professionals, are trying to play a significant role in breakthrough discoveries by sharing their knowledge and achievements with others around the world. Global access to information and key resources is important and fundamental to these requirements is a technology solution that should be patient care-driven.

Nortel Solution

A doctor in Chicago performs surgery and her actions are transmitted in real-time to a professor watching in another city. A nurse making rounds in Singapore gets an instant message (IM) from a terminally ill patient. A physician in London uses his personal digital assistant (PDA) to instantly access online medical information, right at his patient's bedside. These are the scenarios emerging in healthcare and Nortel is actively engaged with healthcare institutions in providing multimedia solutions in support of virtual healthcare delivery.

The Multimedia Communication Server (MCS) 5100 from Nortel delivers multimedia and collaborative applications. Applications like audio and video conferencing, white-boarding, application sharing and file exchange, empower healthcare professionals to consult and share with their peers in remote locations.

Instant messaging and telephony services like call redirect and personalized call routing help staff control how and when they can be contacted,

allowing them to make choices on how best to use their time. Mobility services like find me/follow me and network-wide applications let healthcare professionals receive important calls and access information wherever they are.

The future of medical care is e-healthcare, with the promise of online patient-doctor communication, telemedicine, patient education and an ever-expanding list of opportunities. Nortel is working closely with many of its clients who are entering this new and exciting world - jointly working together to meet the challenges the future holds.

Solution Value Proposition

Nortel MCS 5100 allows institutions to communicate and collaborate any time, anywhere using a desktop PC, laptop computer, wireless device or wireline phone. It provides the flexibility needed to deliver multimedia communications to distributed and mobile professionals.

Unlike vendors offering only voice or data, Nortel has a full voice, data and IP telephony portfolio offering the breadth, flexibility and completeness

needed when it comes to end-to-end IP and multimedia solutions. The MCS 5100 is a key component of that end-to-end IP solution, offering an integrated application delivery platform that helps to manage everything from the network to the desktop.

Point of Care Solution – Mobility in Healthcare



Figure 1: Point of Care Solution – Mobility in Healthcare

Business Needs

As the healthcare industry's transition from paper to electronic medical records continues, another technological revolution is taking place. Healthcare delivery itself is being increasingly mobilized through the use of wireless technologies. Driving this wireless technology phenomenon are the goals of improving patient care and increasing the efficiency of healthcare delivery.

Care-givers need real-time access to accurate patient data, such as clinical histories, treatments, medications, tests, lab results and insurance information, to provide timely care. Timely information is obviously valuable and leads to more efficient, cost-effective care.

Nortel Solution

Wireless and mobile technologies offer many opportunities for improvement in the healthcare industry. From healthcare-specific applications, such as wireless prescription writing and charge capture, to more common capabilities, such as wireless email and instant messaging, the possibilities for healthcare improvement are many.

Nortel, in collaboration with its partners, is enabling mobile access to healthcare applications. We provide wireless infrastructure in support of the many point-of-care applications that our partners provide. Our Wireless LAN 2300 series provides a secure voice and data networking environment, featuring true mobility across the campus, strong encryption to protect the network and intuitive management for control of the

wireless environment. Nortel's strategy is designed to bridge current WLAN challenges by providing mobile healthcare professionals and consumers with secure, seamless, wireless roaming capabilities across converging public/private networks.

Solution Value Proposition

The wireless LAN is more than just access to specialized Web content or text information from a mobile device. It's real-time high-bandwidth access to any content with rich multimedia video/voice or data from standard Internet or intranet Web pages, email, ebusiness applications or conferencing - available any time and anywhere. Only Nortel, based on its heritage (wireless, carriers and enterprise), can deliver all these elements.

Nortel WLAN Point of Care Solution builds on the company's wireless market leadership and industry-proven, standards-based technologies. It is focused on providing a single, secure framework for delivering mission-critical applications and services to users regardless of where they are and how they access the network (public/private).

By extending the security architecture across disparate networks, users will be able to maintain a common communication experience at any time, anywhere - whether they are working from their desk or accessing the network from a pocket computer at a remote clinic.

Sarah Kim, Wireless/Mobile Technologies analyst at the Yankee Group, says: "From a technology perspective, the enterprise and service provider WLAN market segments are heading toward conversion. As enterprises begin to scale their WLANs beyond departmental and 'hotspot' rollouts, they will demand highly manageable and scalable solutions that provide a seamless, secure user experience with their existing wired infrastructure and, ultimately, with the emerging public WLANs. Nortel is taking a major step forward in delivering a portfolio that addresses this level of integration regardless of how the end user connects to the network."

Nortel is working with its partners and customers in enhancing patient care and driving inefficiencies out of the system.

Hospitality Solutions – Connected Guests

Business Needs

As the hospitality industry moves into a period of growth, hotels, resorts and conference centers are looking for ways to differentiate their services and drive new revenue streams. The challenges of doing this are evident: the industry faces increased competition with the emergence of strong third-party Internet distribution channels that are threatening to commoditize individual properties and brands. At the same time, traditional auxiliary revenue streams from telephony and high-speed Internet access are drying up, putting increased pressure on the bottom line.

As a result of market conditions, hotels are looking more closely at their guest engagement strategy. Realizing that the guests walking through their doors are increasingly technology savvy and dependent, market leading hotels around the world are looking to see how communications technology can help them to:

- Support the communications experience that is becoming tablestakes for their guests;
- Enhance guest loyalty by providing a level of service that is beyond their guests expectations and therefore generates highly profitable repeat business; and
- Use technology to launch services that will be valued by their guests and will drive new revenue streams.

Nortel Solutions and Value Propositions

Nortel's converged solutions are opening up opportunities for hotel, resorts and convention centers to achieve their goals by offering a level of guest service that sets them apart from the competition.

Connecting in the Guest Room

Leaders in the industry are taking steps to proactively address their guests' needs while still maintaining a home-like and private atmosphere in the guest room. Nortel solutions including our IP Phone 2007 (touch screen color IP phone), Multimedia Communication Server 5100 (video and collaboration elements enable virtual concierge services) and WLAN 2300 series allow properties to provide interactive and personalized services to their guests.

- Hotels are able to promote real-time services on their property based on current conditions. For instance, if the spa is only partially booked, a special offer can be extended to select groups of guests based on their loyalty program standing.

- Information can be tailored to specific groups. For example, a client event planner could send meeting information to conference attendees or a VIP guest could be provided with an individualized directory of key contacts at the hotel.
- Guests can be offered access to content and information that will increase the enjoyment of their stay such as interactive access to information on local attractions.

Property Wide Mobility

While many hotels now have hotspots in the lobby or lounge areas, the guest demand for loyalty is increasing to become near ubiquitous. Guests expect a single sign-in to the hotel's WLAN high-speed Internet services to allow them to work wherever they want in their room, throughout the property's conference facilities and public areas, and even outside. Nortel's market leadership in wireless positions us to provide solutions that fit the specific needs of the hospitality market:

- The delivery of solutions optimized for multimedia sessions meaning that guests using

their connections for quality sensitive audio or video applications will never be disappointed.

- The ability to customize access characteristics by individual or by group, allowing flexibility in service delivery and billing processes.
- The ability to extend wireless coverage to the outdoors at resorts catering to guests who want to enjoy the beauty of their surrounding environment, even when at work.
- Flexible billing allowing a hotel to split revenue with an ISP or pay a flat fee per customer.
- Simple WLAN management, making Nortel's solution easy to deploy and manage in house even with the most limited IT staff.

Guest Messaging

Delivering guest messaging services should be effortless and should provide the greatest level of efficiency for hotel guests and staff. Nortel's Hospitality Messaging Server 400 does just that. It provides a comprehensive, simple-to-use solution for both guest and staff messaging as well as advanced communication features such as guest wake-up, room status and mini-bar update that provide hospitality businesses with better overall guest satisfaction and operational efficiency – all available in 18 languages. Additionally, the Hospitality Messaging Server 400 integrates seamlessly with the Property Management System (PMS). It is a flexible messaging solution that can scale from the smallest property to the largest mega resort, globally.

Meeting and Conference Environments

Securing a large meeting or event can be a very profitable business for a property both in terms of meeting specific revenue as well as room bookings. While the expectations are high, so are the opportunities to stand ahead of the competition in the eyes of an event planner. Nortel works with our customers in this space to provide:

- Increased flexibility and revenue retention in addressing meeting client needs for telephony: In the past with TDM solutions, requirements for phones needed to be known well in advance making same day or hour requests almost impossible to address. Often, the role of setting up the phone line was outsourced by the hotel and as a result, revenue from the service did not translate into bottom line benefits. With Nortel's VoIP solutions, hotels can react to requests in the instant and all the revenue is retained in house.
- Visitor-based networking: High speed and wireless access can be customized to allow for sponsorship promotions to the targeted group and increased flexibility in addressing the specific bandwidth demands of a conference, exhibition or meeting.
- Improved communications for event planners: Event planners can be provided a Nortel WLAN phone with directory access to all of their key contacts in the property as well as external access to support the success of their event. By keeping these key clients in touch, a conference facility or hotel is able to ensure that the event is a success.

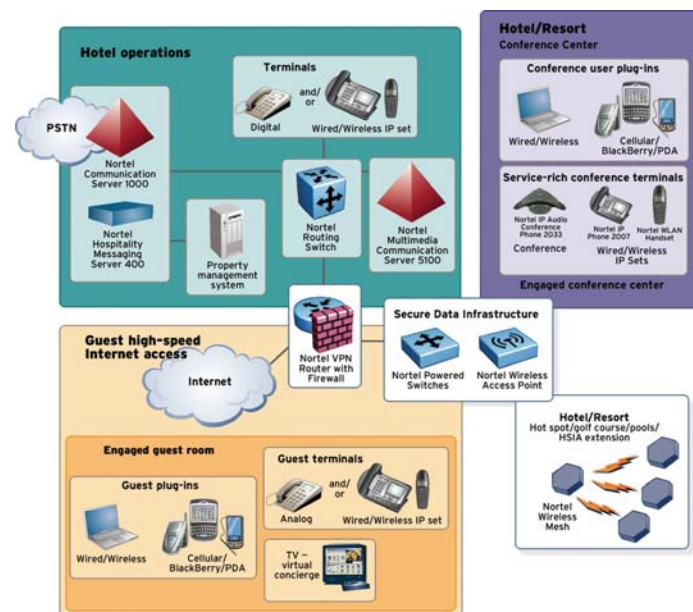
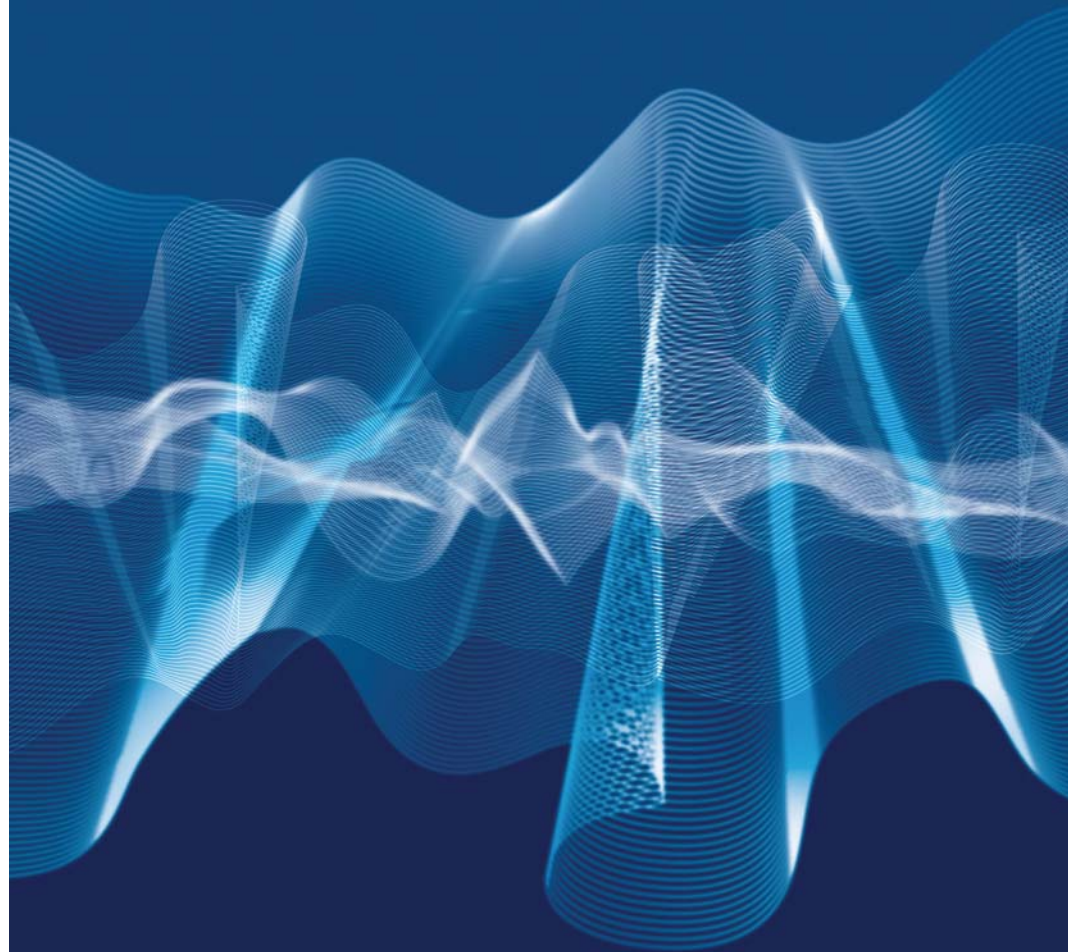


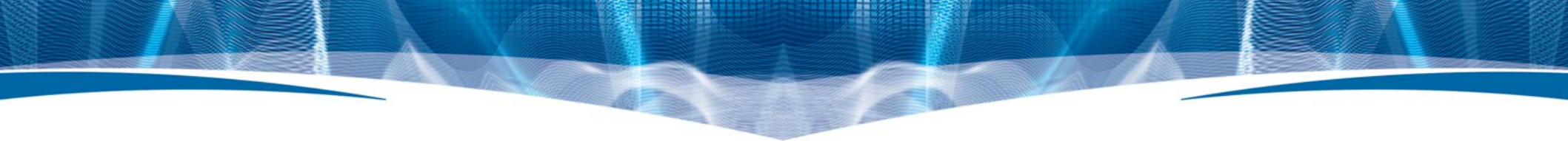
Figure 1: Nortel Hospitality Solutions



Nortel

PRODUCT GUIDE





> Nortel Small IP Telephony Platforms

Nortel's fully converged IP telephony solutions bring together voice, data and business applications into a unified platform. The Nortel Business Communication Manager platforms serve enterprises of varying sizes with IP telephony and a full complement of features and functions.

- Nortel Business Communications Manager 50
- Nortel Business Communications Manager 200
- Nortel Business Communications Manager 400

Please note: Some products included in this guide are not necessarily available to all individuals in all countries and the components and configuration of Nortel Networks solutions contained in this publication may alter from region to region. Products, specifications and availability are subject to change without notice. Please confirm all details associated with both products and solutions with your local Nortel Networks representative.

Business Communications Manager 50/200/400



Overview

The Nortel Business Communications Manager (BCM) 50/200/400 is a series of fully converged business communications systems to meet the needs of enterprises of varying sizes. These servers bring together voice, data and business applications onto a single unified solutions platform. The BCM 50/200/400 product line delivers IP telephony and a full complement of features and functions, such as Internet access, voice messaging and call center capabilities, as well as intuitive system management. Each server is a breakthrough solution built specifically for small to medium businesses and networked branch offices. It enables businesses to streamline operations and can lead to improved employee productivity, better customer service and more effective and profitable relationships with clients. The Nortel BCM 50/200/400 systems let businesses communicate over traditional voice circuits, IP networks or a combination of both. The unified communications platform makes network management easier, facilitates voice over IP calls and IP networking between offices and can help to significantly lower operating costs and overall cost of ownership. In addition, the Digital Mobility and Wireless LAN solutions available for the BCM 200/400 offer cost-effective, secure mobile communications anywhere in the workplace.

Ideal For

- Small and medium-sized businesses and enterprises with startup/single sites, multiple sites, franchises or branch offices (3-200 users)
- Businesses that want the cost advantages of an integrated solution that provides turnkey access to the Internet while protecting existing equipment investment
- Businesses that want a solution that allows migration – at their own speed – to a fully converged IP based data and voice network
- Businesses that want an affordable, high-quality professional call center
- Businesses that want mobility solutions to allow employees to remain accessible when they're away from their desks
- Businesses that want a solution that delivers rock-solid reliability for business-critical applications

Business Challenges

- Are you seeking a solution that enables seamless communication with your clients and suppliers and still delivers on the promise of ease of management?
- Have your plans to implement a call center been hampered by high costs or limited feature sets?
- Are you concerned about the business opportunities you've lost because you're not communicating with your clients in a way that suits them?
- Do your employees travel and could they benefit from greater accessibility and freedom to work from anywhere?
- Are you looking to increase revenue earning opportunities?
- Have you considered the cost savings you could realize by moving to a converged voice and data network?
- Have you considered implementing IP telephony?

- Do you want to adopt new technologies and applications at your own speed?
- Are you looking for a secure workplace mobility solution to keep in touch with employees who are away from their desks?

Typical Applications

- Integrated business communications – fax, voice, voice messaging and Internet access – is available all in one footprint.
- Call center functionality can also voice-enable web sites.
- For companies with multiple sites, IP telephony can help contain network costs.
- Unified messaging creates a desktop portal for all communications – voicemail, email and fax.
- For organizations that need to retrieve customer records from a database when a customer calls, computer telephony integration (CTI) automates the retrieval process.
- Mobility ensures that employees can answer their phones when they're away from their desks.
- Auto attendant enables customers to reach the appropriate personnel, even when the reception desk is un-staffed.
- A virtual private network (VPN) delivers the security of a private WAN over a public network.
- Telecommuters have access to reliable, toll-quality telephony and applications such as unified messaging and call center, just as if they were in the head office.
- An evergreen solution, this platform protects owners' investments in hardware as they migrate to IP telephony, call center functionality, mobile telephony, etc.

Key Points

- **IP telephony** – supports powerful new e-business applications that allow small and medium businesses to level the field with larger competitors, extend network services to remote workers, increase portability, simplify adds, moves and changes, while eliminating call charges on site-to-site calls

- **Call center applications** – combines the reach of the Web with personalized agent interaction and customer support
- **Hybrid environment** – leverages existing investments in Nortel Meridian and Nortel Norstar systems as well as other vendor equipment, offering a future-proof migration strategy
- **Universal Internet access** – for all connected users and workstations, including access to corporate Intranets, support for intra-site virtual private networks (VPNs) and remote connectivity for mobile or home users
- **Simplified network infrastructure** – cuts costs by connecting IP phones over the LAN wiring system, seamlessly extending features to multiple sites through IP connectivity and streamlining network management
- **Wireless solutions** – anytime, anywhere access – that is the promise wireless brings: the ability to use the same applications you have access to from your desktop no matter where you are
- **Simple, intuitive management** – simplifies installations and provides an intuitive method of managing the network
- **Unified messaging** – allows users to manage all their voice, fax and email messages from a single application on a multimedia-equipped PC or laptop
- **Interactive voice response** – a self-service application designed to allow businesses to be accessible to their customers 24 hours a day, 365 days a year. Businesses can supply callers with access to a broad range of information simply by responding to a series of prompts via their touchtone phones.
- **Cost-effective scalability** – from 3 to 200+ stations using a mix of digital and IP stations

Nortel Business Communications Manager Software Release 3.7

Business Communications Manager Release 3.7 (BCM 3.7) is a software evolution for the BCM 200 and 400 platforms. BCM 3.7 includes the following features and system performance enhancements:

- Digital Mobility Solutions
 - Scalable from 1 to 64 users
 - Digital Mobility Controller 080 (DMC 080) – supports up to 8 handsets and 2 base stations (can link 2 for 16 handsets and 4 base stations)
 - Digital Mobility Controller 320 (DMC 320) – supports up to 32 handsets and 2 base stations (can link 2 for 64 handsets and 8 base stations)
 - Access to features and voice mail
 - No “dead zones” and no airtime charges
 - Long battery life for portable phones (work all day before recharging is required)
 - 4 handset models designed for general business or more rugged environments
 - Secure and confidential conversations
- Support for IP Phone 2007
- Optional capture of Call Detail Recording dialed digits
- Consolidated reporting for Integrated Voice Response (IVR)
- Communication Server interoperability via H.323
- Network Configuration Manager Updates
- Call forward to IP PSTN

Features and Benefits

The Nortel Business Communications Manager 50/200/400 is an integrated communications platform for both multi-site enterprises and single-site small to medium businesses. Each delivers a highly reliable, innovative, converged voice/data solution that enables a business to save money by streamlining costs and to make money by increasing revenues, expanding market reach and improving customer service. The BCM delivers PBX functionality along with no-compromise voicemail and auto attendant features. Combined with its robust quality of service (QoS) routing capability, it provides a single cost-effective solution for both data and voice needs. As businesses grow, the BCM functionality can be extended with a simple key code to deliver business-critical applications that positively impact the bottom line.

The BCM provides enterprise-level telephony and data services, all in an easily managed platform. From one platform, a business can cost effectively extend its communication capabilities. The Nortel Business Communications Manager system's built-in routing capabilities and data services such as firewall, web caching and network address translation (NAT) enable a business to connect its LAN to the Internet quickly, reliably and securely. The Nortel Business Communications Manager also offers an extensive range of communications applications – call center, unified messaging, VPN, auto attendant, wireless telephony – all accessed by simply entering a key code.

The top differentiators of the BCM 50/200/400 include:

- Comprehensive solutions that are easily implemented
- Choice of either IP-enabled or pure IP solutions
- Investment protection, since businesses may migrate without investing in completely new infrastructures
- The delivery of value-added applications, such as multimedia call center, IP telephony, voice and data networking, virtual private networks (VPNs), unified messaging and mobility
- Redundancy options, including power, fans and hard-drive, which automatically detect failures and switch over seamlessly without any loss of service

Nortel BCM 50

- For enterprises with as few as 3 desktops needing a complete converged platform
- 76 digital telephone users
- 32 IP telephone users
- Optional expansion units for adding up to 2 media bay modules
- Desk, wall and rack mount options
- 3 Factory configurations – BCM 50, BCM 50e (Integrated Ethernet Router) and BCM 50a (Integrated ADSL Router)

Nortel BCM 200

- 2 U high chassis supporting up to 2 media bay modules
- 32 digital telephone users maximum
- 90 IP telephone users maximum

Nortel BCM 400

- 4 U high chassis supporting up to 4 media bay modules
- Optional expansion cabinet for adding up to 6 additional media bay modules
- 192 digital telephone users maximum (with expansion gateway)
- 90 IP telephone users maximum
- Optional redundant hard drive + RAID controller
- Optional redundant power supplies and fans (main and expansion cabinet)

Market Information

- Unlike other integrated solutions, the Nortel BCM offers full redundancy and PSTN fallback.
- The Nortel BCM delivers the widest range of enterprise-strength applications in a single, integrated solution.
- Value-added services can be implemented with a key code rather than adding hardware.
- No competitor offers as many telephony features.
- Out of the box, it offers unparalleled ease of configuration and management.
- Even if the IP network or WAN goes down, users still maintain quality call processing and get rock solid reliability.
- The Nortel BCM delivers convergence capabilities previously available only to large enterprises.

Technical Specifications

Platform	BCM 200	BCM 400	BCM 50	BCM 50a	BCM 50e
Telephone Sets Supported					
IP Phones					
IP Phone 2001, 2002 and 2004	✓	✓	✓	✓	✓
IP Phone 2007 (200/400 - Release 3.7)	✓	✓			
IP Softphone 2050	✓	✓	✓	✓	✓
Mobile Voice Client 2050	✓	✓			
Digital Desktop Telephones					
T7100, T7208, T310, T316 and T316e	✓	✓	✓	✓	✓
T24 Key Indicator Module	✓	✓	✓	✓	✓
Digital Doorphone and Opening Controller	✓	✓			
WLAN Handsets					
2210 and 2211	✓	✓			
Digital Mobility Sets Supported					
C4010, C4010Ex, C4020, C4050	✓	✓			
T7406 900MHz Cordless Telephone	✓	✓	✓	✓	✓
Environmental					
Dimensions					
	18.3" W 17.5" D 3.5" H	18.3" W 17.5" D 3.5" H	12" W 8.5" D 2" H	12" W 8.5" D 2" H	12" W 8.5" D 2" H

Platform	BCM 200	BCM 400	BCM 50	BCM 50a	BCM 50e
Power	Standard Power Supply – Auto Sensing; 300 Watts; 90/264 VAC; 6.0A / 3.0A, 60/50 Hz Redundant Power Supply – BCM 400 only Auto Sensing; 350 Watts; 90/264 VAC; 7.0A / 3.5A, 60/50 Hz		External Power Supply	External Power Supply	External Power Supply
Trunk Types Supported					
Loop, E and M, DID, Ground Start T1 trunks	✓		✓	✓	✓
Class/CMS services	✓		✓	✓	✓
UK DASS2 and DPNSS	✓		✓	✓	✓
Euro, France, Italy and Switzerland ISDN	✓		✓	✓	✓
MCDN networking (over PRI and IP)	✓		✓	✓	✓
PRI-DMS100/SL100	✓		✓	✓	✓
Q.sig networking via PRI	✓		✓	✓	✓
Voice Applications					
Basic Software Features	Over 200 PBX telephony features				
Basic Call Center					
Active Agents - Maximum	10	10	10	10	10
Skillsets - Maximum	2	2	2	2	2
Number of Lines (trunks) - Maximum	15	15	15	15	15
Recorded Announcements	30	30	30	30	30
Routing steps in routing table	20	20	20	20	20
Intelligent Overflow - Change Priorities	✓	✓	✓	✓	✓
Call routing step to custom auto attendant greeting	✓	✓	✓	✓	✓
Real time status display	✓	✓			
Reporting for Call Center	✓	✓			
Expected Wait Time	✓	✓	✓	✓	✓
Supervisor Help and Silent Monitor	✓	✓	✓	✓	✓
Caller ID on agent sets	✓	✓	✓	✓	✓
Agent's set forwarded to agent's mailbox	✓	✓	✓	✓	✓
Professional Call Center - includes Call Center basic features plus the following:					
Active Agents - Maximum	80	80			
Skillsets - Maximum	50	50			
Maximum Number of Lines (trunks)	100	100			
Recorded Announcements - Maximum	150	150			
Dynamic Agent Prioritization per Skillset	✓	✓			
Call Routing Enhancements	✓	✓			
Overflow Enhancements	✓	✓			

Platform	BCM 200	BCM 400	BCM 50	BCM 50a	BCM 50e
Reporting for Call Center (RCC)	✓	✓			
Multi Media Call Center (Click for agent voice or chat, Web page push, Follow-me browsing, TAPI 2.1 CTI, IVR toolkit, etc.)	✓	✓			
Auto Attendant, CCR Trees					
Auto Attendant	✓	✓	✓	✓	✓
Centralized Auto Attendant					
- BCM-to-BCM	✓	✓	✓	✓	✓
- BCM-to-Norstar	✓	✓	✓	✓	✓
- CS1000 to BCM	✓	✓	✓	✓	✓
Park and Page from mailbox			✓	✓	✓
Messaging					
- Fully featured voice messaging with up to 1000 mailboxes	✓	✓	✓	✓	✓
- Unified Messaging support for: Outlook, Outlook Express, Lotus Notes, Qualcomm Eudora Pro, Novell Groupwise and Netscape Messenger	✓	✓	✓	✓	✓
- Centralized Voice Messaging - BCM to BCM, BCM to Norstar, CS1000 to BCM	✓	✓	✓	✓	✓
Fax Services					
- T.38 FAX over IP	✓	✓	✓	✓	✓
- Fax Messaging, Fax Overflow and Fax-on-Demand	✓	✓	✓	✓	✓
Voice Networking					
H.323 Gateway, H.323 v4 support	✓	✓	✓	✓	✓
SIP trunking (BCM to BCM)	✓	✓			
Communication Server 1000 H.323	✓	✓	✓	✓	✓
Meridian IP Trunk 3.01 H.323	✓	✓	✓	✓	✓
CS2000 H.323 (SN07 and SN08)	✓	✓			
MCS5100 H.323	✓	✓	✓	✓	✓
Gatekeeper interworking					
- Radvision ECS 2.01 and ECS 3.2	✓	✓			
- NetCentrex	✓	✓			
- CS1000 Signaling Server (RIs 3.0) /CS1000 NRS (RIs 4.0)	✓	✓	✓	✓	✓
- CS2000	✓	✓			
H.245 Tunneling and MCDN over H.323	✓	✓	✓	✓	✓
WAN Interfaces					
Ethernet WAN Interface	✓	✓			✓
Integrated ADSL Modem				✓	
V.35, Dual v.35, X.21, V.90	✓	✓			
T1 with built in CSU/DSU	✓	✓			
ISDN dial-on-demand	✓	✓			

Platform	BCM 200	BCM 400	BCM 50	BCM 50a	BCM 50e
LAN Interfaces					
Ethernet LAN Interfaces	1 or 2	1 or 2	up to 3	up to 6	up to 6
10/100 Auto-Negotiating	✓	✓		✓	✓
Auto-Sensing				✓	✓
Protocols					
IP	✓	✓	✓	✓	✓
IPX	✓	✓			
Frame Relay	✓	✓			
Point to Point Protocol (PPP)	✓	✓		✓	
Multilink PPP (MLPPP)	✓	✓			
Point to Point Protocol Over Ethernet (PPPoE)	✓	✓		✓	✓
PPP Fragmentation	✓	✓			
RTP Header Compression	✓	✓			
DLCI-to-IP Mapping for Frame Relay	✓	✓			
Routing					
Open Shortest Path First (OSPF)	✓	✓			
Static, RIP / RIP v2	✓	✓		✓	✓
SAP and RIP for IPX (Novell)	✓	✓			
LAN- LAN Fastpath	✓	✓			
LAN traffic smoothing	✓	✓			
Security & Firewalls					
Network Address Translation (NAT)	✓	✓		✓	✓
Stateful packet filtering	✓	✓		✓	✓
PPTP (point to point tunneling protocol)	✓	✓			
IPSec VPN support	✓	✓		✓	✓
IPSec Client Termination	✓	✓			
H.323 signal and media transparency	✓	✓			
SSL - Secure Socket Layer support	✓	✓			
SSH - Secure Shell Support	✓	✓			
Secure dial back	✓	✓			
PAP/CHAP	✓	✓	✓	✓	✓
Two-way authentication	✓	✓	✓	✓	✓
QoS					
DiffServ	✓	✓	✓	✓	✓
QoS for business sets, fallback to PSTN	✓	✓			
QoS for station side IP sets	✓	✓			
COPs PR Policy management support	✓	✓			
H.323 media QoS	✓	✓	✓	✓	✓
IP Services					
Directory Name Service (DNS) proxy	✓	✓		✓	✓
DHCP Server	✓	✓		✓	✓

Platform	BCM 200	BCM 400	BCM 50	BCM 50a	BCM 50e
DHCP Relay Agent	✓	✓		✓	✓
Web Caching	✓	✓			
Multiple IP Addresses per interface	✓	✓		✓	✓
Direct Mode for Multiple IP Addresses	✓	✓			
Netlink Manager	✓	✓			
VPN Management					
IPSec tunnels and VPN	✓	✓		✓	✓
PPTP tunnels and VPN	✓	✓			
VoIP transport through IPSec tunnels (branch to branch)	✓	✓		✓	✓
Nortel VPN Router client support	✓	✓			
IPSec encryption, authentication, protocol and NAT Traversal	✓	✓		✓	✓
Firewall Content Filtering				✓	✓
Firewall Management	✓	✓		✓	✓
System Management					
Unified Manager system management interface	✓	✓			
SNMP Traps	✓	✓	✓	✓	✓
Network configuration manager for multi-site management and configuration of up to 2000 Nortel BCM 50/200/400 nodes	✓	✓	✓	✓	✓
Element Manager			✓	✓	✓
Mobility Software Service Tool (when equipped with DMC)	✓	✓			

Ordering Information

For further information, please contact your local Nortel representative.

> Nortel Enterprise IP Telephony Portfolio

The Nortel Enterprise IP Telephony offering is comprised of the Nortel Communication Server (CS) 1000 portfolio of fully featured IP-distributed communications systems that deliver the benefits of network convergence along with collaborative communications for today's increasingly "virtual" enterprise environment. The Communication Server 1000 portfolio includes the CS 1000S, 1000M and 1000E platforms along with a variety of IP Communications Gateways and IP Remote Gateways. Nortel's innovative Remote Gateway Portfolio allows the enterprise to extend communications services to teleworkers and branch offices. With the wide variety of solutions, customers can choose the solution that best fits their needs based on branch office size, feature requirements, environment and budget.

The Communication Server 1000 platform operates on Nortel CS 1000 Software (currently Release 4.5). It offers a robust set of telephony features coupled with new SIP-based functionality that provides a fully integrated multimedia solution. System Administration is performed using Optivity Telephony Manager along with Element Managers.

Nortel Communication Server 1000 helps organizations change the way they work by giving home, mobile and team users secure advanced business communications services away from the office. Users get secure services from any high-speed Internet connection point, and the enterprise gets investment protection and low total cost of ownership.

- Nortel Communication Server 1000 portfolio
 - Communication Server 1000 Software (currently Release 4.5)
 - Communication Server 1000S
 - Communication Server 1000E
 - Communication Server 1000M Chassis / 1000M Cabinet / 1000M Single-Group (SG)/ 1000M Multi-Group (MG)
- CS 1000 Element Manager
- Nortel Media Gateway 1000 portfolio
 - Media Gateway 1000S
 - Media Gateway 1000E
 - Media Gateway 1000T
- Nortel Remote Media Gateway portfolio
 - Media Gateway 1000B
 - Survivable Remote Gateway portfolio
 - Survivable Remote Gateway 50 (built on BCM 50 platform)
 - Survivable Remote Gateway 1.0 (built on BCM 200 and BCM 400 platforms)
 - Remote Gateway 9100 Series
 - Remote Gateway 9115
 - Remote Gateway 9150
- Nortel Optivity Telephony Manager (OTM)

Nortel Communication Server 1000 Portfolio

Overview

The Nortel Communication Server 1000 portfolio is an enterprise IP Telephony solution supporting a flexible mix of phones, applications and PSTN gateways connected over a converged network. Telephones supported include IP phones, digital TDM phones, analog TDM phones, DECT cordless and 802.11 wireless LAN phones as well as software phones on PCs and PDAs. The Communication Server 1000 contains all the business telephony features and services developed for the market leading Nortel Meridian 1 PBX plus new innovative features for IP convergence. It supports business applications for personal productivity, team productivity, mobility, customer service and management control. The Communication Server 1000 also provides advanced networking services to other Nortel and non-Nortel equipment using industry standards to protect customer investments and to keep total cost of ownership among the lowest in the industry.

Ideal For

- Enterprises with a mobile workforce (e.g., sales and service engineers, consultants, executives, casual or part-time home workers)
- Enterprises with multi-site networks
- Enterprises with Nortel Meridian 1 PBX systems, which can easily upgrade to a Communication Server 1000 system to save money
- Enterprises that want the latest business telephony features and services available
- Enterprises that have a large number of adds, moves and changes
- Enterprises with Greenfield (new) sites or fully depreciated PBXs
- Enterprises that want to transform the way they work

Business Challenges

- Do you need to reduce your communications costs?
- Are you looking to improve productivity and provide consistency through all your locations large and small?
- Do you need an improved plan for Disaster Recovery?
- Would you like to increase your contact center revenue through geographic independence of Contact Center Agents?

- Do you plan to deploy IP Telephony now or in the future?
- Are you interested in improving the productivity of your mobile workforce?

Typical Applications

- Home worker solutions (e.g., Remote Gateway 9115, IP Softphone 2050, PC/Web access to business IP Telephony applications)
- Mobile worker solutions (e.g., Mobile Voice Client 2050, Web browser access to business IP Telephony applications)
- Team working solutions (e.g., boss-secretary services, conference bridge with Outlook™ integration, personal call assistant to link phone to Nortel MCS 5100 multimedia collaboration software)
- Personal productivity solutions (e.g., Nortel Integrated Call Director, Nortel Integrated Call Assistant to link phone to Nortel MCS 5100 productivity software, presence so you can see if colleagues are available to take a call, multimedia call handling, instant messaging to get quick answers to questions)
- Switchboard operator services (e.g., support for software applications, barge in, break in, camp on to busy extension)

- Management control solutions to proactively manage the network (e.g., integrated billing, unified directory services, global changes, "what if" analysis for planning ahead, alarm management, reports, easy configuration tools)

Network Diagram



Key Points

- Distributed architecture over converged network
- Software built upon the highly reliable, feature-rich Meridian PBX feature set
- Full application portfolio support – Nortel and Developer Partner Program compatible applications
- Multiple built-in reliability mechanisms – no single point of failure, robust operating systems

- Highly scalable – from 1,000 to 15,000 IP clients per call server (100,000 in a centrally managed network)
- Centralized management control and dialing plan for 100,000 IP clients
- Centralized and networked business communication services
- IP telephony service overlay that works on any open standards based data network
- Optional support for campus and geographic redundancy with CS 1000E

Nortel Communication Server 1000 Software



Leading Edge Technology

Anywhere, anytime, any device

System grows as the business grows

Workforce Globalization without loss of capabilities

Operation Resiliency

- Flexibility (Access)
- Dynamic Packet Core
- Standards based & Secure
- Multi-service Support

Network Transformation

- Mobility
- Personalization
- Engaged Services
- Multimedia Collaboration
- Flexibility (Service & Client)

Business Transformation

Nortel Communication Server 1000S

The Communication Server 1000S is a fully distributed IP Telephony solution with all of the features and capabilities of a PBX, designed primarily to support Nortel IP Phones, but with support for analog and digital phones as well.

- Scalable – supporting up to 1,000 IP clients per call server
- Distributed Call Server and Gateways
- Redundant Gatekeepers, Gateways and Client Proxies
- WAN Gateway survivability
- Uses Media Gateway 1000S (up to 4 per system) to provide local access to TDM devices such as RAN/Music, Conference/Tones, Analog/Digital lines and Analog/Digital
- Seamless network integration, simplified management, greater flexibility in deployment and reduced support costs

Nortel Communication Server 1000E

For Enterprises that want to deploy a full IP PBX architecture supporting a large number of users, the Communication Server 1000E can be deployed either at a single location or

distributed throughout a QoS managed IP network. The Communication Server 1000E introduces a redundant call processor configuration.

- Scalable – supporting up to 15,000 IP clients per call server
- Redundant Call Servers, Gatekeepers, Gateways and Client Proxies
- Campus Mirroring – known as “split core,” allows active and inactive call servers of the system to be physically separated up to 25 miles (40 km) across a campus using a high-speed link
- Geographic Redundancy – allows for a redundant CS 1000 system to be deployed at a remote location over any distance via the WAN to take over call processing if the primary system fails or is the subject of a major disaster
- Uses Media Gateway 1000E (up to 30 per system) to provide local access to TDM devices, to support Analog/Digital lines and to support Analog Trunks
- Uses Media Gateway 1000T to provide digital trunk PSTN access

Nortel Communication Server 1000M

The Communication Server 1000M transforms a Nortel Meridian 1 PBX into an IP PBX. Equipped with signaling servers and running on Communication Server 1000 software, the Communication Server 1000M's functionality is no different than a CS 1000S/E. It is available in the following configurations:

- Communication Server 1000M – Cabinet / Chassis (11C Cabinet / Chassis)
- Communication Server 1000M – Half-Group (51C)
- Communication Server 1000M – Single Group (61C)
- Communication Server 1000M – Multi-Group (81C)

The Communication Server 1000M supports:

- Scalable up to 15,000 IP clients per call server and 16,000 digital or analog clients
- Redundant Centralized Call Processor and Gateways
- Distributed Remote Gateways
- Integrated Media Gateways for trunk and line application interfaces
- Provides investment protection and allows for migration to IP Telephony

CS 1000 Series System Management

Systems Management is performed using Nortel's Optivity Telephony Manager along with Element Manager. Element Manager is a simple, user-friendly Web-based interface that supports a broad range of system management tasks including:

- Configuration and maintenance of IP Peer and IP Telephony features
- Configuration and maintenance of traditional routes and trunks
- Configuration and maintenance of numbering plans
- Configuration of Call Server data blocks
- Maintenance commands, system status inquiries, backup and restore functions
- Software download, patch download and activation

Element Manager resides on the Signaling Server and can be accessed directly through a Web browser or via Optivity Telephony Manager. The Optivity Telephony Manager System Navigator includes integrated links to each network system and its respective instances of Element Manager.

Nortel Media Gateway 1000 Portfolio



Distributed throughout the IP network, Nortel Media Gateway 1000 acts as a bridge between IP and traditional telephony networks (such as the PSTN) by housing various cards that perform line, trunk and translation functions. The hardware for the entire Media Gateway 1000 portfolio has the same characteristics: 4 slots that can be used for media cards, analog and digital line cards, analog and digital trunk cards as well as various applications.

Nortel Media Gateway 1000S

The Media Gateway 1000S is used with the Communication Server 1000S to support PSTN trunks, analog/digital telephone resources, TDM application cards and Voice Gateway Media Cards. Each Media Gateway can support one Media Gateway Expander. The Media Gateway 1000S contains a gateway controller card (called SSC card) and four slots for flexible configurations of line, trunk and application cards. The SSC card controls the interface and application cards and acts as a call processor in the survivable mode. The Call Server database is automatically synchronized onto this controller. Application cards provide interfaces to applications like CallPilot and Nortel Integrated Applications portfolio.

Nortel Media Gateway 1000E

The Media Gateway 1000E is used with the Communication Server 1000E to provide basic telephony media services – including tone detection and generation and conference – to phones. It operates under direct control of the call server and can support an optional Media Gateway 1000E Expander. The Media Gateway 1000E contains a gateway controller card (called SSC card) and four slots for IPE cards and Voice Gateway Media Cards. The Media Gateway 1000E supports CallPilot and Nortel Integrated applications. It also provides direct physical connections for digital and analog (500/2500-type) telephones as well as analog trunks for telephone and fax.

Nortel Media Gateway 1000T

The Media Gateway 1000T provides the Communication Servers 1000E/S with digital trunk and PRI access to the PSTN and to other PBX systems. The Media Gateway 1000T contains a gateway controller card (called SSC card) and four slots for IPE cards. It also supports an optional MG 1000T Expander. Unlike the MG 1000Es, the MG 1000T platform does not operate under the direct control of the CS 1000E Core Call Servers. Instead, the MG 1000T provides the primary processing for the MG 1000T platform. The MG 1000T Core SSC card controls the circuit cards in the MG 1000T Core and all cards in up to four MG 1000T Expansions. The MG 1000T supports Media Cards, Digital PSTN Interface Cards (E1, T1, ISDN), Analog Trunk Cards, Service Cards and DECT Mobility Cards.

Features and Benefits

- Mobility services to provide office anywhere functionality enables users to access the same set of business communication services securely from any high-speed Internet connection point as easily as if they were in the office.
- Instant office moves at zero cost (e.g., DHCP IP phones, network-wide virtual office to securely log-in at any IP phone in network, and IP software phone on PC/PDA).
- Designed to scale to meet growing enterprise requirements with 1,000 to 15,000 IP clients per call server, multiple call servers networked with transparent IP networking and a single gatekeeper that supports up to 100,000 IP clients.

- Built-in reliability is based on WindRivers VxWorks operating system and a proven feature set with multiple resiliency mechanisms, including survivable call servers, signaling server redundancy configurations and survivable WAN gateways.
- Extensive desktop portfolio includes IP phones, software phones and 802.11 wireless LAN phones, as well as digital and analog phones to meet diverse end-user requirements.
- Supports business-critical applications, including Nortel Contact Center, Nortel Messaging and integrated services such as conferencing, one-number-follow-me, call director, recorded announcement, network-wide attendant and messaging. A personal call assistant networks with multimedia services provided by Nortel MCS 5100.
- A range of survivable branch office gateways is based on phone type and size (Nortel Remote Gateway Series for digital sets, Nortel Enterprise Media Gateway 1000B for branch offices supporting 50-400 users, Nortel Survivable Remote Gateway for 5-90 IP phones), plus support of compatibility tested third-party PSTN gateways.
- Supports new desktop capabilities including network-wide virtual office (the ability to log into any IP phone in the network as a personal phone) and corporate directory (access to network directory using Optivity Telephony Manager, which is LDAP compatible with an organization's unified directory) and a wide range of data applications for IP phones (available in cooperation with Nortel Select Product Partner Net6).
- Support for multi-vendor networking standards (e.g., DPNSS, Qsig, H323, SIP) enables enterprises to leverage existing investment to new users (including centralized voicemail, unified messaging and operator switchboard services) without requiring duplication of these services across platforms.

Market Information

According to Dell'Oro Q4 2004 report, Nortel:

- Is #1 in total telephony lines shipped for the 16th consecutive quarter
- Has 15% market share
- Is #1 in analog and digital lines shipped
- Is #2 in IP lines shipped (essentially tied with Cisco – only 0.5% fewer)
- Is #2 in IP phone revenue
- Is #3 in total voice revenue

Nortel recognizes that businesses are at different stages, therefore we cater for varying needs – whether a new organization (“Greenfield”) or installed base. IP Telephony can be implemented in a migratory fashion (hybrid digital/IP) or as a pure IP PBX (100% IP). Nortel is the only vendor to offer the flexibility and choice to meet individual needs along with assurances of product reliability, investment protection, an understandable cost-effective migration path, market price and proven reputation.

Our Meridian 1 customers have an excellent migration path to convergence. IP Telephony capabilities can be implemented as an addition to existing Nortel Meridian 1 systems, sharing applications and supporting featured interworking between systems, or can evolve Meridian 1 to Nortel Communication Server 1000, preserving significant existing investments in end-user training and equipment. This demonstrates a proven commitment to our evergreen philosophy of investment protection combined with our innovation spirit.

Nortel Communication Server 1000 fully leverages Nortel Meridian 1 PBX software feature set and expertise, supporting the full suite of telephony features developed by Nortel based on business demand and feedback over the past 20 years – a \$1 billion investment over time. This results in an IP Telephony offering with robust feature and application support.

We are helping companies like yours create a better experience for customers and employees alike by providing solutions that address your unique business realities. Delivering the value of IP Telephony, powerful new IP-based applications and advanced wireless technologies can improve customer service and increase internal efficiency, enabling your

company to achieve a strategic edge over its competitors. Whether you're creating a new IP-based voice/data network or integrating powerful IP solutions into your existing digital telephony environment, Nortel has the experience and complete range of solutions needed to help ensure your success.

Technical Specifications

Platform	CS1000S	CS1000M	CS 1000E
Call Server			
Capacity	1,000 IP Users	15,000 IP Users (MG) 2,000 IP Users (SG) 1,000 IP Users (HG)	15,000 IP Users
Port Capacity	1,248	16,500	16,500
Operating System	VxWorks from WindRiver Systems Inc.		
CPU/Memory	M68040 Call Processor, 48MB Flash, 32 MB DRAM	Redundant CP PIV Call Processor; Flash not required, 256MB DRAM	
Software Features	Over 650 PBX Telephony Features		
Call Control APIs	TAPI		
Geographic Redundancy		SG and MG Only	Yes
Campus Redundancy (Split Core)			Yes
Mounting	19" Rack Mountable Call Server, Signaling server and Media Gateways	19" Rack Mountable signaling Server, and Media Gateways	19" Rack Mountable Call Server, Signaling server and Media Gateways
Geographic Distribution	Call Servers and Gateways		Call Servers and Gateways
Busy Hour Call Completions	20,000 BHCC TDM Calls, 240,000 BHCC IP Calls	280,000 BHCC IP – based Calls (MG)	240,000 BHCC IP – based Calls
Maximum Number of IP Phones	1,000	15,000 (MG) 2,000 IP Users (SG) 1,000 IP Users (HG)	15,000
Maximum Number of Digital Phones	480	16,000	3000
Maximum Number of Analog Phones	480	16,000	3000
Telephones			
IP Telephones and Clients	2001, 2002, 2004, 2007, 2033, WLAN 2210 and 2211, IP Softphone 2050, MVC 2050, Nortel Multimedia PC Client, Nortel Multimedia Web Client		
Digital Telephones	M3901, M3902, M3904, M2006, M2008, M2008HF, M2616, M2216ACD		
IP Phone Power options	802.3af Power over LAN, Power over LAN Hub and local AC adapter		
Attendant Services	Attendant PC Console and M2250 Attendant Console		

Platform	CS1000S	CS1000M	CS 1000E
Trunk Types Supported			
	Virtual Trunks with IP Peer Networks Digital: DTI, ISDN-PRI, ISDN-BRI Analog: Loop and Ground Start CO, FX, WATS, 2 or 4 wire E&M, 4 wire DX, DID, TIE, RAN, Paging		
Applications Supported			
IP Line 4.0	Nortel Media Card – 8 Port Nortel Media Card – 32 Port		No
IP Remote Services	Remote Gateway 9100 Series, Media Gateway 1000B, Survivable Remote Gateway Portfolio		
Nortel Messaging	Call Pilot 201i, 703t, 1002rp and Nortel Hospitality Messaging Server 400		
Nortel Contact Center Express	Up to 300 agents with up to 175 actively logged on (subject to capacity)		
Nortel Contact Center Manager	Configurable to 3000 agents with 175 actively logged on (subject to capacity)	Configurable up to 3,000 agents with 2,200 actively logged on (subject to capacity) *Increases to 3,000 actively logged on with CP PIV introduction (Rls 4.5)	
Nortel Self Service	VPSis: Configurable to 4 T1/E1 spans (96/120 ports) on a single system. With clustering, max capacity is 15,000 ports (configuration dependent)	VPSis: Configurable to 4 T1/E1 spans (96/120 ports) on a single system. With clustering, max capacity is 15,000 ports (configuration dependent). Media Processing Server 500: Configurable to 8 T1/E1 spans (192/240 ports) in a single system. Multiple systems can be networked together for additional capacity. Media Processing Server 1000: Configurable to 64 T1/E1 spans (1,536/1,920 ports) in a single cabinet. Multiple cabinets can be networked to increase capacity to 384 T1/E1 spans (9,216/11,520 ports) in a Managed Cluster (configuration dependent).	
Multimedia Communication Server (MCS) 5100	Micro System and Enterprise System		
Nortel Integrated Applications	Integrated Conference Bridge Integrated Recorded Announcer Integrated Call Assistant Integrated Call Director Integrated Voice Services		
Wireless Applications	WLAN Handsets 2210, 2211, 2212 and DECT 4060 WLAN IP Telephony Manager 2245 WLAN Application Gateway 2246 WLAN Mobile Adapter 2202 Nortel Wireless Access Point 2300 WLAN Security Switch 2350, 2360, 2361, 2370, 2380 Nortel Wireless Mesh Networks Wireless Gateway 7250 Wireless Access Point 7720 Wireless Bridge 7230		
Network/System Management	Optivity Telephony Manager Element Manager		
Systems Capabilities			
Network Signaling Protocols	H.323v4, SIP, 802.1 p/q, DiffServ, 802.3af, 802.11 a/b/g, SNMP, DHCP, RTP, RTCP, VPIM, plus the following SIP RFCs: 2976, 3261, 3262, 3263, 3264, 3265, 3311, 3323, 3326 and 3515 with Nortel Multimedia Communication Server (MCS) 5100		

Platform	CS1000S	CS1000M	CS 1000E
Redundant Options	Call Servers (Standard) Signaling Server (Gatekeepers, Gateway Proxy and Terminal Proxy)		
Survivable Elements	Call Server, Media Gateways including Media Gateway 1000B, SRG Portfolio	SRG Portfolio and Media Gateway 1000B	
Environmental			
Input Voltage	Call Server:		
	AC: 110-240V, 50/60 Hz DC: -48V	AC: 240V, 50/60 Hz DC: -48V	AC: 110-240V, 50/60 Hz DC: N/A
	Signaling Server:		
	AC: 100-240V, 50/60 Hz DC: N/A		
	Media Gateway:		
	MG 1000 and MG Expansion: AC: 110-240V 50/60 Hz DC N/A	Integrated MG / IPE Module: AC: 240V 50/60 Hz DC: -48V	MG1000 and MG Expansion: AC: 110 - 240V 50/60 Hz DC N/A
Dimensions			
	Signaling Server:		
	16.8" Weight; 22.0" Depth; 1.7" Height Weight: 20lb per unit		
	Call Server:		
	17.3" Width 13.5" Depth 3.8" Height Weight 18.9 lb	(Core/Net Modules) Top Cap 32" Wide 22" Depth 4" Height Weight 15 lbs Module(s) 32" Wide 22" Depth 34" Height Weight 380 lbs Pedestals(s) 32" Wide 26" Depth 10" Height Weight 80 lbs	17.4" Width 15.5" Depth 5.2" Height Weight 29 lb

Platform	CS1000S	CS1000M	CS 1000E
	Media Gateway:		
	1000S and 1000S Expansion 17.2" Width 12.8" Depth 8.4" Height Weight 30 lb	Integrated MG/IPE Module) Top Cap 32" Wide 22" Depth 4" Height Weight 15 lbs Module(s) 32" Wide 22" Depth 17" Height Weight 190 lbs Pedestals(s) 32" Wide 26" Depth 10" Height Weight 70 lbs	1000E and 1000S Expansion 17.2" Width 12.8" Depth 8.4" Height Weight 30 lb

Nortel Remote Gateway Portfolio

Nortel offers a wide variety of remote gateway solutions that extend enterprise communications to teleworkers and remote offices. With Nortel Remote Gateway 9100 Series, the enterprise can extend 450+ features and system resources to those working away from the main office, while leveraging the investment of a central corporate PBX. Using the Nortel Survivable Remote Gateways (Release 1.0) and Survivable Remote Gateway 50, an enterprise under network failure conditions has continued telephone services in a cost-effective manner for IP clients at even the smallest remote sites. Using Nortel Media Gateway 1000B, up to 400 users can be distributed across an IP WAN in a survivable environment that supports the same analog and digital line and trunk cards and phones as that of the main site.

Nortel's innovative remote products allow enterprise customers to choose the solution that best fits their needs based on branch office size, feature requirements, environment and budget:

- Media Gateway 1000B
- Survivable Remote Gateway 50
- Nortel Survivable Remote Gateway 1.0 (BCM 200 and BCM 400)
- Remote Gateway 9115
- Remote Gateway 9150



Nortel Media Gateway 1000B

Overview

The Media Gateway 1000B allows larger groups of users to be distributed across an IP WAN to branch office sites with seamless feature and application transparency with a Communication Server 1000 at the main site. It supports up to 400 IP users and provides access to an array of PSTN trunk types as well as line interfaces located at the branch office. IP Phones at the branch office are managed from the main site. The survivability feature allows IP Phones that are centrally managed from the main site to fail over to a "survival mode," retaining all available features. Survival mode engages automatically if the IP WAN fails and reverts back when the IP WAN is back to normal operation.

Ideal For

- Enterprise customers with a main office and multiple branch and remote offices ranging in size from 80-400 users
- Customers who desire centralized management of branch solutions
- Customers who require survivability of branch/remote offices
- Customers who are interested in deploying a mix of analog, digital and IP Phones at the branch

- Do branch employees need to share productivity tools such as unified messaging?
- Are you interested in streamlining costs for trunking and network management?
- Are reliability and availability critical for your branch office?

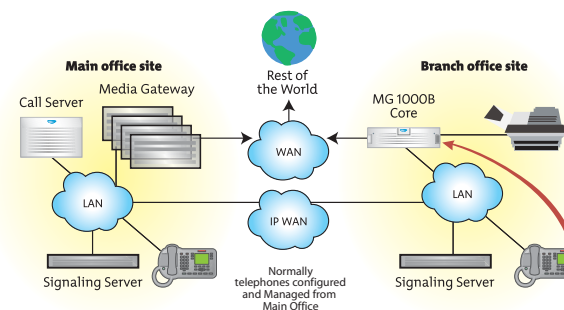
Typical Applications

- Larger branch offices that want to leverage the features and functionality of a central corporate PBX while still providing a local presence in the distant community served, such as hospital clinics, school districts, banks or sales offices
- Multi-site enterprises that want to share Nortel Messaging and Nortel Contact Center applications with remote sites over converged voice/data networks
- Customers with mission-critical operations at the branch level

Business Challenges

- Are you looking for investment protection and scalable solutions that grow with the branch?
- Do you need to deliver consistent communication services to all employees regardless of physical location?

Network Diagram



Key Points

- The Media Gateway 1000B is used to extend CS 1000 features from a main office to a remote office.
- The Media Gateway 1000B can be purchased as new hardware or it can be created by converting an existing Small System (Meridian 1 - 11C) into an MG 1000B. The functionality is the same in both configurations, with one additional feature (Meridian Mail) being supported in the converted system.
- The MG 1000B platform includes an MG 1000B Core connected to an IP PBX at the main office over a LAN or a WAN. This enables a secondary location to centralize the call processing of its IP-based communication network. The Call Server at the main office provides the call processing for the IP Phones in both the main office and branch office locations.
- The MG 1000B provides call processing functionality to local digital telephones and analog devices. In addition, the MG 1000B provides digital and analog trunk access to the local PSTN.
- If the main office fails to function, or if there is a network outage, the Small System Controller (SSC) card in the MG 1000B Core provides service to the telephones located at the branch office location. This enables the IP Phones to survive the outage between the branch office and the main office.
- Main office can be any of the following: CS 1000S, CS 1000M or CS 1000E.

- More than one branch office location can be associated with a single main office. In addition, one branch office location can be associated with more than one main office.
- A branch office is designed to work with a main office only if the two offices use a common dialing plan.

Features and Benefits

- **Simplified Administration** – Provided through a single database at the main site.
- **Cost Reduction** – Applications at the main site can be used by the remote users including Nortel Messaging and Contact Center Manager.
- **Peer to Peer Networking** – All of the advantages of direct IP to IP calls and intelligent VoIP call routing via the centralized H.323 Gatekeeper apply.
- **Geographic Distribution** – The main site is aware of the trunks at the remote so it is truly a single system that is geographically distributed yet intelligent.
- **911 Support** – Calls at the remote location will always go out via a trunk that is local to the remote.
- **User Consistency** – The user experience at the branch is the same as at the main site, which simplifies training and saves money.
- **Trunk Interfaces** – A wide range of trunk interfaces are available at the remote, such as DTI, PRI, BRI, analog and IP.
- **Survivability** – The MG 1000B transforms into its own completely independent IP PBX system until WAN connectivity is returned.

Nortel Survivable Remote Gateway Portfolio



Overview

The Nortel Survivable Remote Gateway (SRG) 1.0 (BCM 200) and SRG 1.0 (BCM 400) seamlessly extend the services and applications of a Nortel Communication Server 1000 Series system at a headquarters site to the smallest remote sites. In addition to the SRG 1.0 (BCM 200) and the SRG 1.0 (BCM 400), there is a new “mini” model for the smaller branch office, known as the Nortel Survivable Remote Gateway (SRG) 50 (available Q3 '05). Introduced with Communication Server 1000 Software Release 4.5, it is cost optimized for sites ranging from between 5–32 users.

While the Nortel SRG 1.0 platform is based on the market-leading small site IP telephony solution and Nortel Business Communications Manager 200 and 400, the Nortel Survivable Remote Gateway 50 is based on the BCM 50. The SRG series has been designed to provide continued telephony services for IP clients under network failure conditions – and to do so in a very cost-effective manner at smaller locations.

The SRG portfolio is not only cost effective at smaller sites, but are also highly reliable solutions that include the intelligence to drive Nortel IP terminals while providing IP routing capabilities and a suite of PSTN interfaces to enable local PSTN access. They are capable of addressing the needs of smaller branch offices ranging in size from 5 to up to 80 users.

Ideal For

The SRG Portfolio is ideal for any business with branch office locations or remote sites and is particularly well suited for:

- Existing Nortel enterprise customers who want the business features and service capabilities of a Nortel Meridian 1 on an IP telephony communications server delivered with Nortel Communication Server 1000 extended to remote sites with survivability
- Companies that want a scalable IP PBX that offers a redundant call server with services that can be extended to remote sites with survivability
- Companies with one or more of the following issues:
 - A C-level executive requirement that the organization use leading-edge technology: converged solutions
 - An interest in leveraging the data network for IP-based converged applications
 - A desire to standardize voice services at remote sites after acquisitions

- The opening of new branch offices
- Outgrown, fully depreciated or lease expiration on an existing PBX or key system

Business Challenges

- Have you ever thought about creating a communications infrastructure that was simpler and easier to manage?
- Have you considered the cost savings you could realize by moving to an IP telephony-enabled network?
- Are you concerned with increasing employee productivity?
- Are you concerned about the cost of network access fees and toll charges between your offices?
- Are you looking for a solution that lets your employees collaborate and communicate more effectively with each other?
- Do you need to extend desktop applications and features across your network?
- Are you looking for an effective way to accommodate mobile workers?

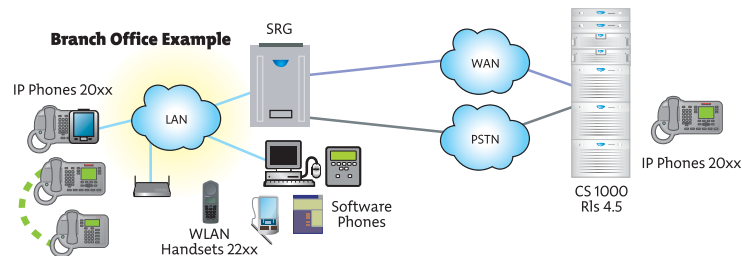
Technical Specifications

Features	MG 1000B – New System	MG 1000B – Converted Cabinet	MG 1000B – Converted Chassis
Scalable capacity	400 users	400 users	144 Users
Dimensions	17.3" Width 13.5" Depth 3.8" Height	Each cabinet is: 25" (635 mm) Height 22" (560 mm) Width 14" (356 mm) Depth	Each Chassis is: 8.4" (213 mm) Height 17.2" (437 mm) Width 12.8" (325 mm) Depth
Weight	26 lbs	75 lbs (fully loaded)	30 lbs (fully loaded)
Power (North America)	100 – 120 V – 15 AMP Supply 50 / 60 Hz	AC 100-240 Volts Single Phase 50/60 Hz DC -44V to -54V 12 Amps	AC Power Installed in Chassis Universal 100-240 VAC input. 363 Watt total output power

- Are you in need of a survivable branch office solution?

- Are you looking for an effective way to accommodate geographically dispersed call center agents?

Network Diagram



Typical Applications

Enterprises today are increasingly considering the benefits of deploying IP voice solutions because of the multiple business benefits these solutions deliver. One of the main benefits is the ability to centralize applications and service platforms and provide access to these services simply by enabling a WAN connection between locations.

Cost-optimized for branch locations supporting 5 to 50 users, the Nortel SRG solutions seamlessly extend the services and applications of a Nortel Communication Server 1000 or 1000M system at a headquarters site to the smallest remote sites. IP telephony users can benefit from the rich features and applications and lower cost of ownership associated with a centralized Nortel Communication Server 1000/1000M system, while ensuring that a basic set of features is available to those same users if WAN/network failures or performance issues prevent IP connectivity to the main Nortel Communication Server 1000 location.

Nortel SRG solutions will be primarily deployed as a key component of a Nortel Communication Server 1000 solution. As such, it is part of a solution that provides industry leading features

as well as productivity enhancing and revenue generating applications to enterprises across all industries.

Key Points

Nortel SRG Portfolio is based on the award-winning and market leading Nortel Business Communication Manager 50/200/400 platform. It includes a complete set of voice services, voice applications and data networking services to provide unsurpassed flexibility in meeting current and future communication needs of enterprises. Cost effective at smaller sites, these solutions are highly reliable and include the intelligence to drive the common Nortel suite of IP terminals and provide VoIP gateway and PSTN interfaces to enable local PSTN access. In addition, they already include extensive interoperability capabilities with the Nortel Communication Server 1000 platform via H.323 with plans to add support for interoperability via H.323 for the Nortel MCS 5100, Nortel CS 2100 and Nortel Communication Server 2000. The platform is an integral part of Nortel enterprise portfolio and is continuing to evolve and expand capabilities to better and more cost effectively meet customer needs in this small site IP solutions segment.

Nortel SRG Portfolio extends the Nortel Communication Server 1000 desktop feature and user interface to remote users and gives them full access to the same applications as the main site. Remote users can share applications like Nortel Messaging, Nortel Contact Center and many others. And, because the Nortel Communication Server 1000 and Nortel SRG solution allows distribution of trunking across the WAN, remote users can also get dial tone from their local central office or from any other IP telephony gateway hosted by Nortel Communication Server 1000. Additionally, Nortel SRG Portfolio provides a full suite of IP-based data and routing capabilities including DHCP, Web caching and firewall.

Features and Benefits

By implementing a Nortel SRG solution, a business can:

- **Streamline costs**
 - **Improved network management** – Supporting voice and data networks has become a major annual business expense, particularly as more and more business-critical processes move “online.” Converged networks, like those enabled by Nortel Communication Server 1000, offer solid opportunities to improve technical support efficiencies through simplified networks and centralized or remote management. Nortel SRG offers complete remote access to all system management information and administration processes. Administrators can program and manage it from any PC on the network using a set of Web-based tools with Optivity Telephony Manager. And by delivering enhanced event descriptions and identification, Nortel SRG lets businesses easily isolate trouble spots. In contrast to Nortel Enterprise Media Gateway 1000B, Nortel SRG provides only the critical system services to IP terminal users when it is cut off from the main Nortel Communication Server 1000/1000M. Therefore, it can streamline the amount of information that needs to be programmed at the branch office site, reducing the total cost of provisioning and supporting the office.
- **A single box solution** – In addition to supporting telephony, Nortel SRG also delivers IP routing capabilities that include support for VPN and a full suite of data services like DHCP and Web caching. If an enterprise is opening a new office, Nortel SRG can eliminate the need for an external router in most cases, thereby reducing the enterprise’s upfront costs. If the organization wants to use an existing router, Nortel SRG interoperates flawlessly in that environment as well.
- **Distribution of trunking across the WAN** – Although toll charges have fallen over the past several years, telecommunications service budgets continue to grow as new applications place greater demands on the network. Converged networks offer the opportunity to increase the use of existing network resources and potentially reduce the number of required network resources. Convergence can also apply to network access. Nortel SRG supports local PSTN access to the remote site, allowing organizations to contact the branch via a local number and minimize costs for local external calls. In addition, users at the main office (on the Nortel Communication Server 1000) can use the Nortel SRG branch trunks to contact customers local to that branch and vice versa.
- **Improve productivity**
 - **Consistent features and applications** – Businesses seek simplification as a way to cut operating costs, increase employee productivity and thereby strengthen the business for long-term success. SRG extends the powerful and intuitive features of the Nortel Communication Server 1000 to the smallest remote sites, providing users at the remote site with access to the same set of features and applications (including unified messaging, conference bridge, contact center, etc.) as the users at the main site. This capability enables employees at all sites to communicate more effectively with each other and be more productive.
 - **Coordinated dialing plans** – With Nortel SRG, a business can establish a single numbering plan for all locations so employees can more

easily contact their co-workers at other locations. This dialing plan can be centrally configured and managed.

- **Distributed call center agents** – Nortel SRG can accommodate geographic independence of call center agents, supporting them via a single call server. The advantages to the enterprise include increased revenues and lower costs resulting from reduced overhead. Plus, call center agents can benefit from not being restricted to a single location.
- **Improved business continuity**
 - **Survivability** – In the normal mode of operation, the IP sets on Nortel SRG communicate transparently from the branch to the Nortel Communication Server 1000. When the branch is isolated from the Nortel Communication Server 1000 for any reason, such as WAN failure, the IP sets re-register to the Nortel SRG. Users have access to a set of critical telephony services allowing them to continue to do business normally and access emergency personnel if necessary.

- **Emergency number support** – Nortel SRG provides local PSTN access, which is utilized for emergency calls (for example, 911 calls in North America), ensuring emergency personnel respond quickly to the correct location.
- **Security** – With the recent rash of worms and viruses on the public IP network, network security and vulnerability is a concern. Nortel SRG includes a full set of security features that include SSL and IP Sec for remote management connections and a firewall.

Nortel Remote Gateway 9100 Series

Overview

The award-winning¹ Nortel Remote Gateway 9100 Series provides an ideal solution for extending cost-effective, high-quality communications to remote teleworkers and remote offices. The Nortel Remote Gateway 9115 extends the features and functions of a Nortel Meridian 1 PBX, Meridian SL-100, or Communication Server 1000 (CS 1000) system out to a single telephone at a small remote office or telecommuter home office, utilizing a standard IP-based network connection and/or an analog PSTN telephone line and a Nortel Meridian digital telephone. The Nortel Remote Gateway 9150 is a powerful option for extending these features and functions to remote branch offices using up to 32 Nortel Meridian digital telephones and a standard IP-based connection and/or PSTN circuit-switched telephone lines. With each Nortel Remote Gateway solution, the remote workers have full access to the corporate telephone network just as if working at the main corporate site. All of the 450+ features and system resources enjoyed in the main office are available remotely, such as unified messaging, the corporate directory and corporate dialing plans as well as features such as “boss-secretary filtering,” “audio conferencing” and “automatic call distribution.”

The Remote Gateway Series 9100 products are configured and maintained using the Remote Gateway 9100 Series Configuration Manager software, a Windows™-based application that is installed on a PC. It provides a simple Configuration Wizard for initial installation that prompts the user through obtaining the minimum information needed to get the remote site communicating with the main site.

After the initial configuration is completed, Configuration Manager is used to administer remote gateways. Administration tasks include the following:

- Viewing system status
- Performing upgrades or backups
- Making configuration changes
- Changing the administration password

Technical Specifications

Features	Nortel Survivable Remote Gateway 1.0 BCM 200	Nortel Survivable Remote Gateway 1.0 BCM 400	Nortel Survivable Remote Gateway 50
Capacity	90 IP Stations	90 IP Stations	32 IP Stations
Terminals Supported	• Nortel IP Sets (2001, 2002, 2004, 2007, IP SoftPhone 2050 and MVC 2050) • Analog Sets • WLAN Sets 2210/2211	• Nortel IP Sets (2001, 2002, 2004, 2007, IP SoftPhone 2050 and MVC 2050) • Analog Sets • WLAN Sets 2210/2211	• Nortel IP Sets (2001, 2002, 2004, 2007, IP SoftPhone 2050 and MVC 2050) • Analog Sets • WLAN Sets 2210/2211
PSTN Interfaces Supported	All BCM trunk MBMs – Global Analag Truink, Digital Trunk (T1/PRI), BRI	All BCM trunk MBMs – Global Analag Truink, Digital Trunk (T1/PRI), BRI	All BCM trunk MBMs – Global Analag Truink, Digital Trunk (T1/PRI), BRI
Applications	Hosted by main site – no local applications	Hosted by main site – no local applications	Hosted by main site – no local applications
Dimensions	18.3" W 17.5" D 3.5" H	18.3" W 17.5" D 3.5" H	12" W 8.5" D 2" H
Power	Standard Power Supply – Auto Sensing; 300 Watts; 90/264 VAC; 6.0A / 3.0A, 60/50 Hz Redundant Power Supply – SRG 1.0 (BCM 400) only Auto Sensing; 350 Watts; 90/264 VAC; 7.0A / 3.5A, 60/50 Hz		External Power Supply

Nortel Remote Gateway 9115



The Nortel Remote Gateway 9115 teleworker/telecommuting solutions feature patented quality of service (QoS) transitioning technology that assures voice quality and reliability by being able to transition live calls between the IP network and an analog telephone line.

Ideal For

- Home-based employees
- Executive home-based offices
- Occasional remote workers
- Call center agent teleworkers - single agent working from home or remote site
- Remote jobsite support - support of small temporary field/project offices
- Support personnel (including IT, facilities) that may rotate pager duty and/or have to respond to work calls after hours
- Very small branch offices (2-3 phones) without ISDN BRI ability and little internal phone-to-phone traffic

Business Challenges

- Do you have very small branch offices without ISDN BRI ability and little internal phone-to-phone traffic?
- Do you need to provide your work-at-home employees with access to all of the tools and applications available at the office?
- Are you considering remote agents for your call center?

Typical Applications

- Any enterprise that needs to extend its network access to outlying communities and wants teleworking employees to work efficiently and cost effectively will benefit from the Remote Gateway 9100 Series of products.
- Typical applications include call center agents responding to calls from their homes or employees working in remote locations with the flexibility of a home office working environment.

Key Points

- Lets enterprise leverage the investment of a Nortel Meridian 1, Meridian SL-100 or CS 1000 communications system across home-office, support personal, remote call center agent, etc.
- Feature richness where all Nortel Meridian 1/CS 1000 applications are supported: telephony features, Nortel Contact Center - Manager, Nortel Messaging, Nortel Meridian Mail, Nortel TAPI Server, etc.
- System administration under Optivity Telephony Manager
- Quality of service (QoS) guaranteed
- Cost effective for home office and remote worker solutions without sacrificing features, functions, quality and reliability

Features and Benefits

- **Integrated solution** – No external equipment is required on the host Nortel Meridian 1/CS 1000 system. All that is required is a 16- or 32-port Remote Gateway reach line card (RLC), which installs in the Nortel Meridian 1/CS 1000 system. RLC ports can also support Nortel Remote Gateway 9150 extensions and locally attached digital sets.
- **Leverages investment in applications** – Nortel Messaging, Nortel Meridian Mail and Nortel Contact Center applications at the main host site can be seamlessly shared by remote users to deliver state-of-the-art features and functionality to users wherever they are located.
- **Flexible access options** – Standard Nortel Meridian digital telephones are extended over an IP network and/or circuit-switched

analog lines. A 10baseT Ethernet interface enables connectivity to the IP network or to any other WAN access device, such as cable modem or XDSL.

- **Survivable** – If the connection from the remote site to the Nortel Meridian 1/CS 1000 is lost, survivability is provided because the analog lines allow local incoming and outgoing calls to occur for all remote users.
- **Quality of service (QoS) transitioning** – If QoS falls below acceptable programmed thresholds, the Nortel Remote Gateway Series will establish a connection over the analog line interface to the host Nortel Meridian 1/CS 1000 system. The call in progress will be dynamically moved from the IP network to the analog line to ensure voice quality.
- **Local calling** – The analog line at the remote office is available to make or receive calls. This allows calling within the local community (local presence) directly through the local telephone community, rather than through the host system, which may be located in a distant city. This can reduce unnecessary call charges.
- **Multiple users per port** – The reach line card will support three methods of sharing ports between users:
 - The dedicated port configuration will assign a fixed port to a particular user for all calls. No other user may use this port.
 - The multi-user ports will allow up to 20 remote teleworkers to access a specific telephone configuration (RLC port) on a shared basis, accessing the assigned line card port only one at a time.
 - The dynamic pool ports can be used in a call center environment. Remote agents would call a specific number and be assigned to an available port. The telephone configuration is not important because the agent ID used at log-in would identify the user for routing of calls and report detail.
- **Full remote agent functionality** – The remote agent telephone provides all call center functionality available to local agents at the PBX. Management reports and supervisor monitoring include both local and remote agents. Third-party call control CTI applications are supported with Nortel Remote Gateway 9110 and 9115. CTI applications are able to monitor and intelligently control incoming and outgoing calls to the remote telephone set.
- **Efficient use of bandwidth** – Multiple compression algorithms are supported to maximize call quality or maximize use of bandwidth between the Nortel Remote Gateway Series users and the PBX.

Nortel Remote Gateway 9150



A powerful option for remote offices, the Nortel Remote Gateway 9150 leverages investment in Nortel Meridian 1 and Meridian SL-100 systems by extending communications to branch offices utilizing up to 32 Nortel Meridian digital telephones.

Ideal For

- Multi-site enterprises that want to leverage the investment in their Nortel Meridian 1, Meridian SL-100 or CS 1000 by cost effectively distributing high-quality communications capabilities over IP throughout the entire organization
- Enterprises that need to cost effectively support small remote offices with up to 32 users
- Teleworking centers that want to transparently connect remote workers or call center agents to a Nortel Meridian 1, Meridian SL-100 or CS 1000
- School districts extending from a central site with centralized voicemail
- Small clinics and doctors offices extending from a main hospital
- Banks, credit unions and other financial services organizations with numerous remote sites

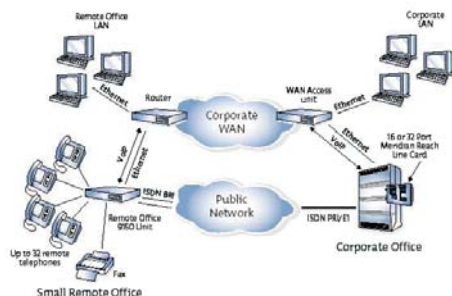
Business Challenges

- Are you looking for investment protection and scalable solutions that grow with the branch?
- Do you need to deliver seamless communication services to all employees regardless of location?
- Do branch employees need to share productivity tools such as unified messaging?

Typical Applications

- Small branch offices that want to leverage the features and functionality of a central corporate PBX while still providing a local presence in the distant community served (bank and credit union branch offices, doctor offices and clinics associated with a major hospital, regional sales and service support centers, a remote agent call center pod at the local shopping center)
- Seamlessly sharing Nortel Messaging and Nortel Contact Center applications with remote sites over converged voice/data networks
- Increasing the productivity of distributed workforce services, mobility and unified messaging
- Ensuring quality of service (QoS) levels

Network Diagram



Key Points

- Cost-effective branch solutions – Leverages customer investments from high-value features and applications at host site.
- Scalable remote solution – Gives up to 32 users very cost-effective access to Nortel Meridian or CS 1000.
- Flexible access options – Digital telephones extended via IP network and/or ISDN BRI lines.
- Reduces toll charges – Dial tone from the host Nortel Meridian 1 or local central office.
- Simplifies management – Only one database to support.
- Efficient use of bandwidth – Multiple voice compression options.
- Maintains high voice quality – Via QoS transitioning technology. The Nortel Remote Gateway 9150 offers a voice QoS feature that automatically switches to the circuit network if IP congestion affects voice quality and back to IP when voice QoS is re-established on the WAN. Switching between IP and circuit switched networks is transparent to the user.

Features and Benefits

- All of the Nortel Remote Gateway Series products communicate with the Nortel Meridian 1 or CS 1000 communication systems via a single slot or dual slot reach line card (RLC). This flexible integrated application card can simultaneously support not only Nortel Remote Gateway Series 9150 based branch offices, but also 9110 and 9115 telecommuters, Nortel Meridian digital phones with the Nortel Digital Telephone IP Adapter and directly wired Nortel Meridian digital phones².
- The Nortel Remote Gateway 9150 is a flexible solution. It may be installed in PSTN-only, IP-only, or IP and ISDN together modes, depending on what access methods are available to the remote user.
- The Nortel Remote Gateway 9150 allows centralized administration and control of branch office telephones, a consistent user interface between branch offices and headquarters and centralized application support, such as Nortel Messaging and Nortel Contact Center.
- The Nortel Remote Gateway 9150 is fully survivable in the event that the branch office loses IP connectivity with the headquarters office.

Technical Specifications

Features	Nortel Remote Gateway Series 9115	Nortel Remote Gateway 9150
Scalable capacity	• 2-3 telephones	• 8 – 32 telephones
Interfaces	• Single analog POTS • 10BaseT Ethernet	• Up to four U or S/T ISDN BRI interfaces • 10baseT Ethernet • One analog port
Compatible handsets	• Support Nortel Meridian Desktop Portfolio M2000 and M3900 sets plus add-on modules	• Supports Nortel Meridian Desktop Portfolio M2000, M3900 and M3900 sets plus add-on modules
Host site	• 16- and 32-port reach line cards • Ethernet interface for VoIP telephony • Shared ISDN PRI/T1/E1 PBX trunking to remote sites	• 16- and 32-port reach line cards • Ethernet interface for VoIP • Shared ISDN PRI/T1/E1 PBX trunking to remote sites

Features	Nortel Remote Gateway Series 9115	Nortel Remote Gateway 9150
Nortel Meridian feature/application support	• All Nortel Meridian 1/CS 1000 applications • Telephony features • Nortel Contact Center • Supports first and third party CTI • Nortel Messaging • Nortel Meridian Mail	• All Nortel Meridian 1/CS 1000 applications • Telephony features • Nortel Contact Center • Supports first and third party CTI • Nortel Messaging • Nortel Meridian Mail
Standards Compliant	• TAPI via Nortel TAPI Server service provider (first party or third party mode) • IEEE 802.1p: layer 2 QoS • DiffServ: layer 3 QoS • NAT-P: network address translation	• TAPI via Nortel TAPI Server service provider (first party or third party mode) • IEEE 802.1p: layer 2 QoS • DiffServ: layer 3 QoS • NAT-P: network address translation
Transparent access to all Nortel Meridian and CS features (from the remote location)	• Nortel Messaging, message lights, Nortel ICB conference bridge, etc • Same phones and user interface whether at remote site or at main site • Phones can be programmed identically to local phones, including an exact copy of an existing phone (one phone number rings at both a remote and local office phone – MADN multiple appearance directory number) • Remote phones have the same access as local phones to call center and other applications	• Nortel Messaging, message lights, Nortel ICB conference bridge, etc • Same phones and user interface whether at remote site or at main site • Phones can be programmed identically to local phones, including an exact copy of an existing phone (one phone number rings at both a remote and local office phone – MADN multiple appearance directory number) • Remote phones have the same access as local phones to call center and other applications
Connection to Nortel Meridian host	• Ethernet interface for IP telephony • Analog POTS • G.729 (8 kbps) encoding back to the Nortel Meridian 1, Meridian SL-100 or CS 1000 on a single analog POTS	• Ethernet interface for IP telephony • ISDN BRI • G.729 (8 kbps) encoding supports up to 8 simultaneous calls back to the Nortel Meridian 1 or CS 1000 on a single ISDN B channel (14 calls on 1 BRI)
Survivable	If WAN connection lost to main system, local line allows local outgoing and incoming call for remote users	• If WAN connection lost to Nortel Meridian, local station-to-station calls supported • ISDN BRI lines allow local outgoing and incoming calls for remote users
Local switching	• Not Available	• Station-to-station calls are switched locally saving bandwidth to host system
Audio compression	• G.711, G.729a, 30ms voice samples	• Supports multiple codecs to maximize WAN bandwidth
QoS transitioning	• Dynamically switches calls from packet networks to analog POTS line when IP performance degrades	• Dynamically switches calls from packet networks to circuit-switched networks if voice quality degrades

Features	Nortel Remote Gateway Series 9115	Nortel Remote Gateway 9150
Voice activity detection	• Voice activity detection (sometimes called silence suppression) can dramatically reduce the amount of IP traffic generated during a voice conversation. The voice activity detection feature allows one side (or both) of an IP telephony connection to stop sending traffic when there is nobody speaking on that side.	• Voice activity detection (sometimes called silence suppression) can dramatically reduce the amount of IP traffic generated during a voice conversation. The voice activity detection feature allows one side (or both) of an IP telephony connection to stop sending traffic when there is nobody speaking on that side.
Dimensions	• Remote Gateway 9115 unit dimensions are: 18.2 cm (7.2 inches) wide 9.9 cm (3.9 inches) deep	• The Remote Gateway 9150 unit dimensions are: 42.5 cm (17 in.) wide (without rack-mounting brackets) 29.4 cm (11.75 in.) deep 4.4 cm (1.75 in.) high
Power	Voltage Current 24VDC 0.3A	Auto-sensing 110/220 V power supply

Market Information

While some IP telephony vendors use proprietary protocols to implement routing across the network, Nortel solutions feature Open Networks. Our remote products were designed to work across any QOS capable network. And unlike many other IP telephony products from other vendors, the Nortel Remote Gateway 9100 Series is able to ensure voice quality and reliability because systems can place and receive phone calls over circuit-switched analog PSTN lines, as well as over IP network connections. When IP performance levels drop, voice quality can be maintained by moving live, active calls from the IP network to PSTN fallback lines without dropping the call.

Realizing that one size does not fit all, Nortel's comprehensive portfolio provides multiple branch office options that allow customers to choose a solution based on their individual requirements. The addition of the SRG 50 provides an extremely cost effective solution for the small branch office.

Ordering Information

For further information, please contact your local Nortel representative.

¹ Nortel Remote Gateway Series 9115 won Best of Show award at the 2001 Internet Telephony Conference and Expo in San Diego, USA.

² Directly wired Nortel Meridian Digital Telephone support not available on Nortel Communication Server 1000 systems

Nortel Optivity Telephony Manager

Overview

The Nortel Optivity Telephony Manager (OTM) is a sophisticated package of application tools for managing Nortel Communication Server 1000 and Meridian 1 PBX systems and is an integral part of Nortel strategy to help companies lower their total cost of ownership in operating and managing next-generation telephony networks. Companies can rely on Optivity Telephony Manager's integrated suite

of management tools for configuration, control and analysis of their telephony network, either through a Windows graphical user interface (GUI) or Web browser interface. In addition, Optivity Telephony Manager can be easily integrated with other Nortel management products to provide a complete management view of an entire converged network infrastructure.

Ideal For

- Large and small businesses
- Businesses that want to simplify and enhance the management of their Nortel Meridian 1 PBX and CS 1000 communications network
- Businesses that want to minimize downtime with the use of consolidated alarm view and alarm notification features
- Businesses that require effective tools for monitoring and reporting on network and services usage, optimizing performance and planning for the future
- Businesses that require LDAP or Microsoft Active Directory integration to serve a variety of business applications in their network. The premium package enables automatic LDAP or Microsoft Active Directory synchronization of user parameters in the OTM directory without admin intervention.

Key Points

- User friendly GUI – Helps customers speed through every day management tasks and shorten the learning curve.
- End-user self management capabilities – Frees up skilled resource.
- Single point of data entry – Results in time savings, increased accuracy and less duplication of effort.

- Consolidated view of network elements – Provides easy access to configuration applications.
- Unified alarm management – Monitors the health of a network from a single window.
- Extended administration reach – Enables access documentation, phone configuration and CLI from anywhere.
- Scalable – Add applications and management capacity as required.
- Complete management functionality – Via Windows™ and Web-based management capabilities.
- Affordable solution – For both large and small enterprises.

Features and Benefits

- **Single management platform** – Optivity Telephony Manager provides a single management platform while other vendors offer multiple management applications that run on disparate operating systems to support different products, releases and applications.
- **LDAP synchronization** – Provides the ability to link the OTM directory to an external LDAP server. Netscape, Novell NDS, Microsoft Active Directory and Microsoft Exchange LDAP servers are supported. LDAP synchronization will save the administrator from having to do repetitive entry of common data.

- **Station administration** – Simplifies the day-to-day station moves, adds and changes to single and multi-line phones. Using a graphical telephone display, administrators can define templates, execute global changes, assign DNs and TNs, program feature keys, supports scheduled changes, and much more.
- **Web based desktop services** – Provide end users with an easy-to-use on-line help; end users can also be given permissions to make feature changes on their phones.
- **Alarm management** – Provides an alarm collection and processing center for multiple systems and devices. Optivity Telephony Manager receives SNMP traps from systems, such as the Nortel Meridian 1, CS 1000 and CallPilot, and stores them in a circular log file on the OTM server. Notification is also available via pager, fax, or email when certain alarms are triggered or thresholds exceeded. Filter and forward key alarms to Nortel Enterprise Network Management System (ENMS), HP Openview and other network management systems.
- **Maintenance** – Allows administrators to quickly trouble shoot and diagnose potential problems through a Web browser. The maintenance application provides Web access to all of the overlay-based maintenance commands.
- **Traffic analysis** – Used to analyze switch resources and to forecast growth, it will provide information such as trunk usage, peak periods, processor loads and loop traffic.
- **Telecom Billing System** – Is a fully integrated telecom costing and billing application. The telecom billing system can collect call records and allocate costs to the appropriate users or departments using flexible cost models. It also generates meaningful reports that support multiple currencies.
- **Call tracking** – Monitor call usage patterns and trends with graphical displays. Call tracking also provides an alarm generating function, which can be set up to warn of unusual calling patterns.
- **ESN analysis** – Provides a simplified method of setting up least cost routing. Electronic Switched Network (ESN) properties can be configured off-line and then uploaded to multiple systems. Existing ESN databases can be copied, modified and then uploaded to a new system, saving the administrator hours of configuration time. ESN analysis also provides a global change capability for an even greater level of administrative efficiency.
- **Virtual Terminal service** – Provides a single point of connectivity to the Nortel Meridian 1 system and other telnet enabled applications (such as Meridian Mail, Integrated Recorded Announcer, Integrated Conference Bridge, etc.) via a terminal emulator that can be launched using a Web browser. It also provides context sensitive online help for Nortel Meridian 1 overlays.
- **Corporate directory** – Enables enterprises to define parameters and generate reports from corporate station and user data that is associated with a terminal number. These reports can include up to 100 different data fields including name, extension, location and department associated with each terminal number. This function is also used to provide the corporate directory information directly on Nortel digital and IP telephones.
- **Access server** – Offers terminal server-like capabilities and provides the ability to access OTM via command line interface (CLI) and have the input passed through to a specific connected device.

Ordering Information

For further information, please contact your local Nortel representative.

> Nortel Large IP Telephony Platform

Enterprises that are geographically dispersed or have a large campus environment will enjoy the robust features and scalability of Nortel's carrier-grade IP soft switch. Nortel Communication Server 2100 offers enterprises the best of both worlds: carrier-class reliability with enterprise features and applications. With the Communication Server 2100, the enterprise can implement a hybrid or pure IP network.

- Nortel Communication Server 2100
 - XA Core Platform
 - Compact Platform
- Nortel Communication Server 2100 Software Release SE07
- Nortel Large Trunk Gateway Portfolio
 - Media Gateway 15000
 - Media Gateway 7480
 - Media Gateway 3200
- Nortel Large Line Gateway Portfolio
 - Media Gateway 9000
 - IP Client Manager 7.0
 - 3rd party gateways
- Nortel Large Remote Media Gateway Portfolio
 - Media Gateway 1000M

Nortel Communication Server 2100



Overview

Nortel Communication Server 2100 (CS 2100) is the first carrier-grade, IP softswitch for very large campus and geographically dispersed large enterprises. The "superclass" softswitch delivers the ubiquity, quality and reliability of the traditional TDM telephony network on a next-generation packet network. Built on proven, industry leading, Linux-based software, it provides the reliability, redundancy, fault tolerant and system robustness associated with carrier grade switches, plus a full suite of enterprise business features and scalability up to 200,000 ports. With the Nortel CS 2100, organizations can implement a hybrid or pure IP network, preserve existing investments in TDM equipment while adding new IP capabilities. The Nortel CS 2100 is the cornerstone of an IP solution for very large enterprise implementations.

Ideal For

- Government
- Universities
- Health care
- Financial institutions
- Fortune 500 companies that require the reliability of carrier grade networks, modular scalability from 5,000 to 200,000 ports, enterprise business features and ease of operations associated with a multi-function softswitch.

Business Challenges

- Do you need maximum, carrier-grade reliability?
- Do you need geographic survivability?
- Is network reliability critical to your company?
- Do you want to lower your operating costs and simplify management?
- Do you need scalability support for your TDM and IP users?
- Do you want to add new users on an IP platform, yet preserve your existing investment in TDM equipment?
- Do you want a migration strategy that makes sense for your company?
- Do you want your IP telephony network to be as reliable as your traditional voice network?

- Do you need your IP network to be more reliable than your data network?
- Do you have multiple call centers that you want to consolidate?

Key Points

- **Business Continuity** – The CS 2100 was designed to provide continuous service for mission-critical users and applications to ensure revenue retention and improved customer satisfaction.
- **Lowers Operating Expenses** - The Nortel CS 2100 provides simplified/consolidated management and administration, which reduces the cost of adds, moves and changes. It is also a cost-effective solution for replacement of expensive Centrex lines.
- **Large Scale Convergence** – The Nortel CS 2100 improves employee productivity through virtual office and collaborative services. Reduced network costs and real estate are possible through node consolidation and convergence of the voice and data networks.
- **Carrier-grade Reliability** - The "five nines" carrier reliability means less than 5.3 minutes of access downtime per year caused by product upgrades and maintenance, call path outage, equipment failures or software errors. It meets the requirements as defined

by Telcordia (US). Carrier-grade reliability is ensured by the redundancy in all core components including: power, processors, disk drives and shelves.

- **Highly Scalable, multi-function switch** - As a multi-function switch, the Nortel CS 2100 lowers network operation expenses and complexity. This enables the enterprise to be ready to support unforeseen business requirements that may occur through mergers, acquisitions and expansions. Delivers a consistent experience across the business and reduces costs and disparate technologies through network consolidation.
- **Investment protection** - The Nortel CS 2100 supports hybrid and pure IP networks. Organizations can upgrade at a comfortable pace from their existing Nortel Meridian SL-100 to a Nortel CS 2100, or install a new Nortel CS 2100 and continue to use their analog and digital phones. Organizations can migrate from Centrex and maintain their existing phones and complete functionality, protecting their investment in equipment and training.
- **Open standards** - The Nortel CS 2100 was designed with open standards to allow ease of interoperability with other applications and services. It features greater flexibility along with the ability to deliver new capabilities faster.

Typical Applications

- **Business continuity** - For companies where the voice network is mission critical to operations, the Nortel CS 2100 provides disaster recovery and continuity of voice services. It dynamically routes calls onto any point in the wide area network, can operate from multiple locations and redirects calls dynamically to other locations in the event of a disaster or network disruption. Geographic survivability allows the redundant processors of the system to be in different geographic locations so that a disaster in one location will not interrupt the operation at other locations.
- **Virtual contact center** - The Nortel CS 2100 can consolidate multiple call centers and collapse applications into a centralized data center

model. A virtual contact center can utilize lines and trunks directly from the Nortel CS 2100 or aggregated from existing PBXs using CTI. It will reduce the edge infrastructure by centralizing business logic and call control, allowing the customer to operate all agents and resources in the contact center as if they were part of a single PBX system.

- **Centrex migration** - The Nortel CS 2100 provides investment protection and flexibility for existing Nortel Meridian SL-100 customers with pockets of Centrex in their network or customers who are entirely Centrex-based and who want to move to a carrier-managed or self-managed services model. Essentially packet gateways can be deployed to bypass traditional Centrex; this reduces branch Centrex expenses while retaining analog set investment and call feature capabilities of the Centrex environment.
- **PBX integration** - The Nortel CS 2100 can be deployed into an existing PBX or satellite branch office network to collapse services, applications and intelligence into a centralized framework. This solution will optimize access expenses and reduce capital and operational expenses. The Nortel CS 2100 centralizes and simplifies operations, administration and maintenance, and enables new IP services to be deployed ubiquitously across the network.
- **Managed services** - Partners can leverage the capacities, applications, carrier-grade reliability and billing features of the Nortel CS 2100 to offer a variety of managed services for voice services, data services, call center applications, unified messaging and multimedia services to small- to mid-sized enterprises.

Features and Benefits

- **Geographic survivability** allows the continuation of services in the cases of disasters such as fire, severe weather or acts of terrorism. The call servers of the system are geographically distributed between locations that can be up to 18 miles apart. Traffic is dynamically redirected and the IP-based VLAN can be extended to different locations and provide sub-second

failover. In a geographic survivability configuration, the media gateways for both lines and trunks have access to either call server. Applications can be deployed in a tandem configuration. IP twinning, which allows IP soft phones to be duplicated on existing stations, is also supported.

- **Integrated Element Manager System** enables centralized management and administration. In addition to common provisioning for distributed networks, IP Phones support DHCP and self labeling keys, which lowers the network's total cost of ownership. Centrex telephones devices can be ported over Media Gateways without changing the user experience.
- **Application Integration**, a key element of the Enterprise Portfolio, the CS 2100 optimizes common components and application allowing you to maximize your investment in:
 - CallPilot Unified Messaging
 - Symposium Call Center Server
 - Ethernet Routing Switch Portfolio
 - VPN Routers
 - Media Gateways and Survivability Solutions
 - IP Telephone Portfolio
- **Carrier-grade technology designed for the enterprise business** is the same leading technology deployed by major North American and global carriers. Nortel is the vendor of choice for IP telephony technology in the carrier space where reliability and services cannot be compromised. With 99.999 percent reliability and redundancy in all core components, the Nortel Communication Server 2100 enables highly reliable solutions over IP.
 - Complete duplication of all critical elements
 - Port level redundancy
 - 1.4M Busy Hour Call Attempts (BHCA)
 - Geographic separation & survivability
- **Unmatched scalability** allows networks to easily and cost effectively expand from 5,000 to 200,000 ports. Extremely large campus environments can easily be addressed with growth of up to 200,000 ports.

- 125,000 IP Phones (SE08 software)
- 140,000 IP trunks
- 30,000 ACD agents
- 112,000 nodes off of one call server
- **Investment protection** is realized since the MSL-100 can be easily upgraded to a CS 2100 with maximum investment retention
 - XA-Core processor
 - Applications
 - Media Gateways support existing ports
- **Open standards** are due to a Linux Operating System and open industry standard hardware (compact PCI processor). It features multi-vendor compatibility, including H.248, SS7, QSIG, H.323, MGCP and session initiation protocol for telephony (SIP-T) interfaces for the enterprise. The architecture promotes compatibility with standards-compliant packet switching equipment, TDM circuit-switched facilities and operations support systems (OSS) and billing operations.
- **Leverages the power of Nortel portfolio breadth** by embedding the reliability and performance of Nortel Ethernet Routing Switch 8600, the transport and flexibility of Nortel Optical Metro platforms, and the capacity and capability of the Nortel Multiservice Switches in the carrier data portfolio. Interoperability features provide flexibility by offering customers an end-to-end Nortel solution or a multi-vendor solution based on their requirements.
- **Multimedia collaboration** in conjunction with the Nortel Multimedia Communication Server 5100 (MCS 5100) expands traditional enterprise services and offers advanced multimedia services such as productivity - enhancing collaborative capabilities and presence-enabled call handling and directory services.

Nortel Communication Server 2100 Software

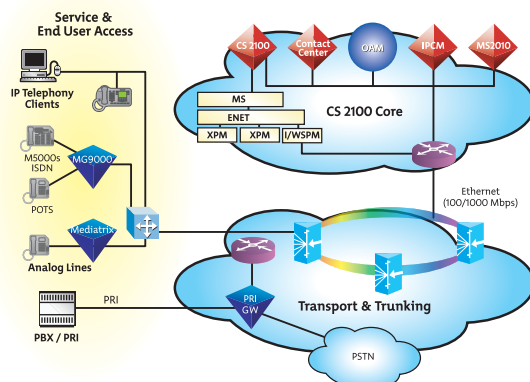
Current Release SE07 Features Include:

- **Geographic Survivability** – Provides redundancy of the CS 2100 Compact by distributing its architecture in different physical locations up to 18 miles apart.

It allows all Media Gateways (line and trunk) to take instruction from either call server shelf in the event of an outage.

- **ACD Agent Expansion** – Extends the maximum number of ACD agents that can be provisioned in a single CS2100 from 9,000 to 30,000.
- **Introduces the IP Phone 2001** – Single line, entry level IP phone is ideally suited to low volume requirements such as lobbies and common areas.
- **Support for IP Phones 2001, 2002 and 2004** Phase II sets with integrated power over LAN options.
- **IP Key Expansion Module** – An add-on-module for the IP 2002 and IP 2004 provides up to 24 programmable keys per modules (up to 2 modules can be added to each set).
- **USB Headset Adapter for IP Softphones** – A small portable device that is available for the M6350 Soft Client provides mobile workers with a flexible solution for increased productivity.
- **Enhanced Secondary Directory Number (DN)** – Allows multiple phone numbers to be associated with a common telephone reducing the need for multiple telephone devices in a shared facility such as a dorm room.
- **Group Intercom All Call (GIAC)** – This feature was modified to provide a one-way communication path to broadcast, rather than the original two-way. The number of group members has also been expanded from 30 – 99.
- **SimRing Deny Redirection** – Improves the control of SimRing call routing and eliminates the confusion of calls going to multiple voice mailboxes.
- **Basic Virtual Call Admission Control (VCAC)** – Addresses the ability to control the amount of traffic that enters the network via limited bandwidth links, preventing the over subscription and ensuring voice quality.
- **Media Gateway 9000 (MG 9000)** – Offers all the advantages of a managed IP infrastructure, while preserving existing investment – allowing customers to retain existing sets and migrate to IP at their own rate.
- **Integrated Element Management System (IEMS)** – Consolidates performance, fault and security functions for the VoIP network, reducing costs and integration complexity. IEMS provides simplified management of the CS 2100 and all of its elements from a single work station.
- **Media Gateway 15000** – Supports over 48,000 ports and performs the gateway conversion between the IP packet network and the TDM switches.
- **Media Server 2010** – Is a new solution that delivers recorded announcements and advanced IP packet audio and conferencing services (including Music on Hold and SimRing) in IP networks. It is scalable up to 240 IP Ports.
- **IP Client Manager 7.0** – A single blade option with the ability to support up to 3,000 users, providing significant cost improvement over its predecessor the IPCM 2.5.
- **SIP Converged Desktop** – Allows end-users to use their PCs for the multimedia portion of their communication, while retaining their existing telephony system for voice.
- **MCDN over H.323** – Cost effectively extends the reach of VoIP VPN services between multiple call servers in the network allowing centralization of voice mail and contact center applications.

Network Diagram



Nortel Communication Server 2100 Processors

The Nortel CS 2100 offers two core processors: XA Core and Compact. The Compact runs on Motorola PowerPC 765 cPCI card using a carrier-grade Linux operating system to provide the hardware flexibility. The second version of the Communication Server core is the Extended Architecture Core (XA-Core). By adding a network interface card into the XA-Core shelf and implementing software release SEO6 or later, the soft switch capabilities are enabled. Then IP clients, line gateways or trunks gateways can be easily and quickly added to the network as required. This maximizes existing investments and provides the flexibility to continue to deliver TDM today and implement IP telephony as needed.

XA Core

- Scalable computing power
- Load Sharing (2+1) Call Agents (versus duplicated)
- Ability to withstand multiple processor/memory failures
- Enables a smooth evolution to IP with all XA-Core components being retained with CS 2100
- Provides Hybrid TDM or IP Support

Compact

- Distributed structural design that allows physically separated Call Servers
- Proven third-party commercial off the shelf (COTS) components
- Leverages recent advances in fault tolerant technology
- Inactive Call Agent card continually receives and transmits Ethernet messages
- Memory sync between active/inactive Call Agent Memory

Nortel IP Communications Gateway Portfolio

The Nortel CS 2100 solution supports a plethora of line and trunk gateways in type and size that allow modular scalability to 165,000 lines and 40,000 trunks.

Nortel Large Trunk Gateway Portfolio

Trunk Gateways serve as the packet interface for other TDM modes and the packet network. They provide a platform for terminating TDM trunk facilities such as PRI.

- Media Gateway 15000 – a large-sized PSTN Gateway that supports OC12, OC3 and DS3 interfaces, H.248 Protocol, NI1, NI2 and SS7 Signaling and has a capacity of 16,238 DSOs/frame.

- Media Gateway 7480 – a mid-sized PSTN Gateway that supports OC3, DS3 and DS1 interfaces, H.248 Protocol, NI1, NI2 and SS7 Signaling and has a capacity of 4,032 DSOs/frame.
- Media Gateway 3200 – open platform small Trunk Gateways supporting H.248 and PRI protocols. Multiple configurations are available that range from one E1/T1 (30/24 Channels) up to sixteen E1/T1 (480 /384 Channels).

Nortel Large Line Gateway Portfolio

Line Gateways provide a common platform for end-user client devices and services including POTS, DSL digital set and IP Clients.

- Nortel IP Media Gateway 9000 combines voice and data services into a single access gateway, with a single network interface and management. It supports up to 6,080 lines for plain old telephone service (POTS), M5000, M2000, M3900, H248 and intelligent peripheral equipment (IPE) cabinets.
- IP Client Manager (IPCM) 7.0 uses IP technology to deliver the full Meridian business feature set and capabilities to users connected to a managed IP network in both a hybrid and IP solution.
- Third-party analog gateways (See Select Products Section for Details).

Nortel Large Remote Gateway Portfolio

Media Gateway 1000M is a stand-alone remote solution for the CS 2100. It contains a network management system with the ability to manage

the host CS 2100 and the MG 1000M remote from a single location (including provisioning, alarms, traffic reports, inventory, billing). This allows adds, moves and changes between the two systems to be integrated and managed from a single platform so the customer can track and update users between the host and remote system.

- The MG 1000M complies with the Joint Interoperability Test Command (JITC) and is certified and approved as a solution for the Department of Defense Switched Network (DSN).
- The MG 1000M provides a survivable system at a customer's remote location ensuring service even if connection to the main site is lost.

Market Information

Key differentiators for the Nortel Communication Server 2100:

- Carrier-grade reliability and redundancy of all core components
- Modular scalability up to 200,000 ports
- Investment protection
- Lower operating costs
- Simplified and streamlined operations
- Hybrid and pure IP network support
- Geographic survivability
- Support for open standards
- Multifunction switch, a PBX with central office switching capabilities
- Leverages the entire Nortel portfolio for optical, data, wireless and applications

Technical Specifications

Technical Specs CS 2100

Call Processors	XA-Core (Extended Architecture Core)	Compact PCI
	Motorola 604 processor From 768 Mb to 1,152 Mb Memory	MCPN765 Compact PCI card 500 MHz PowerPC 7410 processor 2MB L2 cache 1.5 GB ECC RAM 16MB on-board Flash memory
Busy Hour Call Attempts	Up to 1.65 million BHCA 50,000 Simultaneous Calls	Up to 1.3 million BHCA 30,000 Simultaneous Calls

Technical Specs CS 2100		
Client Capacity	165,000 Clients (not including trunks)	150,000 Clients (not including trunks)
Operating System	Carrier Grade Linux	
Geographic Survivability	Not Applicable	Geographic Survivability - The processors can be physically separated up to 18 miles
Redundant Equipment	Processors Power Disk Drives Shelves	Processors Power Disk Drives Shelves
Telephones Supported	Analog Sets POTS CLASS M5000 series sets Digital Sets M2000 series sets M3900 series sets IP Sets IP Phone 2001 (SE07) IP Phone 2002 IP Phone 2004 Soft Clients M6350	
Standards Supported	H.248/Megaco - Line and Trunk ISDN (NI-1 and NI-2) SNMP RTP RTCP H.323 - Trunk RFC 2705 (MGCP-Media Gateway Control Protocol) Packet Cable - NCS UNISTim RFC 3261 - SIP (Session Initiation Protocol) – Trunk Application (SE08) RFC 2833 T.38 NEBS SS7 QSIG	
Gateways Supported	Trunk Gateways Media Gateway 7480 Trunk Gateway (up to 4,032 DSOs/Frame) Media Gateway 15000 Trunk Gateway (up to 16,128 DSOs/Frame) Media Gateway 3200 Trunk Gateway (up to 16 T1/E1 per gateway) Line Gateways MG 9000 Analog/Digital Station Gateway (up to 5,920 POTS lines) IP Client Manager 7.0 (SE07) 3rd party analog gateways Remote Gateways Media Gateway 1000M – (JITC certified survivable gateway)	

Technical Specs CS 2100	
Operating Environment Power Consumption	Call Control Frame Power - 2,500 watts or 8,540 BTU/hour Current Drain - 56.2 Amps Nominal Voltage - -50.25 Volts OAM&P Cabinet Power - 1650 watts or 5,640 BTU/hour Current Drain - 32.5 Amps Nominal Voltage - -50.25 Volts Note: Power consumptions vary depending on the actual components housed in each cabinet.
Dimensions	C42 equipment cabinet 107 cm wide x 183 cm high x 71 cm deep (42 inches x 72 inches x 28 inches) Houses: XA-Core, Message Switch, ENET C28 equipment cabinet 71 cm wide x 183 cm high x 71 cm deep (28 inches x 72 inches x 28 inches) Houses: SuperNode Data Manager, Integrated Service Module/Input/Output Module PTE2000 equipment cabinet 61 cm wide x 213 cm high x 61 cm deep (24 inches x 84 inches x 24 inches) Houses: SAM21 shelves with 3PC Call Agent, Network File System and Gateway Controllers. SAM16 shelves configured as RTP Media portal, Sun Netra servers for Device Managers and OAM&P applications.

Ordering Information

For further information, please contact your local Nortel representative.

> Nortel IP Telephony Clients

Nortel IP Phones are the portals to application access, supporting a comprehensive suite of telephony features from Nortel Communication Servers and application presentation for information exchange from network-based application gateways. Serving the needs of organizations of all sizes – from those with users who have basic communications requirements to those whose needs span high call volumes, multimedia presentation and/or mobility, Nortel has solutions for every worker. Nortel offers desktop solutions for the campus-based worker who prefers physical phone presence at the desktop along with a variety of wireless and soft-client solutions offering whenever and wherever real-time communications access for workers who are constantly on-the-go. With Nortel IP Telephony Clients, customers benefit from the latest in telecommunications technology while leveraging the reliability, quality and cost-effectiveness only Nortel can deliver.

- Nortel IP Phones
 - Nortel IP Phone 2001, 2002 and 2004
 - Nortel IP Phone 2007 (color display)
 - Nortel IP Audio Conference Phone 2033
- Nortel IP Softphone 2050 and Mobile Voice Client (MVC 2050) Accessories
 - Nortel Enhanced USB Headset Adapter
 - Nortel Mobile USB Headset Adapter
 - Nortel IP Key Expansion Module (KEM)

Nortel IP Phones / IP Softphone 2050 and Mobile Voice Client (MVC) 2050

Overview

The **Nortel IP Phone 2001** is an entry-level single-line phone. The Nortel IP Phone 2001 complements the IP desktop portfolio by providing a very cost-effective solution tailored for users with basic communication requirements while addressing enterprise demands for a full IP solution.

A mid-range addition to the Nortel IP desktop portfolio, the **Nortel IP Phone 2002** is a compact display-based phone with a built-in voice prioritized Ethernet switch. Ideal for moderate call volume users, the **Nortel IP Phone 2002** is designed with a smaller footprint than the Nortel IP Phone 2004, yet it offers the same sophisticated new interface and delivers the same full featured support and advanced applications access as the Nortel IP Phone 2004.

The Nortel IP Phone 2004 combines the familiarity and ease of use of traditional business communications functionality with powerful capabilities that capitalize on the values introduced by voice and data convergence at the desktop. This multi-line phone features a built-in Ethernet switch designed to accommodate shared LAN access between an IP telephone and desktop PC as well as a sleek new interface with a large LCD display screen capable of displaying a maximum amount of information including customized web-based content. The Nortel IP Phone 2004 is well suited for business professionals with high call volumes.

The Nortel IP Phone 2007 is a superior multimedia “information appliance” featuring a 5.7” diagonal color display that leverages a variety of network-based applications servers to deliver both pre-packaged and customized content to the phone. It has a built-in touch screen that adds intelligence and convenience along with the traditional dial-pad capability and delivers a robust telephony feature suite from Nortel Communication Servers with its emulation of feature sets to that of IP Phone 2004.

The Nortel IP Audio Conference Phone 2033 is a flexible, expandable, full-duplex, high-quality audio, hands-free speakerphone offering 360-degree room coverage and support of up to two extension microphones for small-to-medium sized offices and conference rooms up to 20ft by 30ft.

The Nortel IP Softphone 2050 is a Windows-based application that turns a desktop computer into a powerful tool for unified voice, data and video communications. Designed to meet diverse user needs as a primary desktop phone, a supplemental phone or a telecommuting device, the Nortel IP Softphone 2050 transforms a PC into a full featured telephony communications platform by simply loading the software and plugging the headset into a USB port.

The Nortel Mobile Voice Client 2050 is an 802.11 WLAN IP Telephony Software client designed for pocket PC PDAs to maximize mobile worker productivity. The Nortel Mobile Voice Client 2050 delivers secure access to both voice and data communication and leverages a rich suite of telephony features from Nortel Communication Servers.

Ideal For

- **Nortel IP Phone 2001** – Designed for users who require basic telephony functionality, this IP phone is ideal for common areas with low call volumes such as reception areas, hallways, school rooms, lobbies, cafeterias and restaurants.
- **Nortel IP Phone 2002** – Designed for office professionals and technical specialists, this multi-line phone offers an integrated LCD display screen and is well suited for moderate call volumes.
- **Nortel IP Phone 2004** – Ideal for managers, executives and office administrators, this multi-line phone features a large LCD display screen capable of displaying a maximum amount of information including customized data applications and is well suited for high call volume environments.
- **Nortel IP Phone 2007** Able to serve businesses from small to large, IP Phone 2007 is ideal for customers wishing to leverage its superior multimedia applications presentation capability to present web content, still frames or video. Examples of applications include a hotel suite that features a daily services menu and corporate lobbies or sales offices where the phone is leveraged for company highlights or events. Knowledge workers who need to obtain information while talking to a customer (i.e., inventory, student attendance, sales promotions, etc.) along with executives (as a “prestige” phone) are also ideal candidates for the IP Phone 2007.
- **Nortel IP Audio Conference Phone 2033** – This IP phone is ideal for conference rooms and executive/managerial offices up to 20ft by 30ft (6.1m by 9.1m) where full-duplex handsfree support with expanded room coverage and the administration benefits of IP are desired.
- **Nortel IP Softphone 2050** – Created for a broad range of workplaces, this IP phone serves small to large businesses with single or multiple sites that are ready to deploy IP telephony solutions to mobile workforces such as road warriors, casual telecommuters and dedicated home office workers who require or prefer the

convenience of a converged solution (i.e., voice and data communications) from their laptops or PCs.

- **Nortel Mobile Voice Client 2050** - Ideal for intra- and external-to-campus mobile employees who find PDA device portability essential to perform their work. This mobile solution also serves professionals who prefer the convenience of a single portable device to access both their voice and data communications while on the go.

Business Challenges

- Are you looking for flexibility and choice when it comes to desktop users?
- Do you have a variety of Platforms (Meridian 1, CS 1000, CS 2100 BCM, MCS 5100) throughout your network?
- Would you like to maximize your employees’ productivity, delivering simultaneous access to voice, data and video communications?
- Do you have campus-based workers, casual telecommuters and employees who could benefit from mobility?
- Are you looking for a simple, cost-effective way to provide employees who are on-the-go with convenient access to both their voice and data applications?

Key Points

- As business needs change, it is easy to unplug the Nortel IP Phones and move to an alternative location without any reprogramming.
- Cost-effective solutions, the IP Phones that can be efficiently maintained across a converged network.
- Nortel IP Phones access and expand upon the very same robust suite of telephony features delivered to traditional phone sets from Nortel Communication Servers.
- Nortel IP Phones provide a flexible choice of desktop clients and standards-based powering options to address diverse enterprise requirements.

- Nortel IP Phones can be used for business or IP contact center sets.
- The IP Softphone 2050 emulates the operation of the Nortel IP Phone 2004, providing access to the wide range of Nortel Communication Server telephony features and provides total transparency for mobile workers and telecommuters through IP access.

Features and Benefits

All Nortel IP Phones connect directly to an enterprise LAN via a 10/100 base-T RJ45 connector. The Nortel IP Phones support either manual or automatic IP address assignment with a standard DHCP server to simplify the process and reduce the cost of station moves, adds and changes. Designed to seamlessly connect with the entire range of Nortel IP telephony system platforms, Nortel IP Phones are supported by Nortel Communication Servers and hybrid Nortel Meridian 1 systems.

- **Simplicity, flexibility and cost advantages**
 - Sets are flexible and can be connected to any LAN port.
 - IP phones are faster to set up and rearrange and easier to manage.
 - They offer reduced long-term management costs of configuring, supporting and maintaining IP extensions over digital extensions.
 - Corporate directory allows a user to access the company directory from any IP set with a display.
 - Business data applications such as price checks, inventory reporting, security alerts or university class schedules can be efficiently displayed on IP phone screens.
- **Portability**
 - It is possible to extend an IP station to virtually anywhere in the LAN/WAN via IP.
 - Home workers can be connected through dialup from anywhere in the world.
 - Branch offices can be connected back to a central hybrid Nortel Meridian 1, Nortel Communication Server 1000, or Business Communications Manager 50/200/400

using a Nortel data switch at the branch office and data network connection back to the central site.

- Users have the ability to enter a code into an IP set, which allows them to access their own profile from that set anywhere in the corporate network.
- **Unified infrastructure**
 - With IP clients, voice is supported on an IP-based data network.
 - On Nortel IP Phones 2002, 2004 and 2007 it is possible to connect the telephone and the PC into a single Ethernet cable on the desktop reducing overall cabling costs and delivering a unified infrastructure that supports both voice and data.
 - Nortel offers comprehensive power support for Nortel IP Phones, including pre-standard-based power over LAN solutions and IEEE 802.3af standard powering schemes which boost reliability and reduce cost with centralized power backup.
- **Improved Productivity**
 - Multimedia capabilities of the IP Phone 2007 provide new avenues for information exchange and productivity applications such as visual voicemail, IT Alerts, Corporate Directory with photo images, etc.
 - Familiar user interface and telephony features across the entire IP Phone portfolio minimize employee training.
 - Features such as Multiple Appearance Directory Number (MADN) enable employees to “twin” multiple IP phones off of their main office IP Phone, extending reach of the corporate network and delivering anywhere/anytime access to employees.



Nortel IP Phone 2001

- Multi-line set with 2 line 24 character bit-mapped LCD display
- 4 soft keys, 5 fixed keys, 2 programmable feature keys and up/down navigation
- One LED for visual ringing alert/message waiting
- Supports headset splitter box
- Listen speakerphone capability
- Supports local AC or direct inline power from 802.3af compliant switches
- Desk or wall mounting
- ADA Compliant Dialpad



Nortel IP Phone 2002

- Multi-line set with 2 line 24 character LCD display
- Supports four self-labeling programmable features and four soft feature keys
- Dual use incoming call indicator and message waiting light
- Supports direct headset connection (set has built in amplifier)
- Navigation cluster keys gives fast menu, sub-list and call log scrolling
- High fidelity full duplex speakerphone supports disabled users with hearing aids
- Supports local AC or direct inline power from 802.3af compliant switches
- Desk or wall mounting
- ADA Compliant Dialpad



Nortel IP Phone 2004

- Multi-line set with 4 line 24 character LCD display
- Supports six self-labeling programmable features and four soft feature keys
- Dual use incoming call indicator and message waiting light
- Supports direct headset connection (set has built in amplifier)
- Navigation cluster keys gives fast menu, sub-list and call log scrolling
- High fidelity full duplex speakerphone supports disabled users with hearing aids
- Adjustable LCD contrast
- Supports local AC or direct inline power from 802.3af compliant switches
- Desk or wall mounting
- ADA Compliant Dialpad



Nortel IP Phone 2007

- Multi-line set with Enhanced Color 5.7" QVGA LCD Display
- Built-in Touch Screen with customized stylus as standard
- Supports web-centric and multimedia-based content as presented by network-based application gateways
- Supports up to twelve self-labeling programmable features and four soft feature keys (communication server dependent)
- Supports local AC or direct inline power from 802.3af standard compliant switches
- Dual use incoming call indicator and message waiting light
- Additional onscreen message waiting indication
- Integrated RJ-8 port supports direct amplified and un-amplified headset connection (set has built in amplifier)
- User selectable ringtones
- Adjustable LCD brightness and contrast
- Personalized softkeys
- Desk or wall mounting
- ADA compliant dialpad
- Integrated 3-port switch

Vertical Applications

- **Hospitality** – The IP Phone 2007 is ideal for showcasing a variety of property services for increased customer service and to promote revenue generation. IP Phone 2007 could be leveraged to provide guests with concierge, front desk and bell captain services (restaurant menus, daily events, tourist attractions, daily weather reports, etc.) as its color touch-screen supports web-based content along with still-frame and streaming video presentations. Placement in "staging areas" (places where people gather such as property lobbies or on floors within towers nearby elevators) along with property suites make for excellent "kiosks" to promote the property's brand and the services offered as well as conveying status of the property to their guests.
- **Healthcare** – IP Phone 2007 has a variety of applications within the healthcare segment. For example, IP Phone 2007 could be located at nurse stations, so that nurses, doctors or visiting staff could access their messages along with patient medical records presented via the display.
- **Manufacturing** – IP Phone 2007 could be used for time-clock (employee check-in and check-out), production status updates and/or for presentation of output from employee resource planning (ERP) applications.
- **Retail** - As an information portal to advanced applications, the IP Phone 2007 enhances customer service, providing

personnel with up-to-date inventory and order delivery status – ideal in retail settings where a PC isn't convenient due to space considerations or isn't deemed desirable by customers for other reasons.

Examples of Horizontal applications include:

- **Sales Offices** – Tight integration with network-based application servers enables IP Phone 2007 to present dynamic multimedia content, such as still-frames and video, in branch/sales offices, highlighting company services, special offers to visitors – thereby entertaining while informing customers and driving revenue opportunities for the business.
- **Security Stations** – For added security, IP Phone 2007 in tandem with an application gateway can support security applications such as pushing surveillance video of a parking garage or campus entrances to a security guard station. The IP Phone 2007, with its support for wall mounting, could also be used as a security doorphone.
- **"Thoroughfares"** - IP Phone 2007 can be deployed in hallways, lobbies or other centralized locations – providing "virtual" interactive maps of floors, a building or other important locations within the campus – thereby minimizing the need for on-duty staff to address routine questions.



Nortel IP Phone 2033

- Single-line with the same telephony features of the IP Phone 2001
- 10 fixed keys (Line, Release, Hold, Mute, Volume Up/Down, Messages, Services and Scroll Up/Down)
- Easy to distinguish display
- Backlit 3 x 24 LCD for enhanced viewing angles
- Full duplex handsfree (IEEE 1329 Compliant)
- 360 degree room coverage
- Intelligent and Synchronized status indicator with three LEDs viewable from varying angles within the room
- 3 Self Labeling soft feature keys
- Up to 2 extension Microphones can be added
- High-quality audio – comfort noise generation, silence suppression
- Supports local AC or direct inline power from 802.3af compliant switches
- Automatic IP address assignment with DHCP

Applications

- **Executive/Managerial offices** where freedom of intra-office mobility is desired with the robust feature sets as delivered from Nortel Communication Servers
- **Conference Rooms** – where portability of an IP solution is desired combined with high-quality audio as delivered with its full duplex audio communications support

Technical Specifications

	Nortel IP Phone 2001	Nortel IP Phone 2002	Nortel IP Phone 2004	Nortel IP Phone 2007	Nortel IP Audio Conference Phone 2033
Power supply	110V wall mount supply delivering 16 VAC @500 mA	110 V wall mount supply delivering 16 VAC @500 mA	110 V wall mount supply delivering 16 VAC @500 mA	100/240VAC Power Adapter delivering 48VDC @ 0.52A Max	Universal Power Interface Module (PIM) supporting both 110/220V AC; Japan 100V delivering 19 VDC @1A
AC power	90-240 VAC, 50/60 Hz	90-240 VAC, 50/60 Hz	90/240 VAC, 50/60 Hz	100/240 VAC, 50/60Hz	100-240 VAC, 50/60 Hz
DC input power	-48 VDC LAN feed	-48 VDC LAN feed	-48 VDC LAN feed	-48 VDC LAN feed	N/A
Output power	N/A	N/A	N/A	N/A	N/A
Dimesions	191mm x 171mm x 169mm (WDH) on footstand	230mm x 172mm x 167mm (WDH) on footstand	286mm x 172mm x 167mm (WDH) on footstand	295mm x 172mm x 170mm (WDH) on footstand	38.8x 31.1 x 6.4cm (L x W x H)
Platform Compat-ibility	BCM 50/200/400, Nortel Meridian 1 PBX Portfolio and Nortel Meridian SL-100 systems, Nortel CS 1000 Series, Nortel CS 2100 and MCS 5100	BCM 50/200/400, Nortel Meridian 1 PBX Portfolio and Nortel Meridian SL-100 systems, Nortel CS 1000 Series, Nortel CS 2100, MCS 5100	BCM 50/200/400, Nortel Meridian 1 PBX Portfolio and Nortel Meridian SL-100 systems, Nortel CS 1000 Series, Nortel CS 2100, and MCS 5100	BCM 200/ 400, Nortel Meridian 1 PBX Portfolio and Nortel CS 1000	Nortel CS1000 Series and Nortel Meridian 1 PBX Portfolio
Power dissipation	4.5 Watts typical, 8 Watts max	4.5 Watts typical, 8 Watts max	4.5 Watts typical, 8 Watts max	8 Watts typical, 13 Watts Maximum	7.4 Watts typical, 10.5 Watts max
Operating Temp-erature	+5°C to 40°C 40°F to 104°F	+5°C to 40°C 40°F to 104°F	+5°C to 40°C 40°F to 104°F	+5°C to 40°C 40°F to 104°F	0°C to 40°C 32°F to 104°F
Relative humidity	5% to 95% (non-condensing)	5% to 95% (non-condensing)	5% to 95% (non-condensing)	5% to 95% (non-condensing)	20% – 85% (non-condensing)
Storage Temp-erature	40°C to 70°C -40°F to 158°F	40°C to 70°C -40°F to 158°F	-40°C to 70°C -40°F to 158°F	-40°C to 70°C -40°F to 158°F	-22° to 131° F, -30° to 55° C
Codecs support	G.711a and/or u law, G.723.1 and G.729a and Annex B	G.711a and/or u law, G.723.1 and G.729a and Annex B	G.711a and/or u law, G.723.1 and G.729a and Annex B	G.711a and/or u law, G.723.1 and G.729a and Annex B	G.711a and/or u law and G.729a
Call control protocol	UNISim subset over UDP w/ reliability layer	UNISim subset over UDP w/ reliability layer	UNISim subset over UDP w/ reliability layer	UNISim subset over UDP w/ reliability layer	UNISim subset over UDP w/ reliability layer
Headset support	Supports headset splitter	Built-in amplifier for direct headset connection	Built-in amplifier for direct headset connection	Built-in amplifier for direct headset connection	N/A
OS comp-ability	N/A	N/A	N/A	N/A	N/A

	Nortel IP Phone 2001	Nortel IP Phone 2002	Nortel IP Phone 2004	Nortel IP Phone 2007	Nortel IP Audio Conference Phone 2033
Security	Private key challenge response	Private key challenge response	Private key challenge response	Private key challenge response	
Audio interface	N/A	N/A	N/A	N/A	N/A
RX jitter buffer	Configurable, default is two frames	Configurable, default is two frames	Configurable, default is two frames	Configurable, default is two frames	Non-configurable
WAV buffer	N/A	N/A	N/A	N/A	N/A
Internet telephone switch	No	Integrated	Integrated	Integrated	N/A
Mounting	Desktop or wall	Desktop or wall	Desktop or wall	Desktop or wall	Desktop
Ports	1 internal	3 (1 internal, 2 external)	3 (1 internal, 2 external)	3 (1 internal, 2 external)	N/A
Data rates	10/100 Mbps auto sensing	10/100 Mbps autosensing	10/100 Mbps autosensing	10/100 Mbps autosensing	10/100 Mbps autosensing
Standards	IEEE 802.3, 802.3u	IEEE 802.3, 802.3u	IEEE 802.3, 802.3u	IEEE 802.3, 802.3u	IEEE 802.3, 802.3u
MAC address	Auto-learning, auto-aging at 700 seconds	Auto-learning, auto-aging at 700 seconds	Auto-learning, auto-aging at 700 seconds	Auto-learning, auto-aging at 700 seconds	N/A
Hardware priority	Fixed priority to phone port based on hardware	Fixed priority to phone port based on hardware	Fixed priority to phone port based on hardware	Fixed priority to phone port based on hardware	Fixed priority to phone port based on hardware
Power feed	16 VAC by supplied AC adaptor or 48 VDC Power over LAN Hub	16 VAC by supplied AC adaptor or 48 VDC Power over LAN Hub	16 VAC by supplied AC adaptor or 48 VDC Power over LAN Hub	16 VAC by supplied AC adaptor or 48 VDC Power over LAN Hub	110/220V AC Universal Power Interface Module (PIM)
Load sensing	N/A	N/A	N/A	N/A	N/A
Fault sensing	N/A	N/A	N/A	N/A	N/A

Features and Benefits

Nortel IP Softphone 2050 and Mobile Voice Client

- PC and pocket PC-based software phones that can act as a primary or supplementary phone for within-campus mobile employees, casual telecommuters, frequently traveling workers or for use at public hotspots
- Provides access to commonly used features such as call origination, call termination, transfer, conference, forward, mute, volume and message waiting indication - plus hundreds more for feature parity to other Nortel IP Phones

- Macro function for programming lengthy dialing patterns, access to voicemail/integrated voice response systems which boosts personal productivity
- Local generation of call alerting, call progress and dial pad tones which saves on LAN/WAN bandwidth

- Enables multiple appearance of a user's personal extension for maximum flexibility in access to voice communications services
- Static and dynamic IP addressing (DHCP) for maximum flexibility in administration
- Customized Windows Help for online single-click assistance

Nortel IP Softphone 2050 – The Nortel IP Softphone 2050 provides access to the same services and capabilities as the Nortel IP Phones 2002 and 2004, but it uses the computer and audio resources of a standard PC or laptop. Supported by Nortel Business Communication Manager 50/200/400, Nortel Communication Server 1000 and hybrid Nortel Meridian 1 systems, the Nortel IP Softphone 2050 supports the following features:

- Easily twinned with any other set that the user may have in the office, providing a choice of how users answer or make calls
- Three slide out feature trays (line/feature keys, dial pad or combination)
- Supports five special purpose service keys and four interactive keys
- Message waiting indicator alerts users to new voice messages and incoming calls
- Supports direct headset connection via PC USB port
- Enhanced USB Audio Kit provides a telephony-optimized sound card to ensure superior audio quality
- Supports local directory imports. Reads Symantec ACT, Microsoft Outlook and LDAP databases for seamless directory integration
- TAPI compliance for operation with other telephony applications



Nortel Mobile Voice Client 2050 – The Nortel Mobile Voice Client 2050 (MVC 2050) also extends access to the same services and capabilities as the Nortel IP Phones 2002 and 2004, but it uses a pocket-PC PDA. The Nortel MVC 2050 delivers the convenience of a single, extremely portable device that allows mobile workers to leverage easy-to-use, rich, reliable and secure business telephony features from Nortel Communication Servers. The Nortel Mobile Voice Client 2050 supports the following features:

- Centralizes business applications access over an 802.11b WiFi connection eliminating the need for standalone voice and data devices
- Thirteen fixed keys which include hold, answer/originate, goodbye, mute, volume up, volume down, directory, services, messages, shift, expand, copy and quit
- Four programmable interactive soft label keys
- Ability to synchronize Microsoft Outlook contact lists with the PC using ActiveSync or beam to another PDA
- Customized online help with full index search capabilities
- Customer choice in headset and headphone options (use of headset or headphone varies by type of PDA)
- Global IP sounds (GIPS) software from NetEQ as standard supporting packet loss concealment up to 30% in high packet loss environments



Technical Specifications

	Nortel IP Softphone 2050	Nortel MVC 2050
Platform compatibility	BCM 50/200/400, Nortel Meridian 1, Nortel Communication Server 1000	BCM 50/200/400, Nortel Meridian 1, Nortel Communication Server 1000
PDA support	N/A	Dell® Axim® models X50v, X5 Advanced, X3 and X3i; Hewlett Packard® iPAQ® 555x series; Toshiba e75x/e80x series
Codecs support	G.711a and/or u law, G.723.1 and G.729a and annex b	G.711a and/or u law
Call control protocol	UNISTim subset over UDP w/reliability layer	UNISTim subset over UDP w/reliability layer
Audio interface options	Nortel USB audio kit (Enhanced kit for desktop or Mobile USB when traveling) recommended	Plantronics M130i with HP iPAQ and Toshiba PDAs; Jensen JM-11 with Dell Axim PDAs; Headset for Dell Axim 50V orderable directly from Dell
PC Software	MS Windows XP, 98, 98SE, 2000	MS Windows Mobile 2003 and Windows Mobile 2003 SE (AKU2)
CPU	Pentium Pro 200 MHz or equivalent	Intel XScale 255 PXA 400Mhz or higher recommended
Memory	128Mb memory (Windows 2000 and later) 64Mb memory (Windows 98)	64Mb RAM or higher recommended
Storage	55Mb free hard-drive space	64Mb RAM or higher recommended
Video	16 bit high color, 800x600 resolution or higher	Varies by PDA model
Input/output	One IP network connection One free (powered) port for USB Audio Kit	One wireless LAN IP network connection
Configuration	Static or dynamic DHCP support	Static or dynamic DHCP support

IP Phone Accessories: Nortel Mobile USB Headset Adapter and IP Phone Key Expansion Module (KEM)



Overview

The Nortel Enhanced USB Headset Adapter and the Mobile USB Headset Adapter both deliver superior audio quality performance for software-based IP telephony clients. Highly optimized for telephony applications, these Nortel USB Headset Adapters increase Nortel IP personal productivity with single-step access to call answer, call release, mute and smart functions all at the touch of a button.

Ideal For

- The Enhanced USB Adapter is a desktop version that was designed exclusively for use with the IP Softphone 2050. It is ideal for those seeking the benefits of a reduced desktop presence with the ability to centralize business communications on the PC.
- The Mobile USB Headset Adapter was designed for use with the IP Softphone 2050, MCS 5100 and 5200 PC and Web Clients and the M6350 Centrex Softclient. It is ideal for casual telecommuters, road warriors or those workers seeking a smaller desktop footprint than that offered by the enhanced version. It offers the same functionality but with greater portability.
- Both USB Adapters are well suited for:
 - Distributed workforces involving teleworkers and telecommuters who require access to the telephony network
 - Roaming staff who require access to the telephony network
 - Businesses willing to increase their market awareness through the use of leading-edge technology
 - Businesses that have call center agents

Business Challenges

- Are you looking for superior digital audio quality combined with a user-friendly interface for your mobile employees?

- Do you have casual telecommuters who would benefit from improved efficiency?
- Does the ability to centralize communications onto the user PC interest you?

Typical Applications

- The Enhanced USB Adapter is used by the campus-based worker or dedicated teleworker who prefers the benefits of centralized access to both voice and data communications via the PC. The Enhanced USB Adapter supports an external Lamp option to provide a visual indication of an active call or a message waiting. It can also be ordered as a complete USB Audio Kit to provide the best assurance of obtaining superior voice quality and a rich user experience.
- The Mobile USB Adapter is ideal for workers who are constantly on the go within or external to the campus. It is used by individuals who work from home a couple of days a week or are always on the road and are seeking maximum portability from their voice communication solutions. The Mobile USB Adapter comes with a Belt Clip and features a blue backlit LED to signal the user that the adapter is functioning. It is also compatible with third-party Motorola cellular telephone headsets (2.5mm headset jack) to allow single headset use. In addition, it is fully compliant with version 1.1 of the USB device

specification and Windows plug-and-play specifications (Support on Windows XP, 2000 Professional and SPKs 1 & 2, Windows 98, Windows 98SE).

Key Points

- The Nortel USB Headset Adapters provide a controlled high-quality audio environment with quick and easy access to frequently used functions directly from the adapter unit.
- They are superior to sound cards in that they offer the ability for a soft phone to have an absolute and predictable loss and level plan. They offer simple installation using standard Windows drivers (requires no additional software or drivers).
- They are fully compatible with the suspend and resume functions for effective use in battery operated laptops.
- Power is derived from the PC's USB power subsystem so there is no external power required.
- The only connections are standard USB cable to the PC and an RJ-9 jack for a telecom style headset and handset.

Features and Benefits

- Both of the Nortel USB Audio Adapters include the following feature buttons to provide one-touch access directly from the adapter, as a quick alternative to bringing the Nortel IP Softphone 2050 client to the foreground of the PC or laptop screen:
 - **Call answer/initiation button** – provides an additional option for quickly answering incoming calls or initiating new calls
 - **Mute button** – mutes or restores audio during an active call
 - **Mute light** – provides visual lamp indication that the audio has been muted on an active call
 - **Adjustable volume keys** – allows volume to be raised or lowered from the navigation keys on the adapter. These buttons are also used for function menu navigation when using softkeys

- **Release button** – allows calls to be released from the adapter unit
- **Maximize/Minimize button** – brings the client application to the foreground of the PC screen and minimizes the client window as desired to facilitate access to other Windows-based applications
- **Incoming call/message waiting lamp indicator** – Located at the top of the adapter, the indicator displays a solid light to designate that a message is waiting for the user. A flashing light indicates an incoming call. These are the same message waiting and incoming call indicator lamp conditions as on Nortel IP Telephony Clients.

USB Audio Kit

The Enhanced USB Adapter can be ordered as a complete USB Audio Kit to provide the best assurance of obtaining superior voice quality and a rich user experience. The USB Audio Kit contains the Enhanced USB Adapter, the Headset and Headset quick-disconnect cord along with the USB adapter cord. The USB Audio Kit:

- Provides audio quality that rivals or is superior to sound cards
- Provides predictable loss and level plan
- Rivals or surpasses the audio performance of hard telephones
- Draws power from the PC
- Uses standard Windows drivers
- Requires no additional software or drivers

Nortel has thoroughly tested the USB Audio Kit to ensure that it provides satisfactory quality of service (QoS) for Nortel IP Softphone 2050 users.

Technical extensions have been made to the USB Audio Kit to provide support for audio conformance tested third-party headset options.

Nortel IP Phone Key Expansion Module (KEM)



Overview

The Nortel IP Phone Key Expansion Module is a hardware component that connects to the IP Phone 2002 and IP Phone 2004 to provide additional line appearances and feature keys. It offers a greater level of personalization to inbound calling customers and colleagues offering centralized access to additional soft-labeled line/feature keys at the desktop.

Ideal For

- The **Nortel IP Phone Key Expansion Module** is an ideal solution for small- to moderate-line appearance centralized answering positions. The IP KEM is a cost-effective, space-saving alternative to deploying multiple phones.

Business Challenges

- Do you have administrators who support large groups of people?
- Do you need to offer increased personalization for inbound callers?

Typical Applications

- Centralized answering positions

Key Points

- The IP Phone KEM delivers 48 additional programmable line/feature keys for 2002 and 2004 IP Phones
- Connection is simple using an Accessory Expansion Module
- The IP Phone KEM supports the same language set as the Nortel IP Phones

Features and Benefits

- Each KEM has 12 physical keys on each side of an LCD display unit to provide 24 additional self-labeled line/feature keys.
- Up to two IP Phone KEMs can be attached to the same IP Phone 2002 or 2004 providing 48 additional keys.
- Using the shift key functionality, an IP Phone 2004 can have up to 48 logical line/feature keys using just one IP KEM.
- Feature keys on the IP Phone KEM are soft-labeled and support up to 10 characters.
- It comes with its own stand and tilt mechanism so it can be adjusted to match the angle of the IP Phone 2004.
- Contrast adjustments are made concurrently when the user adjusts the IP Phone contrast.
- Wall mount or Desk Mount brackets are available.

Technical Specifications

- The IP Phone KEM is supported on IP Phone 2002 /2004.
- It requires Communication Server 1000 Release 4.0 software and IP Line 4.0 or later.
- It requires Software Release SE08 (and later) for the CS 2100.

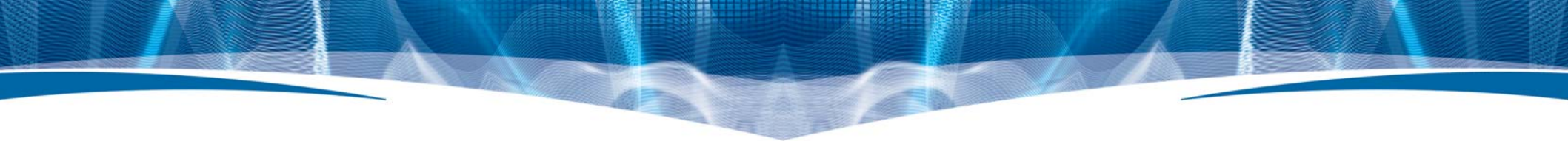
Market Information

The Nortel IP Phone Portfolio supports a rich and robust suite of telephony features (up to 650). The portfolio is common across multiple platforms providing investment protection for the enterprise. Nortel IP Phones employ a thin-client (stimulus/response) architecture, leveraging External Application Servers (XAS) for presentation and multimedia content such as web pages and video. This enhances security versus IP Phone implementations with integrated XML browsers which must maintain open ports in order to access such content.

Thin-client architecture also allows centralized administration which can significantly reduce costs. Changes can be made on the network application server and then be pushed to each phone. With integrated XML browser implementations, IT administrators must address changes at each and every desktop.

Ordering Information

For further information, please contact your local Nortel Networks representative.



> Nortel IP Multimedia Platforms

Nortel's integrated multimedia solutions help enterprise users to communicate better and more efficiently through a host of real-time applications ranging from collaboration and conferencing to the ability to communicate no matter where they are. For enterprises with 50 users as well as those with thousands, the platforms serve any organization with a mobile or geographically dispersed work force. Equally important, the simplicity and reliability of the solutions result in cost savings and improved productivity for the enterprise. Using the Multimedia Client applications and a PC, users can send instant messages, send and receive video, share text and images, and collaborate in real time.

- Nortel Multimedia Communication Server (MCS) 5100
- Nortel Multimedia Clients

Nortel Multimedia Communication Server (MCS) 5100



Overview

The Nortel Multimedia Communication Server (MCS) 5100 is Nortel's enterprise multimedia applications solution, providing innovative communications, real-time collaboration and productivity services for enterprise users. Nortel MCS 5100 uses open, industry standard hardware to evolve TDM as well as IP networks to highly collaborative, multimedia networks. Nortel MCS 5100 is seamlessly deployed alongside an enterprise's current network infrastructure, enriching the enterprise user's communications experience and providing new SIP multimedia applications.

Ideal For

- Enterprises with mobile users or geographically distributed workgroups, such as highly mobile workforces, R&D teams collaborating on a new project, sales representatives and customer support staff
- Telecommuting programs – multimedia tools that keep users connected and productive, extending voice, video and collaborative real-time communications to users irrespective of location
- Conferencing service needs – reduce travel costs and increase collaboration with "Meet-Me" conferencing. Highly scaleable, Nortel MCS 5100 provides in-house conferencing with multimedia integration. Visual notification of meeting events such as joined or left the conference, waiting on bridge and transfers.
- Brings low-cost video conferencing to the desktop
- User productivity tools - increase productivity even when away from the office - individuals who work in areas remote from their work teams can collaborate more effectively
- Businesses with as few as 50 users and those that scale up to 60,000 users
- Businesses that want to increase user productivity and want new multimedia features for their staff while at the same time retaining the existing feature set and existing digital handsets

Business Challenges

- Do you want control over how and when callers can reach you?
- Do you need to increase collaboration across geographically dispersed groups of employees?
- Are you looking to reduce the cost of supporting your telecommuters?
- Would you like to reduce travel expenses for internal meetings?
- Would you like to reduce outsourced conferencing costs and bring them in-house?
- Do you need to integrate multimedia applications into a single user interface to provide an integrated user experience?

Typical Applications

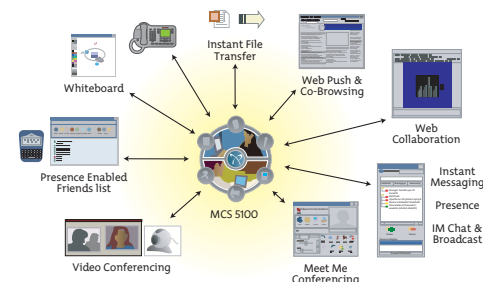
- **Real-time** collaboration and conferencing – Productivity is enhanced with services such as IP telephony with video, Ad-hoc and "Meet-Me" audio and video conferencing, secure IM, IM Chat, presence, web collaboration, white boarding, Web push, co-browsing and file exchange.
- **Productivity and personalization** – Users can personalize and provision their workspaces by simply setting up and establishing individual preferences. Using any browser, a user may select such call handling services as call forwarding, call screening and monitor the availability of other office personnel through friends lists which let users know whether or not you are available to take calls.

- **Mobility** – Find me/Follow me, call management and screening in conjunction with presence awareness allow communications to reach you no matter where you are and which device you choose to use. Additionally, make all your calls using normal office dial plans from virtually anywhere, thereby reducing calling card and cellular usage fees. Extend multimedia communications to mobile devices such as the RIM Blackberry.

Nortel MCS 5100 is about transforming communications within the enterprise, improving the way users communicate, making communication transactions more immediate and allowing users to be proactive in their response to

others. It also enables users to gain control over their communications priorities and lets them make decisions based on personal preferences – how, where and when they want to be communicated with, anytime, anywhere. Nortel MCS 5100 brings together the voice services of an existing voice infrastructure (Nortel Networks provided or third party) together with new multimedia applications including instant messaging, chat and presence, file exchange, white board collaboration, Find me/Follow me call handling, call screening, "Meet-Me" and Ad-hoc conferencing and web collaboration as well as video to deliver increased productivity, collaboration, mobility and service ubiquity.

Network Diagram



Key Points

- **Hard dollar cost savings:**
 - With native "Meet-Me" media conferencing, substantial savings can be shown by eliminating outsourced audio conferencing expenses.
 - Travel expenses can be reduced with point-to-point and multi-point videoconferencing and collaborative tools taking the place of face to face internal meetings.
 - Time savings from use of collaborative tools means increased opportunity to generate revenue especially for front line sales.
 - Mobile users reduce their calling card and cellular usage fees using MCS IP telephony.

- Generate Nortel MCS 5100 cost savings and revenue recapture scenarios for the enterprise with the Nortel Networks convergence tool at www.nortel.com/voip_tool. Look under the engaged applications tab: multimedia applications.
- Telecommuting initiatives reduce real estate and support costs. Nortel Networks itself, for example, saves on average \$5–\$9K per employee per year in real estate and associated expenses.
- Converged desktop brings SIP-enabled services to all users irrespective of the device type: analog, digital or IP set.

- **Simplicity**

- Consolidation means simplified cabling, installation and maintenance.
- Consolidation over IP reduces network complexity and training.
- New users are added quickly, moves are simple remote operations and user profile changes are point and click.
- SIP is an open-industry standard protocol that enables third party interworking and promotes the exchange of new applications and clients based on customer need.
- LDAP support simplifies user set-up and operations.
- Automatic client software update feature speeds the deployment process.

- **Productivity**

- IT staff are freed up from time-consuming adds, moves and changes as well as customization operations for individual users, allowing them to focus on more critical development projects.
- Users have control over their communications preferences, improving their ability to interact with customers, team members and management.
- Users can better manage their interruptions with preferences.
- Presence capability reduces time required for collaboration.
- Tools such as Instant Messaging provide real-time responses to queries.
- Instant Message screening reduces non-productive interruptions.

- **Collaboration**

- Video calling and conferencing and web collaboration reduce travel and encourages distributed workforce collaboration.
- Integrated collaboration tools (file exchange, Web push, white boarding) simplify communications and ease the learning curve.
- Instant Messaging and IM Chat allow sidebar discussions for quick resolve.

- **Mobility**

- E911 zoning provides security and assurances should the need for emergency services arise.

- Dynamic registration: Users connect to the IP network and their profiles go with them enabling users to login to any device to accept and make calls.

- Dialing plan and privileges follow employees (network-based). Employee “phone number” and calls automatically are rerouted to wherever the employee is.
- Solution provides location independence for mobile employees (Find me/Follow me services).

- Simultaneous ringing: Office, mobile and home phones ring at the same time; whichever is picked up takes the call.

- Sequential ringing: System will try office, then mobile and then home phone.

- Extend multimedia communications to mobile devices such as the RIM Blackberry.

- **Personalization**

- Users have control over their communications experience dictating how, where and when they receive their communications.

- Call routing is established by the users, eliminating missed calls when they are on the run.

- Dynamic call handling brings real-time call control.

- Flexible personal call management allows end users to control how they are reachable – time of day, day of week, etc.

- Instant Message screening reduces non-productive interruptions.

- Multiple language support allows users to personalize their work environments.

- **Reliability**

- High-performance, industry-standard hardware has built-in reliability to avoid business disruption.

- System leverages existing Nortel IP Phone 2004, Meridian 1 digital telephones, as well as Nortel Unified Messaging (CallPilot) and contact center solutions.

- System provides alternative disaster recovery solution to ensure business continuity.

- Built from a carrier-class architecture, redundant and non-redundant hardware configurations support the most demanding networks.

- **Scalability**

- Network-centric architecture supports the agile needs of today’s enterprises allowing them to scale their communications solution based on changing requirements.

- MCS 5100 is scaleable from 50–60,000 users.

- System provides “Meet-Me” conferencing services for up to 1,500 ports per cluster and tens of thousands per network.

- Flexible choice is available in user client options, IP Phone 2002 and 2004, multimedia PC client, Web client, third party SIP phone and converged desktop (analog, digital, IP set).

- Teleworker and mobile worker solutions that parallel those in the headquarters site reduce training and extend multimedia values.

Features and Benefits

The Nortel MCS 5100 supports an impressive suite of integrated multimedia capabilities that allow users to enjoy a feature-rich multimedia experience. The following summarizes the key capabilities:

- Desktop video calling is delivered through coordinated video display on the PC screen and audio conversation via the hard or soft client. Low-cost desktop multi-point video conferencing extends video to all users.
- Presence - Notification is provided on the status of a “watched” user. When a user is on the phone, dynamic presence will show the person as on the phone and when a user is away from his/her desk, the presence will change to inactive.
- Picture calling line ID - Incoming and outgoing communications present a picture of the originating caller on the PC screen along with CLID.
- Personal agent – Call screening - This user-friendly html (Web) interface provides a Find me/Follow me service, with call screening provisioning for communication

personalization. Users define who, where, when and how callers can reach them. Calls can be screened and routed based on who is calling (or groups), or on when calls are received (time of day, day of week). Calls can be directed to try multiple locations at once (office, cell phone and house), or to ring sequentially one after the other, or a combination. This solution set provides tremendous flexibility and control of the communication experience.

- Network-based incoming and outgoing call logs are kept for easy access and retrieval.
- Directory – Personal and global directories allow users to store information and utilize these directories for click-to-call capability.
- Click-to-call – From the directory on the multimedia PC client, from the incoming/outgoing call logs, or from the Outlook contact or inbox.

- Mobility solution - The multimedia PC client can provide the primary voice service for users who are not in their office, or those who do not leverage existing voice infrastructures.

- Conferencing - “Meet-Me” media conferencing delivers multimedia services such as visual notification to the conference chairman of all participants entering/leaving the conference. Conferencing also supports file exchange, Web push and co-browse, and allows Instant Message Chat for side-bar real-time communications. This solution set delivers a very impressive return on investment (ROI) over outsourced conference solutions, as well as improved functionality.

- Collaborative applications - The Nortel MCS 5100 provides a suite of applications such as Instant Messaging, Web collaboration, IM Chat, file sharing, white boarding and Web pushing. Video conferencing is another key application in today’s collaborative environments, improving the effectiveness of distance conferencing.

- PDA support - Many MCS 5100 applications are supported on PDA devices such as the RIM Blackberry giving users extended use of presence, secure Instant Messaging, Click to Call and Route management.

- Unified Messaging – Available as an integrated MCS application. Delivers voice mail to virtually all email applications.

Market Information

Nortel was first to bring a commercially available, enterprise scale SIP application solution to market. Since its introduction, the MCS 5100 has won several awards and has been deployed in several high-profile customer installations. The MCS 5100 continues to be the only fully integrated real-time multimedia collaboration solution in the market today

Technical Specifications

Key Specifications Interworking:

Communication Server 1000, Communication Server 2100, Meridian 1 PBX, Meridian IP-enabled, Business Communications Manager, Norstar key system, SL-100, 3rd Party Gateways (industry-standard protocols) inter-working supported. Gateway control protocols H.323 v4 SIP (Session Initiation Protocol)

Signaling protocols

MTP3-User Adaptation Layer (M3UA)
ISDN Q.921-User Adaptation (IUA)

Server and Client intercommunication protocols

Server: SIP, SIP-T

Client: UNISTIM, IPv4, SIP

Management: XML, FTP, SNMP vers. 2c,
Accounting, IPDR (XML-based)

Signaling interfaced

European Telecommunications Standard Institute (ETSI) and American National Standards Institute (ANSI) ISUP
ETSI and ANSI PRI

Other country interfaces, including, but not limited to, Spain and China

Ordering Information

For further information, please contact your local Nortel representative.

Nortel Multimedia Clients (PC Client and Web Client)



Overview

Now you can talk, send instant messages, send and receive video, share text and images, and collaborate in real time, using a single Internet connection from your PC and the Nortel Multimedia Clients. The Multimedia Client applications provide a wealth of powerful communications features—from traditional telephone service to advanced multimedia communications such as video calling, instant messaging, call screening, real-time call disposition, conferencing, file sharing, and whiteboarding. Advanced Web communications include web collaboration, pushing Web pages and co-browsing the Web with customers, co-workers, and associates.

The Multimedia Clients can be used to control communications over a PC headset or over the Nortel IP Phone 2004 or 2002, while becoming more productive and efficient and gaining greater control over daily communications. You'll be able to efficiently perform diverse communications tasks in a single session, bring the human touch of face-to-face contact to remote communications, and manage incoming and outgoing communications in new ways.

Ideal For

- Enterprises with geographically dispersed departments such as R&D teams that regularly collaborate on new projects
- Any business that wants to use multimedia tools that keep users connected and productive, extending voice, video and collaborative real-time communications to users irrespective of location
- Customers who are looking to reduce the cost of telecommuting

Business Challenges

- Do you have work groups that are not co-located?
- Is scalability important to your business?
- Are you looking to eliminate your out-sourced audio conference service?
- Do you need to integrate multimedia applications into a single user interface to provide an integrated user experience?

Typical Applications

- Real-time collaboration and conferencing – productivity is enhanced with services like "Meet-Me" media conferencing, video, IM, IM Chat, white boarding, Web push, co-browsing, application sharing and file exchange
- Communications access for mobile users.

Key Points

- The Multimedia PC Client is a software application while the Multimedia Web Client is a web-based applet. Both applications transform a PC into a powerful telephony and multimedia communications tool. These applications provide advanced telephony features including the following:
- IP Calls - users can make calls over the internet or a company intranet, complete with video, allowing the user to see as well as hear their caller
- Mobility - E911 capabilities (North America only), automatic firewall detection, global address book access from clients, and network based call logs to make it easier to work anywhere, anytime.

- Audio Options - A headset can be used to hear and speak during calls. Optionally, a separate microphone along with the computer speakers can be used for the voice portion of the call.
- Call Management – keep personal directories of the people you call regularly, initiate calls simply by clicking a name, view call logs, and conference-all with up to 15 participants
- Call screening - allows the user to choose whether to answer a call, play recorded greetings, send the call to another number, send it directly to voice mail, redirect it to email or a web site.
- Collaborative applications – users enjoy new levels of teamwork among geographically dispersed teams by sharing files, images, text, or even a shared workspace, where all call participants can view and manipulate material together.
- Multimedia communications - send and receive live streaming video, co-browse the web with a remote party, send an instant message – all on the same call.

Features and Benefits

- Advanced call logging - keep track of incoming, outgoing, and missed calls
- Personal address book - stored on the network and synchronized across clients
- Global address book - stored on the network (PC Client only)
- Presence - shows who is online
- Control of Nortel IP Phone 2002 and 2004 (PC Client only)
- Call hold/retrieve
- Call park/retrieve
- Call transfer (blind or consult)
- File transfer - send and receive files• sharing tools - web push, shared whiteboard, shared clipboard (only web push supported for web client)
- Do not disturb (DND)
- IM chat - creating a chat room or joining a private, public, or public with password chat room

- Call handling - decline, redirect, or ignore incoming calls
- Instant messaging - send and receive text messages
- Video calls (on demand, one-way, and two-way video)
- Conference calls (requires network conference server)
- Optional ability to make calls from and import contacts from Microsoft Outlook 2000 and Microsoft Outlook 2002. (making calls from Outlook for PC Client only)

Multimedia Client for Mobility

The Multimedia Client for Mobility is available for PDAs such as the RIM Blackberry. Users can log in from this client on their PDA and get access to the following features:

- Presence – Ability to control their own presence, view the presence of users in their friends list, and receive alerts for presence changes
- Secure Instant Messaging
- Click to Call from the personal directory
- Route Management to activate or deactivate user defined routes

Technical Specifications:

Minimum hardware and operating system requirements

- 550 MHz Pentium-class or equivalent processor
- Windows* 98(SE), Windows Me, Windows NT* 4.x with SP5, Windows 2000, or Windows XP
- 28.8 Kbps modem
- Microphone and full duplex sound card
- 48 MB free RAM (This requirement is in addition to the memory requirements of the OS and other concurrent applications.)
- 28 MB (Web Client) 75 MB (PC Client) free hard disk space (if Java Runtime Environment needs to be installed, otherwise 8 MB)

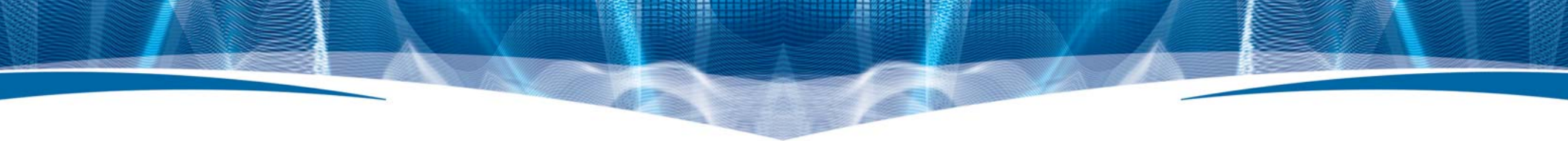
- Netscape* 7.0 and above, or Internet Explorer 6.0 and above (Web Client Only)
 - Cookies enabled
 - Java script enabled• 640x480 @8bpp (256 colors) VGA graphics card
- Mouse

Recommended hardware and operating system requirements

- 1 GHz (or higher) Pentium-class or equivalent processor
- Windows XP, Windows 2000, Windows 98(SE), or Windows NT 4.x with SP5
- 56 Kbps modem or faster network connection (Cable modem, DSL, 10base-T Ethernet connection will provide a better user experience.)
- Full duplex sound card with headset (microphone-headphone combination)
- 64 MB free RAM (This requirement is in addition to the memory requirements of the OS and other concurrent applications.)
- 28 MB (Web Client) 75 MB (PC Client) free hard disk space (if Java Runtime Environment needs to be installed, otherwise 8 MB)
- Netscape 7.0 and above, or Internet Explorer 6.0 and above (Web Client Only)
 - Cookies enabled
 - Java script enabled
- 800x600 @16bpp (65,536 colors) VGA or better video graphics card
- Mouse

Ordering Information

For further information please contact your local Nortel Networks representative.



> Nortel Messaging Portfolio

Nortel Messaging solutions incorporate the latest technology and add web-based graphical user interfaces to bring feature-rich communications to the desktop or mobile device while making message management easy and effective. For any size enterprise, the Nortel Messaging portfolio of products provides unified, personalized messaging to both office and mobile or remote workers.

- CallPilot 100/150
- CallPilot Mini
- CallPilot
- Nortel Hospitality Messaging Server 400

Nortel CallPilot



Overview

CallPilot is a unified messaging tool that brings together voicemail, email and fax to create a personalized, feature-rich communications and message management system. CallPilot incorporates the latest technology, including advanced speech activated messaging and email-by-phone, which enables access to messages using telephone user interface (TUI) through either voice commands or dual tone multi frequency (DTMF) tones from virtually anywhere. CallPilot builds on the customer-driven functionality of proven Nortel messaging products and adds Web-based graphical user interfaces (GUI) to make system management easy and effective.

The CallPilot portfolio includes CallPilot 100/150 (Current Software Release 3.5) for the Nortel Norstar Integrated Communications System, CallPilot Unified Messaging (Current Software Release 3.0) for the Nortel Communication Server 1000 Series, and CallPilot as an integrated version for Business Communications Manager 50/200/400.

Ideal For

Ideal for small, medium and large businesses, CallPilot offers a messaging solution for every business requirement, from a small 20-user Greenfield site to a single CallPilot system that serves a 20,000-user, multi-site corporation using IP telephony.

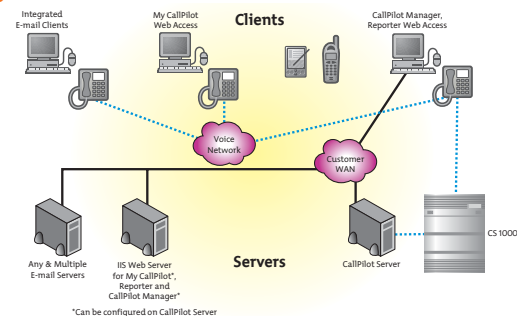
Business Challenges

- Do you use a traditional Nortel Meridian 1 PBX, a Nortel Communication Server 1000M or a Nortel Communication Server 1000?
- Are you planning to upgrade your voice messaging system?
- Do you frequently employ temporary or mobile workers?
- Do you require confidential, person-to-person message transmissions?
- Are you interested in ways that you can improve user productivity and reduce administration overhead?

Typical Applications

All employees can benefit from the implementation of CallPilot. Typical applications include head offices and branch offices in the finance, government, healthcare and transportation sectors, although CallPilot is utilized across many other industries. (The Nortel Hospitality Messaging Server 400 is designed specifically for the hospitality industry.) Productivity enhancements will be immediately apparent for businesses with mobile and remote employees. However, stationary desktop users will also find that their time spent accessing messages is significantly reduced utilizing CallPilot.

Network Diagram



Key Points

- Increased productivity – reduced message access time by up to 50%
- Lower total cost of ownership – simplified management and ongoing maintenance
- Seamless integration, provides a single mailbox for voice and fax messages – just point and click via a desktop PC email client or through a simple Web interface
- Supports conventional touch-tone commands as well as a convenient and easy-to-use speech activated messaging interface – ideal for the mobile workforce
- Includes Web-based and centralized system management tools to maintain low total cost of ownership
- Complies with industry standards to fit in with existing IT and telecom environments
- Architecture does not impact your existing email server – simplified deployment and no single point of message failure
- Allows quickly creating caller services such as auto attendants and fax-on-demand – easier than ever to manage caller routing

Features and Benefits

- **Simple to use interface** – reduces training and increases productivity, uses the same telephone user interface (TUI) commands as Nortel Meridian Mail to ensure ease of transition between the two systems
- **Playback messages** – through the PC, Web or telephone, “anything, anytime, anywhere”

- **Digital networking** – saves transmission costs
- **Unified messaging** – gives users the ability to merge voice, fax and email messages into a single interface, easily integrated with Lotus Notes, Microsoft Outlook and Novell Groupwise
- **Integrated voice and fax messaging** – provides the ability to receive, store and process voice and fax messages in the same “multimedia” mailbox – a single point of user administration and access
- **Email-by-phone** – provides users with access to their emails from a telephone set – lets users scan through a list of email messages and initiate printing of email to a fax machine
- **Nortel Contact Center integration** – will support the Nortel Contact Center (ACCESS voice) service, voice menu and the voice processing needs of Nortel Contact Center, allowing CallPilot to become an integrated part of a Nortel Contact Center solution. CallPilot offers the same Nortel Contact Center functionality as previously provided in the Nortel Meridian Mail solution including:
 - Give IVR – allowing callers to be sent to an IVR session while retaining their spot in Queue
 - Controlled Broadcast Announcement – plays broadcast type announcements to callers
 - Open Voice Session - prompts the caller for information, collects the information and plays expected wait time message.
- **“My CallPilot”** – accessible through a Web browser, brings users their very own personalized, visual “window” into the CallPilot

- system. My CallPilot offers exceptional flexibility for managing messaging needs, including the ability to change the setup of mailbox features, create personal distribution lists and receive, forward, reply to and send messages via the Web client.
- **CallPilot Manager** – a powerful management application that enables the device to be configured and maintained from any browser enabled workstation at the click of a mouse. Included within CallPilot Manager is CallPilot Reporter, which generates reports around the operation and performance of the CallPilot system.
 - **Application Builder** – enables administrators to create custom voice menus, automated attendants and fax-on-demand, all via a drag-and-drop GUI
 - **Networking** – uses voice profile for Internet mail (VPIM) standards to create seamless IP integration with existing communications systems such as Nortel Meridian Mail, Nortel Norstar Integrated Communication System and other vendors. Standards based – VPIM, SNMP, LDAP, IMAP, etc.

- **Alternative user interface** – provides an alternative interface that emulates the most commonly used DTMF commands utilized by other messaging systems (e.g. Octel Serenade and Aria)
- **Optional Enhanced Contact Center** – for the CallPilot 100/150 and Norstar ICS. Provides agent and supervisor features, intelligent call routing, skills based routing, activity codes, reporting, real-time displays for up to 100 configured agents.
- **Used across the Nortel Multimedia Communications portfolio** – CallPilot is offered with Nortel Meridian 1 PBX, Nortel Communication Server 1000, Nortel Meridian SL-100, Nortel DMS-100 (CPE Centrex), Nortel Business Communications Manager 50/200/400 and Nortel Norstar Integrated Communications System platforms.

Technical Specifications

Platform Options: There are several different platform options available. Each platform offers different levels of capacity and redundancy as well as switch connectivity options. The following provides a breakdown of each type:

Platform	CallPilot Intergrated	CallPilot 100	CallPilot 150
Processor	Intel	Motorola PowerPC 855	Motorola PowerPC 855
Number of Ports:	16 VM / 32 Total	4	8
Storage Hours	2000	9	82
Maximum Mailboxes	1000	40	300
Downloadable Greetings	1000	Standard	Standard
Park & Page from Mailbox	Standard	Standard	Standard
Basic Call Center	Standard	Optional	Standard
Call Center Reporting	Optional	Optional	Optional
Centralized Voice Mail	Optional	N/A	Optional
Enhanced Call Center	N/A	N/A	Optional
VPIM/AMIS Networking	Optional	Optional	Optional
Desktop Messaging	Optional	Optional	Standard 2 Seats – additional optional
Connectivity	BCM	Norstar ICS	Standard
Dimensions	N/A	13" (33 cm) H 8" (20 cm) W 1.5" (4 cm) D	13" (33 cm) H 8" (20 cm) W 1.5" (4 cm) D
Power	AC	AC/DC Adapter (9V DC input)	AC/DC Adapter (9V DC input)

Technical Specifications Continued:

Platform	CallPilot Mini	CallPilot 201i (in skins)	CallPilot 703t (Tower)	CallPilot 1002rp (Rack Mount)
CPU	Motorola PowerPC 855	Celeron 300 Mhz	Dual Intel Pentium II 450Mhz	Dual Intel Pentium II 866Mhz
Memory	PCMCIA	256 MB	512MB	512MB
Channels	8	40	96	96
Storage Hours	82	350	1,200	2,400
RAID	No	No	Standard	Standard
Max UM Clients	100	2,200	7,000	7,000
Max Voice Mail boxes	200	10,000	20, 000	20, 000
Connectivity	Meridian 1 PBX 11C Cabinet and 11C Chassis	Meridian 1 PBX Portfolio and CS 1000 Series	Meridian 1 PBX Portfolio and CS 1000 Series	Meridian 1 PBX Portfolio and CS 1000 Series, Meridian SL-100, Centrex
Protocols Supported	SMTP, IMAP4 OR POP, VPIM, SNMP, LDAP	SMTP, IMAP4 OR POP, VPIM, SNMP, LDAP	SMTP, IMAP4 OR POP, VPIM, SNMP, LDAP	SMTP, IMAP4 OR POP, VPIM, SNMP, LDAP
Dimensions	8" (20 cm)- D 13" (33 cm)- H 2" (4 cm) - W	2 IPE Slots	16.75" (420 mm) – H (chassis only) 8.6" (215 mm)- W (chassis only) 26" (650 mm) D Clearance: front: 10" (250 mm) rear: 5" (125 mm) side: 3" (75 mm) 46 lb (22 kg) fully loaded	12.5" (320 MM) – H 19" (483 mm) – W 19.5" (495 mm) – D (without front bezel) 21" (533 mm) – D 100 lb (45.5 kg) fully loaded
Power	External Power Supply 115/230 VAC nominal; range 100 to 240 V 50/60 Hz nominal; range 47 to 63 Hz	Powered by the media gateway	AC 110 60Hz / 220v 50 Hz	AC 110 60Hz / 220v 50 Hz and 48v DC Hot swappable and fully redundant power supplies

Ordering Information

For further information, please contact your local Nortel representative.

Nortel Hospitality Messaging Server 400



Overview

The Hospitality Messaging Server 400 (HMS 400) replaces the Meridian Mail HVS as the messaging solution for the hospitality industry. It is a global product with multi-language support. The HMS 400 platform provides ample resources to add additional feature/capabilities in the future. It is scalable up to 7000 users with the choice of single server or multi-server configurations.

Ideal For

The Nortel HMS 400 was designed for enterprise customers who are looking to deploy a guest messaging application for the hospitality industry. It will allow hotel owners to provide valuable services to their guests such as:

- Voice messaging
- Automated wake up calls with snooze
- Remote retrieval of messages

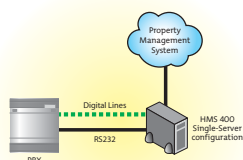
Business Challenges

- Are you looking for a full featured voice-messaging solution for your hotel guests and staff?
- Do you need a messaging platform that will seamlessly integrate with your Property Management System?
- Do you have a large number of guests from other countries?

Typical Applications

Hotels or any hospitality environment interested in providing best in class communications features to their guests.

Network Diagram



Key Points

- **Scalable** – each system is configurable from 8 to 40 ports. Up to 3 servers can be clustered bringing the port capacity to 120.
- **Voice Messaging** - Simple to use Guest Voicemail with Group Messaging features... great for tour groups and events business. It can also provide voice mail or unified messaging for staff members.
- **Auto Wake-up** – is delivered in the language of the guest's choice (18 languages) and features a snooze capability. The front desk is notified if the guest doesn't answer after 3 attempts.
- **Housekeeping Features** – assist hotel staff in updating room status and are also available in any of the 18 supported languages.
- **Mini-bar Feature** – is a system for the hotel to perform inventory using the room telephone.

Features and Benefits

The Nortel Hospitality Messaging Server 400 provides many guest features including:

- Guest configurable greeting – for personalization
- Guest Configurable Pass-code – for security
- Assign Guest Pass-code through PMS – ease of check in
- Automatic Check-in Comfort Message – welcoming guests to the hotel
- Auto-login/auto-play – no buttons to push
- Move Guest between rooms – preserves any messages saved by the guest in the previous room
- Guest Group Message Delivery – for tour announcements, etc.

- Guest Language Set by PMS – allows front desk staff to program for the guests preference
- Guest Text Message – to provide alerts for guest
- Restore All Deleted Guest Messages (Staff Activated)
- Post Check-out Message Retention – in case a guest forgets to collect messages before leaving

The Nortel Hospitality Messaging Server 400 also contains the following system features:

- Disk to Disk back up & restore
- Disk to Tape back up & restore (optional)
- Remote Maintenance Access
- Maintenance/Admin Format - GUI based look/feel
- Guest admin backup terminal in the event the PMS system is down
- Auto-Attendant Services
- Time of day, day of week, holiday controllers
- System Reports
- Automatic Wake-up Reports
- System Alarms
- Remote Notification (DTMF Pager)

Market Information

Nortel is focused on building on a strong presence in the hospitality market to show our continued leadership in the industry. Our goal is to provide "Guest Services of the Future" to all of our customers. The HMS 400 is a server-based, scalable solution that will enable us to deliver new engaged applications that are adaptable to IP Telephony, Wireless and Multimedia technology cost effectively for the smallest property to the largest mega-resort.

Technical Specifications

Dimensions

Height chassis only: 16.75" (42 cm) / with chassis feet: 17.5" (44 cm)
Width chassis only: 8.6" (21.5cm) / with chassis feet: 12.7" (32 cm)

Depth (distance from front to back) – 26" (65 cm)
Clearance • front: 10" (25 cm)

• Rear: 5" (12.5 cm)

• Side: 3" (7.5 cm)

Weight of fully loaded system approximately 46 lbs (20 kg)

Power

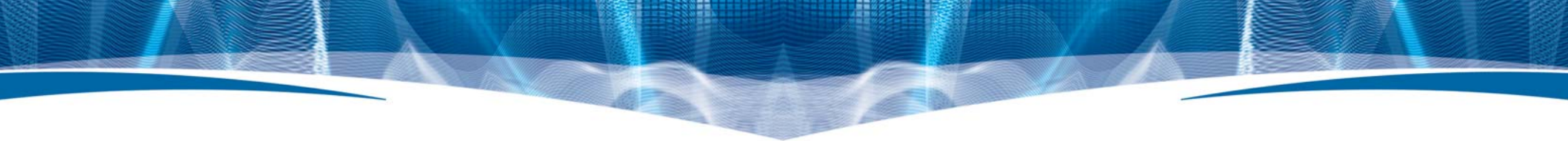
AC power supply connector (450 W non hot-swap power supply)

Currently Supported On:

Meridian 1 PBX Portfolio - Release 25.40b or later
CS 1000 Series Release 3.0 or later

Ordering Information

For further information, please contact your local Nortel representative.



> Nortel Contact Center Portfolio

The Nortel Application Suite creates versatile, end-to-end customer contact centers that deliver complete, seamless customer experiences. An enterprise can start modestly with a single center or ambitiously with a global, multimedia center with thousands of representatives. Products in this portfolio provide a variety of ways to enhance customer interactions, such as merging telephony systems with applications and managing electronic inquiries from the enterprise web site. Call center agent information can also be made available to external computer applications to create enhanced services.

- Nortel Symposium Call Center Server
- Nortel Symposium Express Call Center
- Symposium Web Center Portal
- Nortel Remote Agent Observe
- Nortel Agent Greeting
- Nortel Communication Control Toolkit
 - Nortel CTI Communications Server

Nortel Symposium Call Center Server



Overview

Nortel Symposium Call Center Server (SCCS) 5.0 offers a complete and powerful solution for dynamic contact centers, providing skill-based routing, comprehensive management and reporting tools to deliver fast, personalized service and increased productivity. Nortel SCCS enables an organization to leverage its contact center investment by using voice over IP (VoIP). Regardless of the business environment – single site or geographically dispersed – Nortel IP contact center solutions simplify management and administration and extend contact center capabilities to agents anywhere – in branch offices or at home. Nortel Symposium Call Center Server supports Nortel Meridian 1, Communication Server 1000 (CS 1000), CS 2100, DMS Centrex and SL-100 environments.

Ideal For

- Small to large dynamic contact center environments that require superior sophistication, agility and differentiation in the service offered to customers
- Organizations in industries such as finance, hospitality, government, etc. that need to provide 24/7 service to their customers or clients
- Contact centers requiring skill-based routing to deliver callers to the right place the first time
- Standalone, networked or virtual state-of-the-art contact centers, including networked skill-based routing
- Outsourced contact centers (service bureaus)
- Contact centers utilizing branch office or remote (at home) agents
- Multimedia customer contact centers (voice, fax, email, Web) using blended environments
- IP contact centers

- Do you want to Web enable your contact center and do you have plans to use VoIP in the contact center infrastructure?
- Do your agents have specialized skills that can be best used by matching them to callers with specific needs?
- Do you wish to provide differentiated service to your customers such as VIP service to individuals?
- Do you need to read the pulse of the contact center with real-time displays and make instant modifications to manage changing contact center conditions (fine tune)?
- Do you want all contact center data to be openly available to anyone who needs it?
- Do you need to extend full contact center capabilities to resources located away from the main center such as in a branch office or at home?
- Do you have agents in multiple locations who should share calls equally between the sites (networking)?
- Do you want to implement industry standard, open, client-server architecture?
- Do you want an open third-party interface strategy and open databases for historical reports?
- Do you want to track each call from start to finish, obtaining the data needed to fine tune your contact center?
- Do you want to address peak loads and

Business Challenges

- Do you want customer service to be a key differentiator for your business?
- Are you looking for a powerful and flexible business solution to provide superior customer service?
- Do you want to customize your contact center to build strong customer relationships?

reduce wait times in the contact center with richer real-time information and reports?

- Would it be desirable for contact center managers and supervisors to be able to access and view contact center data from virtually anywhere by simply using an Internet Explorer browser to connect to the server?
- Do you want to build the right solution for your business, today and tomorrow?

Typical Applications

- Call routing and treatments based on assessing numerous traffic, skill set and real-time factors such as current call volumes, logged agent count, age of call, average speed of answer, time of day, day of week and/or holidays
- Call routing decisions based on individual customer information stored in a host computer
- Advanced real-time and historical reporting, including detailed "call-by-call" reporting
- Provides ways for contact center managers to minimize their total cost of ownership and optimize efficiency, even with the new functionality and benefits the thin client affords
- Eliminates co-residency problems with desktop software applications
- Symposium Call Center Server benefits any organization striving to build a winning customer contact strategy. It is a solid foundation for evolving multimedia contact center requirements, enabling businesses to be flexible in meeting their customers' ever changing service needs, creating customer loyalty while retaining agent talent, reducing overall costs to improve profit.

Key Points

- Powerful, skill-based routing – Skill-based routing means that a business can intelligently route callers based on their needs to the agent that is best suited to fulfill those customers' needs. Priority routing for preferred customers ensures that valued customers are given VIP treatment.
- Seamless networking environment – Networking provides an efficient, streamlined solution for centrally managing multiple contact centers in a Nortel Meridian 1 or CS 1000 environment.
- Adaptable call handling – A rich, flexible scripting language allows the business to customize call routing decisions and treatment based on its business processes
- Graphical, real-time displays – Real-time displays provide a snapshot of the contact center for management to view customized performance statistics for increased responsiveness to changing conditions.
- Complete, customizable reports and call tracking – With more than 70 standard reports and the ability to customize historical reports, Symposium Call Center Server offers a comprehensive management tool to explore valuable data for making business decisions.
- Industry-standard platform – Based on client/server architecture, Symposium Call Center Server is designed on an industry standard platform to enable real-time data, host data exchange and other advanced call handling features.
- Enhanced filtering – Better support for service bureau or multi-tenant contact centers comes from enhanced filtering.
- Anywhere access – Thin client permits agents to access client data from anywhere using an Internet Explorer browser.
- Superior reliability – Warm-standby and high availability options help ensure uninterrupted service for your customers.
- Optimized for Internet, multimedia and CTI applications – Symposium Call Center Server can be integrated with multimedia transaction handling, CTI and other advanced multimedia enabled functionality.

Features and Benefits

- Routes calls quickly to the agents best equipped to answer them, increasing customer loyalty
- Builds profitable customer relationships by personalizing service with superior flexibility
- Improves agents' effectiveness and productivity – helping to increase employee satisfaction and retention
- Provides managers with the decision-making tools they need, from up-to-the-second, real-time displays to comprehensive reporting capabilities showing contact center activity, traffic fluctuations, agent performance and work characteristics
- Speeds up answering, extends hours of service and connects agents and customers across wide geographical areas by extending the contact center using advanced networking and voice over IP (VoIP)
- Grows and adapts to a company's evolving needs, employing open architecture, flexible design and built-in scalability to protect the contact center investment
- Supports multifaceted call routing and treatment decisions based on combinations of dynamic conditions using a rich scripting language
- Enables virtual or networked contact centers with centralized administration, management and reporting delivering increased business productivity
- Offers more than 70 standard reporting templates that are easily customizable using industry standard report writers
- Leverages familiar Windows and/or Internet Explorer-based displays for agents, supervisors and managers – intuitive and easy to use
- Supports warm-standby and high availability options for maximum reliability
- Permits a cost-effective, entry-level solution with the expansion potential required to meet the changing needs of any enterprise
- Includes a browser-based thin client application that introduces superior management tools and simplifies the

administration and configuration of clients on the Symposium Call Center Server

- Supports up to 3,000 concurrent active agents (depending on associated switch), 6,000 configured on a single server
- Allows calls to be queued to 20 skillsets simultaneously
- Supports up to 1,000 skillsets, single site or networked. Individual agents can be assigned to 50 skillsets simultaneously with 48 agent call answering priority levels.
- Handles 35,000 calls per hour
- Enables networking of 30 Symposium Call Center Server sites in a Nortel Meridian 1 or Nortel CS 1000 environment for a virtual contact center
- Supports up to 3 Symposium Call Center Server systems on a single Nortel CS 1000 or Nortel Meridian 1 switch
- Offers support for simple network management protocol (SNMP) compliance
- Provides 7/24/365 reliability with warm standby server

Market Information

Nortel Symposium Call Center Server offers many unique advantages over competing solutions in the marketplace. Some specific examples include:

- Routing intelligence and flexibility – In many contact center solutions, agents are assigned to groups based upon the skills they possess. Routing parameters are then assigned to the group, not the individual agents. Symposium Call Center Server has removed the concept of agents belonging to groups, providing more flexibility in call routing and allowing agents to be viewed as individuals with distinct skills and abilities. Call routing parameters are scripted to bring the appropriate agent to the call, not the call to the agent. This is advanced skill-based routing – offering a business more flexible and sophisticated alternatives for call routing.

- Superior performance – Overall system performance is heavily dependent on the system processing power between application server and core switching system. Call processing performance, as measured by busy hour call completions (BHCC), of a Nortel Meridian 1 or Nortel CS 1000 server (up to 320,000 BHCC) exceeds that which is currently available from competing products. A contact center's performance is directly impacted by the system's ability to adequately handle call volume.
- Tightest integration – The integration between the Symposium Call Center Server and core call switching systems (Nortel Meridian 1 and/or Nortel CS 1000) is tighter than that offered by competitors. Furthermore, major competitors attempt to run these customer contact applications on the same server used for basic call processing, causing weakened performance of both the application (call center or IVR) and the essential call processing (PBX). Nortel has designed these demanding applications to reside on their own tightly integrated servers, thereby delivering superior overall system performance.
- Unparalleled reliability – Nortel contact center solutions are backed by the inherent reliability of the Nortel Meridian 1 and Nortel CS 1000 switching platforms. World renowned five 9s (99.999%) of reliability is assured based upon these atypical solution attributes:
 - Distributed processing
 - Redundancy with no single point of failure
 - PSTN fallback and survivability
 - Open standards-based design can utilize continuously available server hardware, and/or warm standby server mirrors historical and operation system data and software.
- Market leader – Nortel Networks has more than 30 years experience in developing contact center applications with solutions installed in more than 100 countries and more than 4 million agent positions handling over 68 million customer calls each day.

- #1 share for contact centers - US, Canada
 - 1H04 total systems (InfoTech) + 2003 total systems & agents (InfoTech, NBI)
 - Over 15,000 large enterprise CallPilot systems deployed globally
 - 4M+ contact center agent positions worldwide handling 68M+ calls per day
 - 40K+ contact centers in 100+ countries – 12K+ using skill-based routing

Ordering Information

For further information, please contact your local Nortel representative.

Nortel Symposium Express Call Center



Overview

Nortel Symposium Express Call Center (SECC) 4.2 combines sophisticated, skill-based call routing, call treatment flexibility and intuitive management tools to deliver faster services and increased productivity to department-level or small to medium enterprise customer contact centers with up to 150 active agents. Symposium Express Call Center provides functionality that is usually available only in more complex systems, yet is both comprehensive in scope and remarkably easy to use.

Ideal For

- Small, medium and large enterprises with smaller formal contact centers
- Department contact centers such as help desks, sales desks, customer service centers and corporate branch offices
- Any business or organization where five or more people make frequent use of the phone for incoming calls
- Businesses or organizations that may currently use hunt groups or basic ACD and require more control
- Organizations that currently do not have a contact center and require an easy to use system

Business Challenges

- Do you have several people answering calls in a reservations office, order desk, technical help desk or the like?
- Do you require an environment designed to process calls with efficiency to maximize customer satisfaction?
- Do you require instant updates on call status and the ability to measure, report and improve your customer call handling using "off-the-shelf" reporting tools?
- Do you need sophisticated technology such as skill-based routing and hot-desking to support a contact center function?
- Are you looking for a solution to support new ways of doing business, such as utilizing CTI applications and screen pops?

- Do you require sophisticated contact center functionality that is quick and easy to use, with a low cost of ownership?

Typical Applications

- Small to medium call centers or internal helpdesks can benefit from the relatively simple-to-manage call flow configuration and sophisticated features such as skill-based routing.
- Environments that require flexibility in caller treatment and reporting balanced with ease of management, such as:
 - Customer care lines,
 - Sales lines,
 - Technical assistance and
 - Employee helpdesks.

Key Points

- Grows as business requirements grow
- Handles up to 150 active agents (300 profiles can be created)
- Wizard-driven interfaces to management functions
- Easy to use, minimal training
- Low cost of ownership
- Provides excellent customer service – the same as a large contact center
- Increases productivity through efficient utilization of staff resources
- Skill-based routing supporting up to 50 skillsets

- Rich and comprehensive historical management reports
- Graphical or text based real-time information
- Supervisor view of contact center and agent activity with real-time display of information
- Open interfaces to data access, easy integration
- Integration with third-party applications
- Software-only solution running on specified industry-standard PC platforms
- A flexible and easy upgrade path provides a smooth stepping stone to Nortel Contact Center – Manager retaining investment spent in software, training and management.

Features and Benefits

Symposium Express Call Center utilizes a predefined decision tree and customer defined parameters for call routing to determine incoming call queuing and treatments. Queuing and treatments are based on call type and current contact center conditions. Contact center conditions include "open or closed," emergency status (active or non-active), the number of calls active and queued in the system, the number of calls waiting of a particular type and/or the amount of time a call has waited in queue. During open hours, depending on configuration, queued calls are presented immediately with a greeting announcement and with up to two separate delay announcements (independent timers) while waiting.

The first announcement can be configured to inform callers of expected wait time or position in queue. Additionally, based on conditions and configuration, calls can be queued to alternate

skillsets or sent to an alternate directory number to facilitate answering. During designated closed periods calls can be queued to an alternate skillset, routed to an alternate number for handling or messaging, or receive a closed announcement. Symposium Express Call Center Release 4.2 runs on Windows 2000 server O/S. It can also run on Microsoft Windows 2003 server O/S as of April 29, 2005. The client, running on Windows 2000/XP, supports multiple languages. Symposium Express Call Center interfaces to all Nortel Meridian 1 and Nortel CS 1000 platforms.

Nortel Symposium Call Center Server and Symposium Express Call Center both offer skill-based routing to agents, call treatment options, real-time displays and comprehensive management and reporting functionality – empowering today's contact centers with the tools and agility to deliver unique and unprecedented care to their customers. Determining the best solution for a particular situation requires an assessment not only of size and capacity requirements, but also an understanding of immediate and future business requirements for capacity, flexibility and customization in planning incoming call routing and treatment. The following table summarizes the key features of Nortel Symposium Express Call Center and Symposium Call Center Server to assist in understanding the capabilities of each. (Please consult associated technical documentation for specifics.)

	Symposium Express Call Center 4.2	Symposium Call Center Server 5.0
Contact center	Emerging/small, departmental	Seasoned/small to large
Requirements	Basic, ease of management	Customizable, dynamic
Capacity		
Calls per hour	5,000	35,000
Active agents (A) -	(A) 10 to 150 – (C) 300	(A) 20 to 3,000 (depending on associated system) – (C) 6,000

	Symposium Express Call Center 4.2	Symposium Call Center Server 5.0
Total skillsets/per agent/agent priority	100/50/1 to 4	1000/50/1 to 48
Administration		
Management interface	Wizard-driven, point and click	Uses scripting language
Script customization	No – defined template	Yes
Scheduled changes	No	Yes
Standby mode for skillsets	No	Yes
Routing and treatment		
Idle agent queuing: selection of highest priority idle agent to receive call	Preset: longest idle since last status change	Configurable: longest idle time since last status change, or last serviced or most cumulative idle time this login
Call queuing/treatment decision mechanism	System wide decision tree	Individual script instructions, or via host data exchange
Call treatment classes	32 per system/one applied per call	Customizable in script
Conditions/intrinsics assessed	Per call treatment class/6 conditions	Per script/combinations
Time/day/date/holiday	Open or closed treatment	Customizable
Call volume in system – threshold	Unable to handle call treatment	Customizable
Call volume by call type – threshold	Unable to handle call treatment	Customizable
Calls waiting, or age of call – threshold	1st overflow treatment	Customizable
Calls waiting, or age of call – threshold	2nd overflow treatment	Customizable
Call waiting timers (separate)	Wait announcement treatment	Customizable
Skillset/agent intrinsics (13)	No	Customizable
Traffic volume – call rate	No	Customizable
Utilizes mathematical calculations	No	Customizable
Emergency state	System wide treatment	Customizable
Announcements		
Emergency announcement	1 per system	Customizable
Unable to handle call announcement	1 per call treatment	Customizable
Greeting announcement	1 per call treatment	Customizable
Wait announcements	2 separate per call treatment	Customizable
Position in queue/expected wait time	As 1st wait announcement	Customizable
Closed announcement	1 per call treatment	Customizable
Management reporting*		
Standard reports – customizable	64 – Yes	70+ – Yes
Call-by-call reporting	No	Yes
RT displays, customizable – personal	3 – No – No	6 – Yes – Yes

* Nortel Symposium Call Center Server also offers the option to use Nortel Symposium Thin Client as the management and administration tool.

Market Information

Small contact centers typically require the same functionality as larger contact centers. Nortel Symposium Express Call Center offers a solution for the small contact center with almost the same large solution capabilities as Nortel Symposium Call Center Server. Competing solutions in the

marketplace either try to scale down their larger solution or offer a small contact center solution that lacks critical functionality. The primary difference for smaller contact centers is the need for a simple, all-in-one solution – Nortel Symposium Express Call Center meets this requirement.

Technical Specifications

Minimum Hardware Specifications for Symposium Express Call Center	
Processor	Minimum Processor Type 500 MHz Pentium III (Windows 2000 Server); or 733 Mhz Pentium III (Windows Server 2003)
Supported Processors	Pentium III, Pentium IV, Intel Xeon, Intel Xeon DP Note: SECC can operate on a single or dual processor (quad processor not supported)
Memory	Minimum 256 Mbytes
Hard Drive	Minimum 9 Gbyte (12 recommended) – Manufacture spec of 7200 rpm speed
Monitor	SVGA with minimum display setting of 1024 x 768
Keyboard & Mouse	Standard
CD ROM Drive	Minimum of 4x speed
Floppy Drive	3.5 in. (must be drive A)
Modem	Serial or USB that is V32 or V32bis compliant with minimum 28.8K baud rate
Backup System	Tape Drive or Remote Directory
Interface Card	10Base-T network Interface card for connection to the ELAN (Optional) NIC for connection to the CLAN (can be Ethernet or Token Ring)

Ordering Information

For further information, please contact your local Nortel representative.

Nortel Symposium Web Center Portal



Overview

Nortel Symposium Web Center Portal 4.0 empowers businesses with the capability to enhance customer interactions by enabling organizations to receive, route, track and report on electronic inquiries from the organization's Web site. The solution works with Nortel Symposium Call Center Server or Nortel Symposium Express Call Center to enable businesses to leverage online personalization and present information through multiple views. By servicing this new type of media, businesses will be able to strengthen their existing customer relations and extend their reach into new lucrative markets and an Internet savvy base.

Ideal For

- Any Nortel Symposium Call Center Server or Nortel Symposium Express Call Center user that recognizes customers are missing personalized service across all access media
- Existing call center users that want to transform into a powerful, unified customer contact center using skill-based routing and multimedia agents
- Organizations that desire a differentiator to raise customer service to a new level, to gain market share and increase profitability
- Technical support organizations that have a particularly tech-savvy customer base who are demanding better, multimedia technical support methods
- Organizations such as insurance or financial services that have particularly detailed or complicated customer service processes that would gain from the visual benefits of a multimedia support service, such as Web collaboration, page sharing and form sharing
- Any organization seeking to interact with their customers or clients via email or the Web

Business Challenges

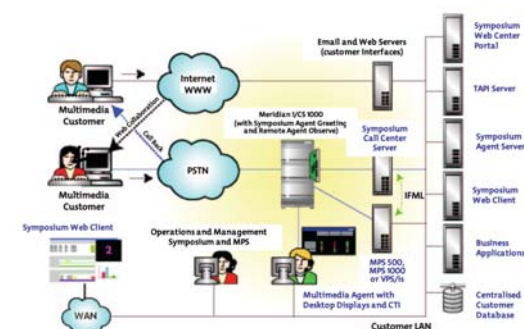
- Do you want to manage emails with the same efficiency and formality with which you currently handle telephone calls?
- Do customers complain that when making inquiries via email, they are not responded to, or the response is too slow?
- Do you want to improve customer loyalty by ensuring that all customers receive prompt responses from their Web-based requests?
- Do you want to be able to fill lulls in voice traffic and improve overall efficiency of the contact center by handling email inquiries?
- Are you planning to evolve your traditional voice call center into a multimedia, Web empowered, customer contact center?
- Do you want to employ skill-based routing of emails and other Web-based contact requests, with the option to push them dynamically to specific agents?
- Do you need multimedia agents handling telephone, email and Web request transactions dynamically?

Typical Applications

- Technical support services where email tends to be the preferred contact method for customers
- Customer services where email is a particularly appropriate response method, such as for frequently asked or predictable questions that can be answered with standard email reply templates, such as in the PC support industry, e.g., PC modem or printer settings

- Any customer service application where prompt email responses from well equipped and qualified agents result in more satisfied customers
- Any application that allows an organization to create an interactive Website to retain customers

Network Diagram



Key Points

- Reduces costs and increases efficiency – Automating customer responses can help reduce costs significantly. Nortel Symposium Web Center Portal can provide immediate, automated answers to electronic queries and ensure that callers are routed to an agent with the most appropriate skills, therefore improving customer satisfaction.
- Empowers businesses – The enterprise can enhance customer interactions through a management solution that routes, tracks and reports on electronic inquiries.
- Internet readiness – Symposium Web Center Portal readies call centers for the future deluge of email traffic by managing electronic inquiries as effectively as phone based inquiries.
- Increases productivity – The capability to blend voice and email traffic to a skilled agent's desktop can increase productivity and reduce costs.

- Efficiency – Symposium Web Center Portal helps streamline the electronic handling process and automates responses, which in turn reduces handling and response times.
- Improved management tools – Symposium Web Center Portal is yet another way of satisfying customers by giving them their choice of access into the business. The management tools provided by Symposium Web Center Portal, such as real-time and historical reporting, allow businesses to effectively measure agent productivity and track customer concerns.
- Increases customer loyalty – Better managing customer relationships and understanding their needs leads to increased customer loyalty. Nortel Symposium Web Center Portal allows companies to create a seamless customer experience, making it easier for customers to do business with the organization consistently – anywhere, anyway and anytime.

Features and Benefits

This comprehensive set of capabilities is modular and includes the following features:

- Email manager with click-to-call functionality
- Multimedia manager
- Web communications manager

All of these solutions provide administrators and managers with the necessary tools to effectively manage on-line customer care activity through real-time displays, statistics and reports. Individual components of the Nortel Symposium Web Center Portal can easily be implemented to enable companies to successfully address their service needs at each stage of growth. In addition, these modular capabilities integrate with Nortel Symposium Call Center Server and other products to expand overall contact center capabilities and enable multimedia customer interactions.

Because the solution is modular, organizations can choose to build applications that use individual features or modules within the Nortel Symposium Web Center Portal, such as real-time email response, typed-chat, page pushing, click-stream tracking and form sharing, either on their own or in combination with any of the other features.

- Text chat – Agents and their customers can engage in a text-based dialogue via the Internet.
- Page pushing – Agents and customers can “push” pre-defined or ad hoc web pages to each other’s web browsers. Agents can send pre-defined URLs associated with the product and ad hoc URLs that the agent or customer enters in the text box.
- Form sharing – The customer and agent have the capability to share and edit HTML forms together. Form sharing allows an agent to help a customer fill out a pre-defined form on-line
- Web-on-hold – intended to keep an end-user’s interest while waiting for an agent. The system will stream or push various media types such as video, images, web

pages, etc. to the customer’s PC. This allows the opportunity to up-sell and cross-sell products and services and advertises a company’s marketing campaigns.

- Click stream tracking – Businesses get the capability to track the customer’s “surfing” activity. An agent is presented with the last series of URLs the customer visited on the web site. This allows agents to better understand the behavior and interest pattern of the customer.
- Agent interface – Contact handling is simplified by using menus, toolbars, data layout and presentation, navigation, transaction and data download. New agent interface functionality includes added views, agent input and info area, status bar and Web collaboration.
- Email manager – Capabilities include support for multiple email servers and the ability for agents to CC and BCC other recipients on their outbound emails. This mail server interaction allows agents to continue to operate during mail server downtime. In addition, email manager also includes analytical tools to expedite the troubleshooting process, should any issues arise.
- Dynamic transaction handler (DTH) - Electronic transactions can be “blended” with telephone traffic for presentation to the agent’s desktop. As agents become available, electronic inquiries are routed to the best qualified agent’s desktop. DTH allows customer contact centers to equally distribute web requests among call center agents through Nortel Meridian 1 and Nortel Contact Center applications.
- Click-to-call – Customers have a connection to live representatives via immediate or scheduled telephone call back that assists in their immediate needs, enhancing the overall customer experience and maintaining customer loyalty.

Market Information

Many companies today have an immediate requirement to more effectively handle their customers’ emails. Additionally, the requirement for web-based self service, providing real-time assistance from a web site without agent intervention, is becoming increasingly compelling. Automated responses to frequently-asked questions are regarded as a growing requirement for today’s right now, instant information, self-service oriented consumers. Industries that have been, and will continue to lead the web collaboration market include mortgage lending, brokerage firms, real estate and internal corporate functions such as technical help support desks, travel and human resources departments.

In a tight economy, companies recognize they can’t afford to lose even one good customer; they are looking at ways to continue realizing revenue and profitability performance by focusing on their customer base and servicing that customer base in unique and strategic ways. But they must also control costs. Internet- or web-based customer service enables companies to do both. Additionally, self service via the web such as auto response, FAQs, etc. dramatically increases the consistency of information customers receive and reduces the costly number of errors that can come with agent assisted transactions.

Ordering Information

For further information, please contact your local Nortel representative.

Nortel Remote Agent Observe



Overview

Nortel Remote Agent Observe 1.0 delivers a simple, cost-effective solution that enhances the contact center observe function with powerful remote observe and supervision capabilities simplifying quality assurance activities and enabling outsourcers to provide a flexible monitoring solution to their clients. Managers can remotely observe the quality of service being provided to their customers without having any equipment at the remote location other than a DTMF-enabled telephone.

Ideal For

- Contact centers of any size that want to assure superior quality
- Service bureau environments that wish to give clients easy access to monitor calls
- Contact centers using skill-based routing
- Virtual contact centers where managers need to monitor agents at remote locations

Business Challenges

- Do you want to give your contact center managers expanded observe functionality?
- Are you operating an outsourced service bureau environment where you want to give clients easy and secure access to monitor calls for their businesses?
- Do you have skill-based routing in your contact center and need to monitor calls to ensure a high level of agent ability across multiple skillsets?
- Are you looking for a simple way to coach agents to improve skills and assure high quality calls?
- Are you aiming for higher levels of customer retention and customer loyalty?

Typical Applications

- Outsource or service bureau contact centers that want to give their clients the ability to easily and cost effectively observe calls from anywhere
- Any Nortel contact center user who needs to enhance the observe function by adding more secure access and call recording

Key Points

- Supervise and observe agents from any location – Managers on a business trip or working from home can simply log-on by using a secure user ID and password. Clients of outsourced contact centers can observe calls with ease, assuring call quality.
- Leverage a wide variety of observation parameters – In addition to monitoring position ID, Nortel Symposium Call Center users can monitor calls presented to a specific agent ID, skillset, application, controlled directory number (CDN) or DNIS – dialed number – giving users more choices and greater control over observation.
- Select supervisor listen and speak options – Supervisors can toggle between “listen only” mode and “listen and speak” mode. If necessary they can choose to speak to both agent and caller. This ability assures managers can interact with agents and callers in the manner most appropriate for the situation.
- Record calls with ease – In a Nortel Contact Center environment, you can record calls in a standard .au format and save them to an FTP server for future reference. For example, these calls can be reviewed with an agent for coaching to improve skills and enhance quality.
- Guard against unauthorized access – Security features assure only authorized users gain access to the system and can observe calls. Administrators easily manage access control, user profiles and privileges using a web browser-based interface.

- Use any phone – No special equipment is required to observe calls – just a touch tone telephone.
- Deploy easily in any Nortel contact center environment – No significant equipment changes are required. Nortel Remote Agent Observe is implemented on a single slot media card that can be installed on any Nortel Meridian 1 or Nortel CS 1000 platform.

Features and Benefits

The Nortel Remote Agent Observe offers a single slot digital card solution that can be installed in any IPE slot where an XDLC can be installed. On larger systems, up to three Nortel Remote Agent Observe cards are supported with scalability up to 16 ports (16 concurrent observation sessions). The Nortel Remote Agent Observe package contains 2 ports (2 concurrent observation sessions) which is the minimal order allowed for a new Nortel Remote Agent Observe system.

- Remote Observe - enables contact center supervisors and other business leaders to monitor the quality of customer service from almost anywhere, including remote or offsite locations
- Observation parameters flexibility - provides users with a number of choices for remote monitoring of contact center activities, such as position ID, agent, skillset, CDN or DNIS
- Supervisor listen and speak options - gives supervisors the choice of a “listen only” or “listen and speak” mode for agent coaching or direct assistance with callers
- Call recording capability - records calls and exports them to an FTP server in .wav format so they can easily be accessed later for reference and/or training purposes
- Access security - uses unique user IDs and passwords to ensure access by only authorized users. Administrators control access, user profiles and privileges.
- Reporting - delivers a log that tracks observed call activity
- Web-based administration interface - allows administrators to control the observation parameters

Overall, the Nortel Remote Agent Observe delivers a simple, cost-effective solution with powerful remote observe and supervision capabilities. This product helps simplify quality assurance activities and enables outsourcers to provide a flexible monitoring solution to their clients.

Market Information

Nortel Remote Agent Observe is perfect for any contact center that needs a simple, effective way to monitor conversations between agents and callers from anywhere without having to install expensive remote locations. This requirement is imperative for service bureaus, outsourcers and any geographically dispersed contact center.

Ordering Information

For further information, please contact your local Nortel representative.

Nortel Agent Greeting



Overview

Nortel Agent Greeting 2.0 is a versatile solution designed to improve customer satisfaction while boosting agent productivity. Nortel Agent Greeting is a simple, cost-effective and easy-to-use solution that enables contact center agents to pre-record standard or multiple greetings that can be played to each customer before the agent handles the live call. Agents in high-volume contact centers are relieved of the monotony of repeating the same greeting over and over throughout the course of their shifts. Likewise, contact center agents who answer calls with multiple and unique greetings based on the customers are afforded that extra few seconds to transition from one call to the next, ensuring the agent is prepared to give each caller undivided attention and superior service.

Ideal For

- Medium to large contact centers with medium to high inbound call volumes
- Service bureau environments
- Contact centers with skill-based routing
- Multi-lingual contact centers where regional or cultural distinctions are business requirements
- Any users of Nortel Meridian 1 or Nortel CS 1000 contact centers, including Nortel Symposium Call Center Server, Nortel Symposium Express Call Center and Nortel Meridian ACD
- Compatible with any version of Nortel Symposium Call Center Server and Nortel Symposium Express Call Center and is also compatible with Nortel CS 1000 release 2.0+

- Do your agents get tired of repeating the standard greeting, resulting in having their greetings become flat and unwelcoming by the end of the day?
- Are you looking for innovative ways to increase agent satisfaction and retention, saving on training and recruitment costs?
- Are you aiming for higher levels of customer retention and customer loyalty?

Typical Applications

- High volume contact centers with short call times such as taxi bookings and paging companies
- Simple or sophisticated, any contact center where agents are handling at least 300 calls per day can instantly see benefit in using this robust and scalable solution
- Contact centers with a large skill mix, language or service offering – a combination that requires differentiated greetings based on call type
- Service bureau or outsourced contact centers where agents are handling a variety of clients' calls

Business Challenges

- Do you want your contact center agents freed from repeating a standard greeting for each call?
- Do you have agents answering calls for multiple skill sets or languages that need to be greeted differently?
- Are you operating an outsourced service bureau environment where agents are handling calls from multiple accounts?
- Are your agents working in a contact center taking more than 300 calls per day?

- Any contact center where flat, monotonous greetings occur after a long day and busy day, impacting agent morale and customer relationships. Agent satisfaction is an ongoing challenge for today's dynamic contact centers as agents are being increasingly challenged both by call volume as well as diverse callers who have unique and often varied needs
- Nortel Agent Greeting is useful in any contact center where retaining the best and brightest talent is critical

Key Points

- Increases agent satisfaction – Nortel Agent Greeting makes agents' jobs easier, giving them extra time to transition between calls and eliminating the repetitive or mundane task of repeating standard greetings throughout the course of their shifts.
- Improves agent retention and reduces costs – Satisfied agents with high morale are more likely to stay in their jobs longer, thereby improving agent retention and reducing costs associated with training and recruiting.
- Reduces the physical demands on agents' voices – Standard and consistent greetings are heard by the customer regardless of the agent's mood or time of day. This enhanced greeting quality results in improved customer service.
- Enhances greeting quality – Agent effectiveness and customer service are improved; improved call quality will in turn lead to customer loyalty.
- Improves customer service – Giving agents a few extra seconds to transition from one call to the next enables them to be better prepared to give each customer their undivided attention.
- Enhances customer loyalty – Higher agent satisfaction and improved agent retention have a positive impact on customer satisfaction levels and ultimately customer loyalty as customers establish and grow relationships with a company.
- Reduces noise levels – Agents are actually speaking less, thus reducing the contact center noise level and minimizing the distraction of background noise for both customers and agents.

- Offers ease of use – Nortel Agent Greeting is easy to use for both agents and supervisors and because it's easy to use, they'll use it! In real-time, high-volume contact centers ease of use is a primary requirement.
- Provides a robust and scalable solution – This solution will meet high inbound (300 or more calls per day) and sophisticated contact center requirements.

Features and Benefits

- The Nortel Agent Greeting card along with required extra conference capacity provides the functionality required to implement the Nortel Agent Greeting feature. The Nortel Agent Greeting card appears to the Nortel Meridian 1 as an extended digital line card (XDLC) with up to 32 sets attached. These virtual sets must be configured as Nortel Meridian modular M2616 sets. Only 24 of these ports are usable for the Nortel Agent Greeting application, as each Nortel Meridian set must have an associated digital signal processors (DSP) port. The extra conference resources are required to conference the incoming call to the Nortel Agent Greeting port for the duration of the greeting.
- Enables agents to easily pre-record standard greetings
 - Supports agent and skill set specific greetings for Nortel Symposium Call Center Server or Nortel Symposium Express Call Center environments
 - Supports agent-specific greetings for Nortel Meridian ACD environments
 - Provides visual key flash and conferenced greeting
 - Offers web-based interface for Nortel Agent Greeting card OA&M
 - Supports remote loadware/DSP firmware upgrade over IP network
 - Provides telephony-class high reliability
 - Supports 24 greeting ports per card – up to 72 ports total
 - Supports up to 1,200 configured agents in a multi-card environment

- Emulates XDLC (Nortel M2616 Aries set)
- Offers tight integration with the Nortel Meridian 1/CS 1000 that speeds information flow by minimizing delays in processing calls and taking messages
- Delivers telephony-class, high reliability design which reduces possible system outages
- Includes security features to reduce the chance of fraud and theft of intellectual property

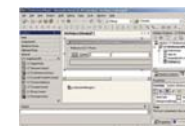
Market Information

Nortel Agent Greeting is ideal for any medium to large contact center with high inbound call volumes wanting to alleviate the repetitive and sometimes confusing task of having to repeat standard or unique greetings for each individual call received. Likewise Nortel Agent Greeting is an excellent solution for outsourced or service bureau environments where agents are handling calls from multiple accounts, as well as multi-lingual or multi-cultural contact centers where language, regional and cultural distinctions are business requirements.

Ordering Information

For further information, please contact your local Nortel representative.

Nortel Communication Control Toolkit



Overview

Communication Control Toolkit 5.0 (CCT 5.0) is the new unified integration middleware platform for the Communication Server 1000 switch range and Media Processing Server MPS 500 and MPS1000 Self Service platforms. The product provides a CTI middleware compatible to the Nortel platforms based upon the Microsoft .Net framework. The product is suitable for server and client integrations and application development.

A Development Environment and API set based on the Microsoft .Net framework are available from the Nortel Developer Program.

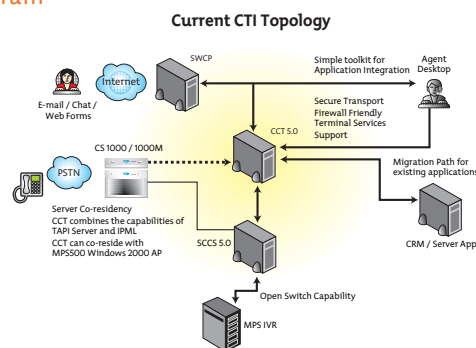
Ideal For

Communication Control Toolkit is designed for deployment in contact center, knowledge worker and self-service environments. The product is suitable for server and client integrations and application development.

Typical Applications

- **Contact Center** - In a contact center environment, Communication Control Toolkit enhances the skill-based routing ability of Symposium Call Center Server by allowing for the creation of customized agent applications, such as software phones, agent telephony toolbars with screen pops, and intelligent call management applications. In this environment, the TAPI Service Provider uses Meridian Link Services to communicate with Symposium Call Center Server over the CLAN. Through Symposium Call Center Server, it communicates with the switch. Optionally, the IPML Service Provider connects to an IVR server on the CLAN.
- **Knowledge worker environment** - In a knowledge worker environment, skill-based routing is not required. The switch directs incoming calls to agents, and Communication Control Toolkit delivers caller information such as ANI/DNIS or CLID. In this environment, Communication Control Toolkit connects directly to the switch over the ELAN. It connects to client PCs and application servers over the CLAN.
- **Self-service environment** - In a self-service environment, callers use an IVR system, such as the MPS 500 or MPS 1000, to answer queries or request services. For example, bank customers might use IVR to find out their account balances or to transfer funds. Calls are not handled by agents. In this environment, Communication Control Toolkit and the IVR server connect to the switch through Symposium Call Center Server. Communication Control Toolkit connects to the IVR system over the CLAN.

Network Diagram



Key Points

- Communication Control Toolkit 5.0 supports existing Symposium TAPI SP 3.0 or IVR CTI 2.1 compliant integrations, permitting customers to schedule their solution and application migrations to CCT5.0. This permits existing applications written to these service providers to be utilized directly with CCT 5.0 replacing those service providers on a nodal or network wide basis.
- Applications and integrations must be rewritten using the new CCT Toolkit and API to avail of the new CCT 5.0 features and capabilities.
- CCT is designed as a full multi-media/multi channel middleware and toolkit product, supporting full telephony support in release 5.0.
- The Toolkit provides multiple levels of abstraction (full, simplified and graphical) and allows for varying developer skill levels.
- CCT enables advanced contact center functionality, increases agent productivity, enhances customer service and reduces operational costs.
- It facilitates the development of desktop and server applications, screen pops, IVR integration and CRM connectors.

Features and Benefits

The Communication Control Toolkit Release 5.0 is the evolution of Nortel's Computer Telephony Integration (CTI) products including Symposium TAPI SP 3.0 and IVR CTI 2.1. The Communication Control Toolkit incorporates the features of these products, plus a number of powerful new features:

- A new easy-to-use graphical toolkit based on Windows Form Controls
- A reference implementation – This implementation can be used in testing and can be easily modified to create a custom client application.
- Support for Windows Server 2003 Standard Edition and Enterprise Edition
- Enhanced security – A secure transport layer based on TCP sockets provides authentication and security for the toolkit.
- Firewall friendliness
- Citrix/Terminal Services support – The toolkit is designed to operate in a terminal services environment supporting both Citrix and Microsoft Terminal Services.

Market Information

For all Call Center and Knowledge Worker environments that wish to increase customer service response times while reducing operational costs.

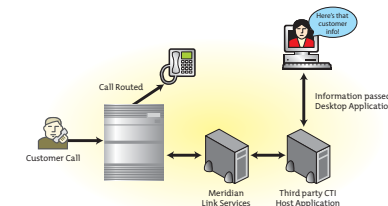
Ordering Information

For further information, please contact your local Nortel representative.

Nortel CTI Communication Server

Overview

Nortel CTI Communication Server 5.0 provides open computer telephony integration (CTI) interfaces which enable the Nortel Meridian 1 or Nortel Communication Server 1000 (CS 1000) telecommunications system to send and receive call information to and from computer systems. It enables businesses and third party software providers to create service enhancing applications by making Meridian 1 call control, call events and contact center agent information available to external computer applications.



Ideal For

- Call centers that desire to become advanced customer contact centers can take advantage of Nortel CTI Communication Server to exchange information gained on the Nortel Meridian 1 switch with application software that resides on a host or PC platform.
- Self-service users may also use Nortel CTI Communication Server to tightly integrate an IVR platform with call control in the contact center or as a standalone application.

Business Challenges

- Do you require a powerful, reliable, intelligent call answering capability using third party CTI host applications?
- Are you planning to tightly integrate your IVR platform and contact center tools to provide superior customer service?
- Are you planning to use powerful third-party outbound applications that need tight control and monitoring capabilities of the PBX?
- Do you require voice processing capabilities for host applications to play messages and collect information from a caller?

Typical Applications

- In an inbound telemarketing environment, Nortel CTI Communication Server can provide an application with calling line ID (CLID) and dialed number identification service (DNIS) information on an incoming call. The application can use this information to retrieve data from a database and present it on the agent's data terminal before the call is answered.
- In an outbound telemarketing environment a host application can retrieve information on a potential customer from a database and display it on an agent's screen. At the same time the application can place the call on behalf of the agent via Nortel CTI Communication Server.
- Both application examples demonstrate how agent productivity can be improved while providing personalized service. The host computer and Nortel Contact Center – Manager cooperate to provide enhanced and effective applications to the end user community

Key Points

- Calls answered employing Nortel CTI Communication Server can be answered in an intelligent manner.
- Call centers that want to become advanced customer contact centers can take advantage of Nortel CTI Communication Server to exchange information gained on the Nortel Meridian 1 or Nortel CS 1000 PBXs with application software that resides on a host or PC platform.

- IVR platforms may also use Nortel CTI Communication Server to tightly integrate call control in the contact center or as a standalone application.
- Nortel CTI Communication Server dramatically increases the power and effectiveness of contact center solutions and third party applications.

Features and Benefits

Nortel CTI Communication Server is based on Nortel Contact Center - Manager Release 5.0. It is an intelligent signaling link offering host application access to Nortel Meridian 1 or Nortel CS 1000 call processing functions. It is an important element of the solution as it provides a computer telephony interface (CTI) to powerful, service enhancing, third party applications.

Nortel CTI Communication Server is available as a no charge feature when purchasing Nortel Contact Center - Manager or Nortel Contact Center - Express with a minimum agent quantity (dependent on region). It can run as a software-only product running on a standard Microsoft Windows 2000 Server.

- Information such as the calling party's telephone number (ANI) and the number the caller dialed (DNIS) are passed via Nortel CTI Communication Server to the external computer or IVR.
- Nortel CTI Communication Server enables TAPI service provider to deliver comprehensive support of call processing features as well as contact center agent functions.

- Host enhanced routing (HER) allows a host application to route an incoming call before a call is terminated at a resource, or provide a call treatment (music, ringback or silence) before routing the call. A resource can be a control DN (CDN). The minimum CCS 200 agent increment package is required for HER.
- Agent ID in agent login message
- Dialed number identification service (DNIS)
- Digit expansion to 31 digits
- Based on Nortel Contact Center-Manager Release 5.0
- Capacity of 16,000 calls per hour

Ordering Information

For further information, please contact your local Nortel representative.

> Nortel Self-Service Portfolio

Enterprises that want to engage their customers with 24/7 personalized service turn to the Nortel Self-Service portfolio of products. Nortel's Media Processing Servers and the Nortel Voice Processing Series/information server help the enterprise to increase customer satisfaction while decreasing operating costs through effective customer contact centers. And they employ the most advanced speech recognition capabilities available. These solutions expand easily for today and accommodate the future while protecting the enterprise investment.

- Nortel Media Processing Server MPS 500
- Nortel Media Processing Server MPS1000
- Nortel Speech Server
- Nortel Web-Centric Self-Service
- Nortel Corporate Directory Dialer
- Nortel Communications Control Toolkit
- Nortel Voice Processing Series/information server (VPS/is)

Nortel Media Processing Server 500 (MPS 500)



Overview

Nortel Media Processing Server 500 (MPS 500) is a cost-effective self-service solution that offers a full suite of advanced self-service capabilities delivered on industry leading, field-proven hardware and software for world-class performance and reliability. The Nortel Media Processing Server 500 uses the same software and key hardware components currently deployed by major enterprise and service provider users on Nortel's higher-end Media Processing Server 1000 platform. Through speech-enabled self-service solutions, Nortel Media Processing Server 500 allows businesses to engage their customers by providing personalized services 24 hours a day, seven days a week. It can give contact centers the ability to decrease operating costs by reducing call completion time, limiting the number of calls that customer representatives handle and increasing overall system operating efficiency.

Ideal for

Nortel Media Processing Server 500 is the ideal self-service solution for small to medium-sized contact centers and small service providers that want to:

- Provide customers with 24/7 access to their services
- Eliminate aggravation, wasted time and delays by providing information to callers without the need for them to wait in a queue to speak to an agent
- Increase revenues and save costs by providing new and additional services in response to the ever changing needs of their customers
- Provide faster, friendlier self-service through speech-enabled applications
- Invest in a self-service solution that meets today's needs while providing a graceful migration to advanced capabilities in the future

Business Challenges

- Are you losing revenue because callers abandon while waiting in queue to speak to your agents?
- Do you need to offer your customers multiple channels into your business?

- Do you need to offer your customers new services that will keep you ahead of the competition?
- Are your IVR menus complex and difficult to navigate?
- Do you need to extend your business hours but can't hire additional staff?
- Do you need to reduce the network costs?
- Do you need to improve your agent retention rates?
- Do you need to increase the volume of business transactions that get through your contact center?

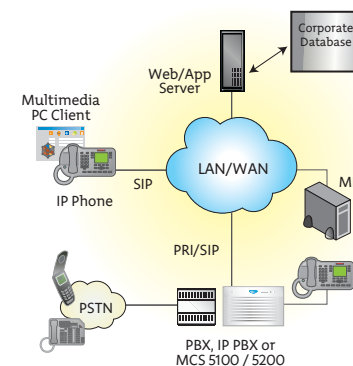
Typical Applications

- Nortel MPS 500 is the ideal solution for medium to large businesses that need to handle more calls, without adding more staff, and reduce abandoned call rate, consequently increasing revenue and customer satisfaction.
- Nortel MPS 500 is the right solution to increase contact center efficiency. By automating many simple and some complex transactions, it offloads agents of routine tasks to boost agent productivity and morale, increasing contact center efficiency and reducing churn.

- Nortel MPS 500 can increase revenue and reduce costs by reducing the number of calls that are waiting in queue and processing transactions faster than those typically handled by an agent, thereby reducing toll charges and other network costs and increasing customer satisfaction.
- Nortel MPS 500 supports voice over Internet Protocol (VoIP) so you can run voice traffic across your data network for further cost reduction.
- Nortel MPS 500 gives your customers an alternative channel to your contact center and provides 24/7 access to your business.

- Integrates easily into your existing infrastructure by supporting a wide variety of networking and computing protocols, without costly re-engineering
- Supports a hybrid environment of traditional and VoIP telephony protocols that enables smooth transition to VoIP without costly hardware upgrades
- Expands size and capability easily so you can buy what you need today, accommodate future growth and protect your investment
- Streamlines system configuration and management with intuitive browser-based toolset to reduce operating costs

Network Diagram



Key Points

- Improves contact center efficiency by automating routine requests and freeing agents for more complex enquiries
- Delivers friendlier self-service and more personalized customer experience through robust, multi-language advanced speech capabilities
- Extends your Web applications to callers by utilizing VoiceXML, JAVA and other Internet technologies

Features and Benefits

- **Supports digital and IP telephony in a hybrid environment** – Scales from 24-192 T1 or 30-240 E1 digital ports or 240 VoIP channels, or a combination digital and IP enabling a phased migration to VoIP that fits business strategy without costly upgrades. It also reduces capital and operating expenses by enabling voice and data communications in a single network.
- **Basic self-service through DTMF digit collection** – As callers respond to menu options using their telephone keypad, they experience a number of benefits. It enables an organization to offer 24/7 access to the business and offload agents of routine tasks to boost agent productivity and morale, increasing contact center efficiency and reducing churn. Customer contact is personalized by routing calls to appropriate applications, thereby increasing customer satisfaction and reducing call duration, which in turn lowers network costs. During peak call-volume periods, Nortel MPS 500 enables handling of more calls without extra staff and reduces abandoned call rate, consequently increasing revenue and customer satisfaction.
- **Advanced speech recognition** – Speech-enabled self-service solutions can promote the corporate brand and provide callers with the same friendly customer experience that they expect when dealing with a human agent. Advanced speech recognition can reduce the number of calls your customer representatives handle, increase

overall system operating efficiency and dramatically enhance customer offerings by linking customers directly to a business. Communicating using speech rather than touch-tone input creates a natural flow for users and can often increase their level of comfort. And, the easier and faster self-service is, the more people will use it, reducing operating costs since less agent time is required and average call length is shorter. Speech recognition capabilities include large vocabulary recognition (LVR), natural language understanding (NLU), speaker verification and text to speech (TTS).

- **Automated fax** – Nortel MPS 500 enables automation of fax send/receive, such as part lists, application forms, registration, claim forms, confirmations, etc., through an IVR application. This automated fax capability reduces contact center costs and increases efficiency by reducing the requirement for human agents to intervene.
- **Dual application development environment** – Nortel MPS 500 offers a choice of options for writing self-service applications: the intuitive, graphical development environment of Nortel MPS Developer (formerly known as PeriProducer); and, the text-based markup language of VXML. Both execution environments have been integrated with best-in-class speech recognition and text-to-speech engines that are supported on the Nortel MPS 500 platform. Nortel's implementation of VoiceXML complies with version 2.0 of the VoiceXML specification. Nortel MPS 500 incorporates a VoiceXML browser that can be used to execute voice dialogues rendered by Web servers. The Nortel MPS VoiceXML Browser is a client-tier component that runs on the Nortel MPS 500 platform. Nortel MPS Developer (formerly known as PeriProducer) applications are constructed using visual icons, making it easy to understand how they work and easy to change them. Nortel MPS Developer also provides capabilities that the VoiceXML specification currently doesn't address, such as pre-answer processing and

integrating with SS7/C7. On the other hand, developers familiar with XML-based markup languages may find VXML more comfortable, especially if the data to support transactions comes from Web servers. VoiceXML applications can invoke Nortel MPS Developer applications and Nortel MPS Developer applications can invoke VoiceXML applications. This integration strategy provides businesses with investment protection and a migration path from one environment to the other, if and when required.

- **Multiple host and database access** – Nortel MPS 500 simultaneously connects to a variety of current and legacy systems, improving customer satisfaction by providing access to all necessary databases in order to deliver prioritized services to customers. Nortel MPS 500 easily integrates into existing data and network infrastructure without costly re-engineering, thereby minimizing integration costs.
- **Computer telephony integration (CTI)** – Implementation of CTI helps agents deliver faster, more personalized customer service. Relevant information via screen pops and automated retrieval of database records allows a new call to be routed to a specific agent. With the customer information readily available on the agent desktop, agents can more easily cross-sell and up-sell to the existing customer base. Nortel MPS 500 seamlessly integrates with complementary systems to accelerate deployment, simplify system integration and deliver faster return on investment. Using standard "out-of-the-box" integration packages, Nortel MPS 500 can:
 - Pass information to other vendor PBX systems for fast, intelligent call routing and superior customer experience.
 - Receive automatic number identification (ANI/DNIS) from a Nortel Meridian 1 PBX and use that information to perform digital call transfers and port activation for more

efficient utilization of IVR and switch resources, saving seconds per call and reducing network costs.

- Pass caller-entered data to a Nortel Contact Center Server to route calls to the most appropriate agents, help agents provide more personalized service and deliver a specialized caller care.
- Pass caller-entered data to a TAPI server to populate agent screen pops, which helps agents avoid redundant questions, process requests more efficiently and provide better service.
- **Centralized system maintenance and administration** – System administration and application development are managed through a complete award-winning set of GUI tools. Nortel MPS Manager (formerly known as PeriView) is one of the software tools used for the Nortel Media Processing Server 500 administration, operation and control. Nortel MPS Manager runs as Java client or in an industry standard browser window. It streamlines system configuration and management with an intuitive browser based toolset to manage multiple systems and varied platforms, thereby reducing operating costs.

Market Information

Nortel ranks number one in a number of IVR industry analyst reports. Unlike the new competitors in this space, Nortel has held a leadership position in the business for more than 30 years and truly understands contact centers and what it takes to successfully deliver complex self-service applications. Nortel has a large research and development organization with more than 200 dedicated engineers. Many of our competitors offer only the IVR solution – Nortel provides the full portfolio, including our own PSO. We have a clear evolutionary path both from Nortel VPS to Nortel MPS and within Nortel MPS, from traditional telephony to VoIP, from traditional application development to VXML and from basic self-service to speech re-enabled applications. The breadth of the Nortel portfolio affords organizations a single point of contact for all their communication needs and fewer issues with integration.

Nortel Media Processing Server 500 is unique in that it has evolved from the current Nortel Media Processing Server 1000 and runs the same tested and proven software. It is offered on either Solaris or Windows platforms and fits into existing voice and data infrastructures without the need for any re-engineering.

Technical Specifications

MPS 500	
Configurations	MPS 500 is available in a variety of configurations, engineered by Nortel to best fit individual business requirements: Desktop - The desktop configuration is typically supplied for Dual Tone Multi Frequency (DTMF) systems with a Sun Blade 150 as the application processor. Cabinet - A cabinet configuration is generally provided for Speech systems and is based on Sunfire V120 and/or V210 architecture with IBM Servers for Speech applications. DTMF systems may also be housed in a cabinet. Rackmount - The rackmount version has the same components as a cabinet configuration but instead of housing those components in a cabinet, the customer supplies a suitable rack.

MPS 500	
Capacity	8 spans for a maximum of 192 TI ports, 240 EI ports 240 VoIP channels, or a combination of TI/VoIP or EI/VoIP Multiple MPS 500 systems can be networked to increase capacity or an upgrade to an MPS 1000 can be implemented to provide growth to thousands of ports.
Operating System:	Choice of Solaris or Windows™
Application Processors:	Sun Blade 150 - typically provided for Desktop configurations. Sun Fire™ V120/V210 - provided for Cabinet and Rackmount configurations.
OSCAR 6.0 Speech Servers:	MPS 500 provides support for Speech Recognition and Text-To-Speech via the Speech Server 6.0 platform that runs on IBM X335 servers, Windows 2000 based. Each server has dual 10/100 Mbps Ethernet and internal management hardware to assist in remote maintenance.
Telephony Protocols Supported:	T1, E1, ISDN, C7/SS7, H.323, SIP
Physical Dimensions	MPS 500 Standalone Module Height: 3.86 inches; 9.80 centimeters Width: 17.67 inches; 44.88 centimeters Depth: 17 inches; 43.18 centimeters Weight: 20 Lbs; 9 kg Clearances: 5 inches front and rear; 12.7 cm front and rear MPS 500 25 RU Cabinet The 25 RU cabinet contains all equipment for 192/240 IVR ports. This self-contained configuration contains all equipment required to monitor and maintain the system. An external PeriView workstation can be used for remote monitoring. Height: 51 7/8 inches; 131.8 centimeters Width: 24 inches; 61 centimeters Depth: 36 inches (40 inches with base); 91.5 centimeters (102 cm with base) Weight MPS equipment: 650 Lbs; 295 kg Footprint: 6 square feet (6.7 with base); 0.55 square meters (0.62 with base) Clearances: 30 inches front and rear; 76 cm front and rear

Ordering Information

For further information, please contact your local Nortel representative.

Nortel Media Processing Server 1000 (MPS 1000)



Overview

The Nortel Media Processing Server 1000 (MPS 1000) is a carrier-class, integrated voice response (IVR) system designed for large enterprise and service provider environments. Ideal for mission-critical installations requiring continuous availability, the Nortel MPS 1000 system integrates a wide range of call processing functions with programmable call handling capabilities. With new hardware and software architecture, the Nortel MPS 1000 is an extremely compact, modular solution. It features a highly flexible, non-blocking call handling architecture. An integrated suite of GUI tools are used for application development and system OA&M across the entire suite of Nortel self-service offerings.

Ideal For

- Medium to large enterprises with mission-critical contact centers supporting high volume of transactions
- Large carriers and service providers

Business Challenges

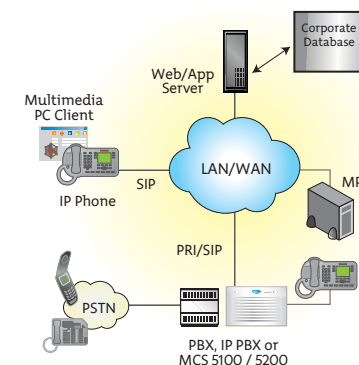
- Do you want to control the operational costs of your contact center?
- Do you need a platform that acts as a media gateway?
- Do you need to reduce network costs?
- Does your contact center staff regularly handle repetitive, routine calls?
- Are you looking for a fully featured, carrier-class integrated voice response (IVR) system that is suitable for diverse contact center environments?

Typical Applications

- Contact centers that handle a large number of routine calls
- Businesses that need to provide customers with 24/7 access to their services
- Any customer oriented organization that wants to eliminate aggravation, wasted time and delays by providing information to callers without the need for them to wait in a queue to speak to an agent

- Organizations that are looking to increase revenues and save costs by providing new and additional services in response to the ever changing needs of their customers
- Contact centers that need to free up agents from repetitive and tedious tasks in order to deliver superior customer service to valuable clients and more complex calls
- In conjunction with CTI software, applications that require customer information input to be displayed on the agent's desktop, eliminating the need to ask for information twice

Network Diagram



Key Points

- Delivers mission-critical reliability to protect against lost service revenue
- Supports almost unlimited future growth by scaling from 96 to thousands of ports
- Delivers robust multi-language advanced speech capabilities for friendlier self service and a more personalized customer experience
- Broadens service creation capabilities by providing a dual application development environment that supports the VXML industry standard in order to speed up the rollout of new applications and provide a graceful migration path for the future
- Supports a hybrid environment of traditional and VoIP telephony protocols that enables smooth transition to VoIP without costly hardware upgrades
- Speeds up service roll-outs by simplifying application development and streamlining network configuration and management
- Enhances customer service and reduces wait times through dynamic, non-blocking resource sharing
- Maximizes efficiency of existing network components, reducing expenditures on new hardware
- Reduces floor space requirements, saving real estate and maintenance costs
- Easily integrates into the existing infrastructure by supporting a wide variety of telephony and network protocols, hosts and databases essentially eliminating the need for costly re-engineering

Features and Benefits

- **Redundant, fault-tolerant solution** – The Nortel Media Processing Server 1000 has been designed with a redundant hardware and distributed software architecture. Redundant hardware can be configured to ensure the continuous operation of critical components such as application processors, ATM switches, network interface controllers (NICs) and system clocks. Standby units such

as ATM switches, hot swappable NIC cards and warm standby application processors can be installed or replaced with no system interruption or manageable system interruption.

- **Advanced speech recognition** – Speech-enabled self-service solutions can promote the corporate brand and provide callers with the same friendly customer experience that they would expect when dealing with a human agent. Advanced speech recognition can reduce the number of calls your customer representatives handle, increase overall system operating efficiency and dramatically enhance customer offerings by linking customers directly to a business. Communicating using speech rather than touch-tone input creates a natural flow for users and can often increase their level of comfort. And the easier and faster self-service is, the more people will use it, reducing operating costs since less agent time is required and average call length is shorter. Speech recognition capabilities include:
 - Large vocabulary recognition (LVR) – recognizes tens of thousands of words with high accuracy. LVR allows the automation of many different types of transactions, eliminating the need for complex and confusing navigation.
 - Natural language understanding (NLU) – is more intuitive, enabling customers to use their own phrasing to answer a menu prompt. With the conversational interaction that natural language understanding provides, customers can say what they want directly, use alternate expressions for menu selections and provide multiple pieces of information in a single phrase. This enables automation of certain revenue generating calls that are too complex for touch-tone input.
 - Speaker verification – utilizes biometric technology to verify a caller's identity based on the unique characteristics of his or her vocal patterns. It quickly and accurately authenticates the caller, complementing or

replacing other authentication methods such as touch-tone PINs or passwords.

- Text to speech (TTS) – converts ordinary text into intelligible speech. This technology communicates information to customers when possible selections include large numbers of items from databases that must be spoken to callers, or when a list of selections changes regularly.
- **Flexibility** – The system supports a wide variety of interactive voice processing applications and is optimized for the multi-application environments typical of both the enterprise and service provider marketplace. A wide selection of telephony and host computer connectivity interfaces facilitates the easy integration of automated functions into existing data processing and communications environments.
- **Dual application development environment** – Nortel MPS 1000 offers a choice of options for writing self-service applications: the intuitive, graphical development environment of Nortel MPS Developer (formerly known as PeriProducer); and, the text-based markup language of voice XML (VXML). Both execution environments have been integrated with best-in-class speech recognition and text-to-speech engines that are supported on the Nortel MPS 1000 platform. Nortel's implementation of VXML complies with version 2.0 of the VXML specification. Nortel MPS 1000 incorporates a VXML browser that can be used to execute voice dialogues rendered by Web servers. The Nortel VXML browser is a client-tier component that runs on the Nortel MPS 1000 platform. Nortel MPS Developer applications are constructed using visual icons, making it easy to understand how they work, and easy to change them. Nortel MPS Developer also provides capabilities that the VXML specification currently doesn't address, such as pre-answer processing and integrating with SS7/C7. On the other hand, developers familiar with XML-based markup languages may find VXML more comfortable, especially if the data to support transactions comes from Web servers. VXML applications can invoke Nortel MPS Developer applications

and Nortel MPS Developer applications can invoke VXML applications. This integration strategy provides organizations with investment protection and a migration path from one environment to the other, if and when required.

- **Maximized resource utilization** – Nortel MPS 1000 is unique in its ability to dynamically allocate system resources to ensure maximum utilization while at the same time reducing the amount of hardware required and ultimately reducing system cost.
- **Integrated suite of graphical user interface (GUI) tools** – Focused on ease of use and support, the MPS 1000 includes a graphical application development environment, graphical speech digitizing and processing tool, a browser-based graphical toolset for system administration, operation and control, and a statistics and reports management tool.
- **System interoperability** – For businesses that currently have either the Nortel VPS/is or Nortel MPS 100 units installed on their networks, the Nortel MPS 1000 can be easily installed to unite the existing units into a cohesive, enterprise-wide IVR solution. Applications that are in use on the Nortel VPS/is systems are compatible with Nortel MPS 1000, saving the time and expense of rewriting and recoding applications. Some applications may require slight modification. In addition, the Nortel Media Processing Server Manager (formerly known as PeriView) suite of GUI tools is leveraged across all three platforms, providing a cost-effective solution by reducing training costs and eliminating multiple software packages.
- **Enhanced multimedia capabilities** – The advanced multimedia features of the Nortel MPS 1000 include standard digital T1/E1 interfaces that can be configured for both ISDN and common channel signaling (CCS7). In addition, the system architecture supports voice transmission over IP networks. The Nortel MPS 1000 supports the H.323 standard, enabling users running H.323-compliant software to initiate or receive calls. The system's switching fabric supports seamless H.323 and SIP VoIP client interfaces with both T1 and E1 standards.

- **Hybrid digital/VoIP architectures** – Nortel MPS 1000 supports both digital and IP voice protocols, organizations that require a hybrid digital/VoIP environment are provided with a smooth migration path designed to protect existing hardware investment. VoIP TMS modules co-reside with T1 TMS modules and fully communicate with each other. Organizations can gradually replace expensive leased lines by shifting telephony traffic onto the IP network. This design eliminates the need for forklift switch replacements as VoIP technology continues to mature and provides a future-proof IP-enabled IVR solution.
- **Remote management** – Comprehensive management services are provided by the Nortel MPS Manager application, which combines local management with visibility into branch installations from the central site. By using a centralized, Web-based management approach, the efficiency of management personnel is maximized. This approach reduces the need for physical visits to branch offices and sharply lowers the cost of system maintenance.

Market Information

Nortel ranks number one in a number of IVR industry analyst reports. Unlike the new competitors in this space, Nortel has held a leadership position in the business for more than 30 years and truly understands contact centers and what it takes to successfully deliver complex self-service applications. Nortel has a large research and development organization with more than 200 dedicated engineers. Many of our competitors offer only the IVR solution – Nortel provides the full portfolio, including our own PSO. We have a clear evolutionary path both from Nortel VPS to Nortel MPS and within Nortel MPS, from traditional telephony to VoIP, from traditional application development to VXML and CCXML, from basic self-service to speech re-enabled applications. The breadth of the Nortel portfolio affords organizations a single point of contact for all their communication needs and fewer issues with integration.

Nortel Media Processing Server 1000 is offered on either a Solaris or Windows platform and fits into existing voice and data infrastructures without the need for any re-engineering. MPS 1000 is typically deployed in carrier or hosted application environments.

Technical Specifications

MPS 1000	
Platform	Unix (Solaris 2.8)
Cabinet Capacity	1536 ports of T1, 1920 ports of E1, or 1920 ports of VoIP (H.323) Up to 6 Cabinets per system: 9216 T1 ports 11520 E1 ports 11520 VoIP channels per system or a combination of digital and VoIP
Telephony Protocols	T1 and E1 E1 DPNSS ISDN PRI interface Nortel ISDN (National ISDN-1 proprietary variant for DMS and Meridian switches) AT&T or Lucent ISDN (National ISDN-1 proprietary variant for ESS and Definity switches) National ISDN-2 Euro ISDN Line Side T1 and Line Side E1 compatibility for Nortel Meridian PBX's and the Avaya G3. VoIP - H.323 and SIP SS7 Support - CCSS Version 6.1 / 6.2

MPS 1000	
Protocols Supported over Ethernet LANS	TCP/IP sockets TN3270 over Ethernet TNVT100 over Ethernet LU6.2 via Brixton over Ethernet SNA3274 via Brixton server over Ethernet The MPS Application Processor can support an Ethernet TCP/IP interface operating at either 10 Mbps or 100 Mbps. The Ethernet LAN connection supports 10 BaseT (twisted pair) or a 100 BaseT connection as standard.
Supported Integration	Oracle Sybase Informix MS SQL (ODBC) DB2
MPS Host and WebServer access	TN3270 TNVT100 TCP/IP Sockets SNA3270 (Ethernet) LU6.2 (Ethernet) CORBA HTMLS SSL XML VXML ISAM/HSAM JAVA Services Bridge
Speech Language Support	SpeechWorks OSR 1.1 Nuance 8 Fonix FAAST 5.2
CTI Interfaces	CISCO ICM (Geotel ICR) ICM/VRU version 2.6 Genesys T Server 6.5
Fax Capabilities	Send and receive FAX storage in MMF or Class F TIFF files Fax encoding via G3 CCITT Group 3 (1d) Fax format
Dimensions	Height - 90" (229 cm) Width - 23.5" (60 cm) Depth - 32.5" (83 cm) Weight - 800 lbs (363 kg) typical / 900 lbs (409 kg) max

Ordering Information

For further information, please contact your local Nortel representative.

Nortel Speech Server



Overview

The Nortel Speech Server is a speech processing platform that provides multi-function capabilities in an open and scalable environment. It supports large vocabulary speech recognition, natural language understanding, text to speech and speaker verification. Its client-server architecture provides for dedicated speech servers, thereby ensuring optimal and predictable system performance regardless of the speech processing algorithm vendor, complexity of the speech application and grammars.

Ideal For

- Any business interested in enhancing customer access to automated services
- Contact Center operations looking to support advanced speech-processing applications in an open and scalable environment

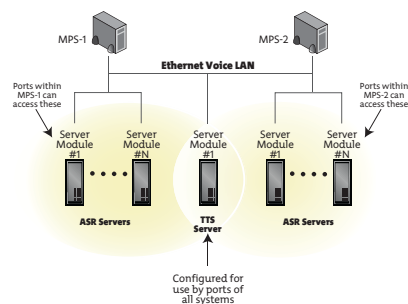
Business Challenges

- Are you looking for a cost-effective solution that provides scalable support from small to very large applications?
- Does your application require high-accuracy and ability to support multiple languages?
- Is your application critical to the operation of your business?
- Are your agents spending too much time on simple mundane often repeated processes?
- Can your application be automated without human intervention, yet retain a high level of customer satisfaction?

Typical Applications

- Speech can be deployed in every vertical market. These highlight some of the typical areas where applications are very successful and a few types of solutions:
- Airlines: (reservations, flight information, ticket status, pricing, general information)
- City Government: (check deposit status, fax forms, Frequently Asked Questions)
- Financial: (banking, mortgage, phone applications)
- Securities: (trading)
- Pre-paid services: (calling cards)
- Catalog sales: (order placement, status, delivery)
- Large Educational Institutes (registration, tuition payments)
- Order processing systems (placement of orders)
- Transportation (verify delivery status)

Network Diagram



Key Points

- State-of-the-art speech processing capabilities using Natural Language Speech Recognition, Text-to-Speech and Speaker Verification engines
- A scalable architecture that grows with the customer's needs
- Investment protection with the goal of providing the lowest possible lifecycle costs
- "Barge-in" option enables speech recognition callers to interrupt a system message or prompt enabling shorter call holding times and providing extra flexibility for expert and novice users
- Choice of industry standard processors/operating systems including SPARC/Solaris™, UNIX and Pentium®/Windows®.
- Provide natural language interface to external customers to ease system use and speed in processing of functions.

Features and Benefits

- Scalable design – Additional speech servers can be added to decrease the response time of a solution, address the resource requirements of more complex applications or increase the functionality through the use of other speech functions.
- Dedicated speech processing resources – Host interaction does not impact Speech Server resources availability.
- Cost-effective resource sharing – Shared architecture offers the most efficient, most reliable platform for modern speech technologies. Large pools of MPS system ports can share pools of speech resources supporting all the popular speech technologies.
- Speech processing reliability – The Speech Pool Manager automatically detects when a speech server module is out of service and directs new speech requests to other available resources.
- Best-in-Class speech algorithms – The Speech Server architecture supports advanced speech processing applications in a robust, module and scalable environment.

Technical Specifications

Choice of industry standard processors/operating systems including SPARC/Solaris™, UNIX and Pentium®/Windows NT®.

UNIX-SPARC-AXi:

- 440 MHz
- Single CPU
- Solaris 2.6

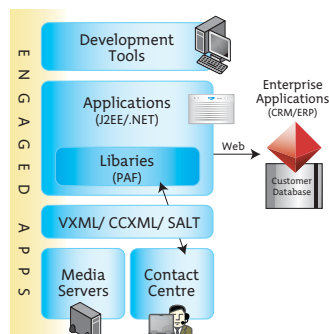
Windows NT 4.0:

- Dual Pentium 1GHz
- 1GB RAM

Ordering Information

For further information, please contact your local Nortel representative.

Nortel Web-Centric Self-Service



Overview

The Nortel Web-Centric Self Server (WCSS) redefines the architecture and possibilities for self-service applications for enterprises and hosted service providers. This new model brings the advantages of Web-based development and content delivery to self-service applications.

WCSS provides a standard for creating multi-tier, Web-based voice processing applications. Through WCSS, Developer can quickly deliver consistent operational, reporting, and context services across disparate voice processing applications.

Web-Centric Self Service is a portfolio comprised of client-side components, server-side components, OA&M components and development tools. The components include:

- Application Processing Components – The Media Processing Server (MPS Platforms) and Multimedia Communication Server (MCS) 5100 platform manage voice dialogs and call control interactions with users and client devices.
- Application Service Components – Are the gateway to application data and logic, and run on industry-standard J2EE (Java2 Platform, Enterprise Edition) platforms such as IBM WebSphere and BEA Systems WebLogic Servers.
- Management Components – Run on an industry-standard desktop platform and provide unified administration of self-service platforms and applications.
- Development Components – Run on standard PCs and provide a visual environment for creating applications and scripts for VoiceXML 2.0, CCXML 1.0, JSPs (JavaServer Pages), grammar creation, and Portable Application Framework (PAF).

Enterprises can now “engage” with customers by providing dynamic, adaptive and personalized services that leverage the richness of Web resources yet are accessed easily using natural speech and the most ubiquitous access device – the telephone.

Ideal For

- The engaged enterprise that would like the ability to anticipate customer needs and deliver critical and time-sensitive information to them precisely when, where and how they want to receive it

Business Challenges

- Re-writing all your applications to fit different media?
- Costing too much and taking too long to write your applications?
- Re-inventing the wheel for the same processes used by different applications?

- A different user interface to your company depending on the access method?
- Not able to provide consistent external image to your customers?

Typical Applications

- Information Retrieval – weather, driving directions, stock quotes, business data, etc.
- eCommerce Applications – automated systems for ordering merchandise, tracking parcels, checking accounts, and using contact center services
- Financial services – online banking, loan and brokerage transactions, inquiring about current rates, submitting or reviewing transactions
- Directory Assistance – Corporate Name dialing to reach an employee simply by speaking a person’s name or department

Key Points

- Easy Access – Everyone can access the Web and any telephone can activate self-service applications for rich resources delivered over the Web.
- Call treatments can be customized on the fly – On-the-spot personalization is based on customer input.
- Customers can pass seamlessly between applications while maintaining the context of the session.
- Users access Web-Centric Self-Service applications with the same telephony devices they use everyday, plus any Web access device, such as PCs and hand-held devices.

Features and Benefits

- Sophisticated Self Service Applications – combine advanced speech processing capabilities of media servers with the virtually limitless data resources of the Web.
- Open architecture – uses industry standards such as VXML for voice dialogs, CCXML for call control and IP for communications.

- Reuse of Code – with Developer (formerly known as PeriProducer), which can take code written for an online banking application and re-use it for self service banking by phone.
- Simple Deployment – enables application logic to reside on any standard Web server, anywhere, and can be accessed from any standards compliant voice server.
 - Accelerate development time
 - Develops Portable Grammars
 - Dynamic Document Generation Capabilities
 - Application Testing from Desktop

Market Information

With the introduction of Web-Centric Self Service (WCSS), Nortel has moved from being the leader in both touchtone and speech-enabled self service, to the new paradigm in voice enabling web applications through self service solutions. This philosophy of integrating self service solutions into customers’ existing web services environment is currently only being addressed by a few players in the market. As many self service vendors have now moved to standard based platform and support VoiceXML standards, this new paradigm in self-service will likely determine who will lead this market moving forward, and Nortel is positioned to continue to do so, through leadership attributes such as:

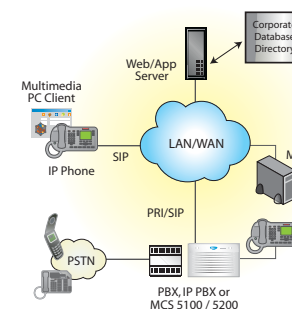
- **Flexibility** – Nortel Self Service solutions are based on open standards and are vendor agnostic to allow ultimate flexibility to customers. Contrary to self service vendors whose solutions are almost exclusively sold within their own infrastructure environment, Nortel solutions are not tied to any particular switching platform and are deployed within many diverse environments.
- **Market Leadership** – Nortel Web Centric Self Service (WCSS) leverages the existing Nortel self service portfolio, the market leader in the number of IVR ports and systems shipped world-wide.

- **Choice** – Nortel addresses the needs of diverse customer requirements with many choices in application development tools.
- **Technology Leadership** – WCSS supports many standard-based technologies such as (Voice XML, CCXML SRGS and SSML). These supported standards represent Nortel's dedication to technology evolution and the open standards philosophy.

Ordering Information

For further information, please contact your local Nortel representative.

Nortel Corporate Directory Dialer



Overview

Corporate Directory Dialer is a packaged, off-the-shelf software application that enables enterprises of all sizes to accurately connect calls in response to callers' spoken requests. It delivers superior service by accurately recognizing up to 50,000 names of individuals and locations – even multiple nicknames, pronunciations, or sites – and reliably connects the call even when users don't know the official name or extension they were hoping to reach. Previous-generation call dialers failed if they couldn't readily determine call routing. In contrast, a correctly configured Corporate Directory Dialer application combines business logic with successive prompting and advanced speech processing to accurately transfer more than 90 percent of calls without operator assistance.

Ideal For

Provide directory assistance via phone, PDA, or PC for internal connection to internal personal for very large enterprises.

- Calls can be transferred or conferenced
- Automatically Generated Grammars
- Browser-based fine-tuning of recognition and pronunciation
- Ability to use nicknames
- Bundled support for 50K subscribers
- Speech Recognition and Text-to-Speech from Scansoft or Nuance

Business Challenges

- Is overhead cost too high to have multiple receptionists, telephone operators, directory attendants?
- Is it difficult and expensive to maintain large multiple telephone directories corporate wide?
- Do callers complain it is too difficult to reach the correct person or department and they always need to be transferred?

Typical Applications

Large enterprise customers can have a speech activated directory dialer that looks up the telephone number or SIP ID of the person being called. It automatically directs the caller to the called party. It enables fast development, accuracy and multiple names to be easily identified.

Key Points

- Nortel Corporate Directory Dialer is based on VoiceXML 2.0 and runs on an industry-standard Web application server.
- It works with your existing LDAP database of employees and departments, and it can be managed via a web interface from any location.
- Grammars are easy to set up and maintain using a Grammar Maintenance Tool that scans the Corporate Directory database and creates a set of names to be used by the application.
- The Corporate Directory Dialer allows you to customize your own entry and exit prompts, call process prompts, location names, routing and recovery rules, and integration with other databases.

- A simplified administration is possible due to graphical web-based tools that administer all aspects of configuration and operations.

Features and Benefits

- Improves customer satisfaction by connecting calls to desired individuals or departments quickly and accurately
- Reduces caller wait time, abandoned calls and network cost per call
- Accommodates multiple listings, homonyms, nicknames and unusual pronunciations
- Supports custom-recorded greetings and prompts; fine-tunes application settings and grammars for optimum performance
- Creates an intuitive and natural customer experience through robust, advanced speech recognition
- Improves inbound call efficiency by automating routine requests and freeing attendants for more complex inquiries
- Applies consistent call treatment and audio branding that may already be used in radio, TV, or Web environments
- Auto-generates speech-recognition grammars from entries in the corporate directory
- Supports traditional and IP Telephony environments
- Integrates easily into your existing corporate directories and Nortel interactive voice response (IVR) infrastructure
- Simplifies service creation through packaged prompts, automatic grammar creation, and intuitive configuration screens

Technical Specifications

System Requirements	
Web application server	Processor: Pentium® III, 1GHz or higher Memory: (For Corporate Directory Dialer application): 512MB + (x) MB x number of ports Disk Size: (For local database): 5GB + (x) MB x number of subscribers Software: Microsoft Windows® 2000 Server or Professional at SP2 or higher, J2EE® Application Server Software (IBM WebSphere® v4.0.3 or v5.0 or JBOSS® Jetty Rel 3.2.1 with SUN® JDK®1.3)
Database	LDAP database (global directory of corporate personnel and departments)
Voice browser	VoiceXML 2.0 compliant running on Media Processing Server MPS 500 or MPS 1000 Release 2.1 or higher Speech Recognition: Nuance 8.0 or later or SpeechWorks 2.0 Text-to-speech (TTS) speech synthesis: Speechworks Speechify®
Database Fields	
Corporate Directory Dialer local database	Required fields: Employee ID, last name, first name, city, state, country, contact number (any one phone number from the optional choices below) Optional fields: Nickname, internal phone number, external phone number, e-mail address, pager number, cell phone number, voice mail number
System Statistics	
Application flow - How much interaction was required from the caller to get transferred	Number of calls transferred: on name alone, requiring name and location, requiring the caller to spell out the request; transferred to operator (total), to operator due to name not found, to operator due to multiple names found, to operator due to caller request for operator help; calls aborted by caller, unsuccessful, and total

System Requirements

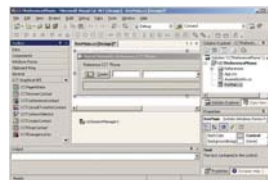
Speech recognition	Average confidence level of success in recognizing names, location, department
Database—Query performance	Number of database requests that returned: employee information, no data, a single record, multiple records, homonym conflicts. Average query time for LDAP queries and local database queries

* Pentium is a registered trademark of Intel Corporation. Sun, J2EE and JDK are registered trademarks of Sun Microsystems. IBM WebShare is a registered trademark of IBM Corporation. JBOSS is a registered trademark of Marc Fleury. Speechworks and Speechify are registered trademarks of Scan Soft. Microsoft Windows is a registered trademark of Microsoft Corporation.

Ordering Information

For further information, please contact your local Nortel representative.

Nortel Communication Control Toolkit



Overview

Communication Control Toolkit 5.0 (CCT 5.0) is the new unified integration middleware platform for the Communication Server 1000 switch range and Media Processing Server MPS 500 and MPS1000 Self Service platforms. The product provides a CTI middleware compatible to the Nortel platforms based upon the Microsoft.Net framework. It supports integrations for Microsoft Windows, Terminal Services and highly secure solution deployments.

A Development Environment and API set based on the Microsoft.Net framework is available from the Nortel Developer (formerly known as PeriProducer) Program.

Ideal For

Communication Control Toolkit is designed for deployment in contact center, knowledge worker, and self-service environments. The product is suitable for server and client integrations and application development.

Business Challenges

- Need to reduce wait time for your callers?
- Do you ask your customers for the same information repeatedly throughout the call?
- Are you spending valuable and expensive time identifying your callers after they reach you?
- Do you want to provide preferential treatment to your higher \$ valued customers?

Typical Applications

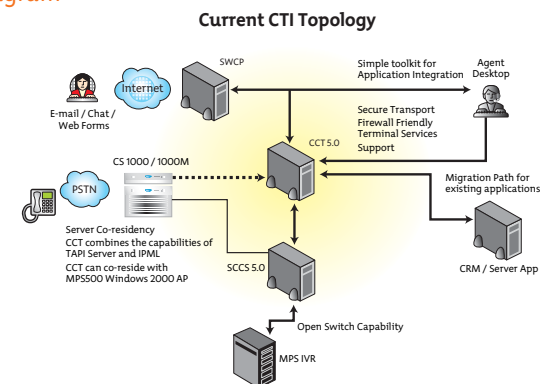
Contact Center - In a contact center environment, Communication Control Toolkit enhances the skill-based routing ability of Symposium Call Center Server by allowing for the creation of customized agent applications, such as software phones, agent telephony toolbars with screen pops and intelligent call management applications. In this environment,

the TAPI Service Provider uses Meridian Link Services to communicate with Symposium Call Center Server over the CLAN. Through Symposium Call Center Server, it communicates with the switch. Optionally, the IPML Service Provider connects to an IVR server on the CLAN.

Knowledge worker environment - In a knowledge worker environment, skill-based routing is not required. The switch directs incoming calls to agents and Communication Control Toolkit delivers caller information, such as ANI/DNIS, or CLID. In this environment, Communication Control Toolkit connects directly to the switch over the ELAN. It connects to client PCs and application servers over the CLAN.

Self-service environment - In a self-service environment, callers use an IVR system, such as the MPS 500 or MPS 1000, to answer queries or request services. For example, bank customers might use IVR to find out their account balance or to transfer funds. Calls are not handled by agents. In this environment, Communication Control Toolkit and the IVR server connect to the switch through Symposium Call Center Server. Communication Control Toolkit connects to the IVR system over the CLAN.

Network Diagram



Key Points

- Communication Control Toolkit 5.0 supports existing Symposium TAPI SP 3.0 or IVR CTI 2.1 compliant integrations, permitting customers to schedule their solution and application migrations to CCT5.0. This permits existing applications written to these service providers to be utilized directly with CCT 5.0 replacing those service providers on a nodal or network-wide basis.
- Applications and integrations must be rewritten using the new CCT Toolkit and API to avail the new CCT 5.0 features and capabilities.
- CCT is designed as a full multi-media/multi-channel middleware and toolkit product, supporting full telephony support in release 5.0.
- It provides multiple levels of abstraction (full, simplified and graphical) and allows for varying Developer (formerly known as PeriProducer) skill levels.
- CCT enables advanced contact center functionality, increases agent productivity, enhances customer service and reduces operational costs.
- It facilitates the development of desktop and server applications, screen pops, IVR integration and CRM connectors.

Features and Benefits

The Communication Control Toolkit Release 5.0 is the evolution of Nortel's Computer Telephony Integration (CTI) products including Symposium TAPI SP 3.0 and IVR CTI 2.1. The Communication Control Toolkit incorporates the features of these products, plus a number of powerful new features:

- A new easy-to-use graphical toolkit based on Windows Form Controls
- A reference implementation that can be used in testing and can be easily modified to create a custom client application
- Support for Windows Server 2003 Standard Edition and Enterprise Edition
- An enhanced security layer based on TCP sockets for authentication and security for the toolkit
- Firewall friendliness
- Citrix/Terminal Services support to operate in a terminal services environment that supports both Citrix and Microsoft Terminal Service

Market Information

#1 share IVR self service – North America, EMEA, worldwide

- 2003 total ports shipped and revenue (Gartner, Frost & Sullivan)
- 8K+ self service IVR systems with 700K+ ports deployed worldwide
- 200+ self service advanced speech applications in use globally

Technical Specifications

Recommended specification for new installs

- 2.8 GHz Intel based CPU, Pentium 4, Xeon, Xeon dp
- 1 GByte RAM
- 1 NIC for Contact Centre or 2 NIC for Direct Connect (KW)
- 40GB hard disk space

Ordering Information

For further information, please contact your local Nortel representative.

Nortel Voice Processing Series Information Server (VPS/is)



Overview

The Nortel Voice Processing Series Information Server (VPS/is) is a multimedia, self-service platform that provides a broad suite of solutions for today's mission-critical transaction processing environments. These systems integrate a variety of call processing functions with data communication and transaction processing. Nortel VPS/is provides multi-function speech processing capabilities in an open client environment. The Nortel VPS/is family distinguishes itself by its networking flexibility, high degree of scalability, low lifecycle cost of ownership and modular technology upgrades in an open system design.

All of the Nortel VPS/is products share an open, modular architecture and the same software, which allows applications developed for any system to operate across an entire range of systems. Application development and systems management is made easy with an integrated suite of graphical user interface (GUI) tools. Systems are available in a variety of scalable configurations to meet a wide range of capacity, application and network needs. Nortel VPS/is offers a full range of advanced speech recognition capabilities including natural language understanding, speaker verification and text-to-speech.

Market Information

The Nortel Voice Processing Series Information Server (VPS/is) is available to current Nortel VPS/is customers for application expansion. (Nortel will support the VPS/is through December 31, 2008.) Organizations purchasing Nortel IVR platforms for new or expanded applications should review the sections on the Nortel MPS 500 and the Nortel MPS 1000. The Nortel MPS 500/1000 is a new generation of IVR platforms offering new features, such as Nortel Self-Service.

> Nortel Norstar Portfolio

Nortel's Norstar portfolio is the perfect voice communications platform for small and medium businesses that want abundant features and applications - without complex instructions or training. A business or enterprise with remote branches will also benefit from the platform, which can accommodate between 2 and 224 users. Along with its reliability and durability, the merging of voicemail, email, computer and telephone makes Norstar a cost-effective solution that can grow right along with the business.

- Norstar Integrated Communications System (Compact)
- Norstar Integrated Communications System (Modular)
- Nortel Norstar Integrated Communications Systems (3x8)
- Nortel Norstar VoIP Gateway
- Nortel Messaging 100
- Nortel Messaging 150
- Nortel Norstar Personal Productivity Suite
- Nortel Norstar Personal Call Manager- Nortel Norstar TAPI Manager
- Nortel Norstar CTI Adapter

Nortel Norstar Integrated Communication System (ICS)



Overview

The Nortel Norstar Integrated Communication System is a fully featured, applications-rich, voice communications platform, perfect for small and medium businesses and enterprise branch offices. Nortel Norstar solutions are ideal for any business with 2 to 224 employees and provide an unparalleled choice in application options, including voicemail and desktop messaging, call center, mobility and computer telephony integration (CTI).

Whether a standalone business office, multi-site business, franchise, branch office, or department within a larger organization, a business relies on its phone system to perform every time the receiver is picked up or a button is pushed. A business needs a simple-to-use telephone system with practical, scalable features that do not require costly end-user training to be effective, as well as a cost-effective system to fit its budget today, with the capacity and scalable applications to secure that competitive edge as it grows. Nortel Norstar Integrated Communication Systems offer end-to-end solutions to small and medium sized businesses and branch offices to enable businesses to focus on the bottom line - the business.

Ideal For

- Single-site small and medium businesses
- Multi-site small and medium businesses with basic site-to-site networking requirements
- Enterprise branch offices with basic site-to-site networking requirements
- Businesses seeking a basic, affordable telephony solution
- Businesses seeking a cost-effective, highly reliable and easy-to-use solution for facilities with fewer than 224 employees
- Businesses that demand a fully integrated communications platform which supports unified messaging, call center and CTI applications

- Do you have employees who perform repetitive tasks such as directing calls, explaining business location or hours of operation? • Are your employees frustrated by the lack of a single application that will allow them to deal efficiently with voicemail and email through one interface?
- Do you find your current phone system difficult to use? Do you spend too much time having to train new employees how to use your phones?
- Is your phone system unreliable or does your current system provide poor voice quality?
- Do you have employees that need to roam about the business but still need to be available to take and make telephone calls?
- Do you need a phone system that will allow you to control and monitor long distance charges or day-to-day usage?
- Would you like to be able to identify a caller prior to answering the phone?

Business Challenges

- Are you looking for a communications solution to improve your business image? Your customer service levels? Your employee efficiency?

Typical Applications

Nortel Norstar can accommodate home offices, small and medium businesses, and enterprise branch offices with up to 224 users.

Key Points

- **Feature-rich** – Nortel Norstar supports a complete set of voice features and applications, mobility with roaming and hand-off capabilities, and sophisticated site-to-site networking applications.
- **Simplicity** – Nortel Norstar is easy to learn and use – no special training is required because the LCD windows on every telephone take the user through feature and application steps.
- **Reliability** – With more than 14 million users, Nortel Norstar is the world's number one small business telephony solution, with one of the lowest failure rates in the industry.
- **Affordability** – Nortel Norstar's modular architecture lets businesses add capacity and applications as required, and its many money-saving applications can reduce long distance charges and increase employee efficiency. Ongoing software and application development ensure that future business needs will continue to be met.
- **Flexibility** – Starting at 2 users, Nortel Norstar can grow to 224 users with multiple applications – an unprecedented level of investment protection.

Features and Benefits

Every Nortel Norstar solution begins with an Integrated Communications System (ICS). This fully digital platform brings together all communications - voicemail, email, computer and telephone - right to the desktop. The communication needs and size of a business will help determine the best system for the company. Whatever system is chosen, every Nortel Norstar ICS offers these important advantages:

- High bandwidth to the desktop allows the business to use applications like ISDN and computer telephony integration (CTI) without changing existing wiring.

- The modular, scalable design lets a business choose the system that fits its needs today, while planning for the future.
- Digital technology creates a platform for current and future PC-based applications.
- Outstanding quality makes Nortel Norstar one of the most durable and reliable voice solutions available, delivering one of the lowest failure rates in the industry with a tested mean time between failure (MTBF) rate of 100 years for the Compact ICS.
- A complete applications suite:
 - Call centers that allow unsurpassed customer service through in-bound call capture, load balancing and intelligent routing
 - Computer telephony integration (CTI), which improves employee productivity by allowing calls to be managed from a PC screen
 - Desktop messaging that solves information overload issues by letting users retrieve all in-bound communications, whether voicemail or email, from one unified mailbox
 - Digital networking that reduces long distance charges by letting businesses send voicemail messages to other locations over the data network, rather than the voice network
 - Digital mobility that allows employees to always be available to address customer needs
 - Private networking that gives employees seamless remote office connectivity
- Extensive connectivity options:
 - Trunking – Analog loop start, analog CLID, analog DID, E&M, T1, ISDN BRI and PRI, basic IP trunking
 - Stations – Business Series Terminals, T7406 Cordless Telephone, Digital Mobility handsets and analog
- Remote administration – Through Nortel Norstar Remote Utilities, Nortel Norstar systems can be programmed and maintained from a remote location, saving enterprises and service providers time and money.

- Private networking – Nortel Norstar to Nortel Norstar networking is supported as well as networking to a Meridian 1, along with the following capabilities:
 - Centralized voicemail
 - Centralized attendant
 - Private numbering plan
 - Network call redirection
 - Trunk route optimization
 - Network tandem calling– Calling number and name IP Networking with Meridian 1 IPT, Communication Server 1000, Communication Server 1000M, and BCM
 - Private numbering plan
 - System calling line ID
- Investment protection – Businesses can reuse trunk cards, telephones and applications as they move from the Compact ICS to the Modular ICS platforms and can upgrade to the Business Communications Manager (BCM) platform and reuse their telephones.

Nortel Norstar 3x8 Integrated Communications System (ICS)

Simple, yet sophisticated, this unit was designed specifically for small businesses and supports:

- Up to 3 CO lines and 8 telephone extensions
- Voicemail, automated attendant and telephone support
- Supports all Business Series Terminals, including fully-featured digital functions with LCD and soft keys

Nortel Norstar Compact Integrated Communications System (ICS)

A flexible building-block design expands with a business easily and cost effectively:

- Grows from a 4x8 to an 8x24 capacity
- Supports voicemail, automated attendant, telephones, basic call center and CTI
- Allows a business to easily add enhancements as the business needs change
- Supports all Business Series Terminals

Nortel Norstar Modular Integrated Communications System (ICS)

Designed to be both flexible and scalable, the Nortel Norstar Modular ICS has ample room to expand the software and hardware capacity, supporting:

- Up to 248 ports in various configurations
- Advanced integrated applications – voice messaging, unified messaging, digital networking and enhanced call centers
- Software and system expansion modules that allow growth as business needs change
- Supports all Business Series Terminals

Nortel Norstar 7.0 Software

Introduces new features and capabilities for small and medium businesses including:

- Capacity Increase - Access to Module 13 and 14 which increases capacity for up to 32 additional stations
- Digital Mobility Solution
 - Scalable from 1 to 64 users
 - Digital Mobility Controller 080 (DMC 080) – supports up to 8 handsets and 2 base stations (can link 2 for 16 handsets and 4 base stations)
 - Digital Mobility Controller 320 (DMC 320) – supports up to 32 handsets and 2 base stations (can link 2 for 64 handsets and 8 base stations)
 - Integrated Access to features and voice mail
 - No “dead zones” and no airtime charges
 - Long battery life for portable phones (work all day before recharging is required)
 - Secure and confidential conversations

Nortel Messaging 100

A sophisticated messaging system for small businesses that grows with the business and as business needs change. Simple to manage and maintain, scalable with a plethora of features, while enabling businesses to simply and incrementally add and pay for mailboxes as the business grows and business needs change:

- Comes equipped with 10 mailboxes
- Grows to 40 mailboxes
- 4 ports, 9 hours of message storage
- Many features to give the small business big business capabilities, including single digit

dialing, external transfer, CLID integration, off-premise message notification and Web-based administration

- Optional Desktop Messaging, VPIM/AMIS Networking and Basic Call Center and Call Center ReportingO

Nortel Messaging 150

An advanced messaging and applications system for small and medium sized businesses that grows with the business as business needs change. Simple to manage and maintain, scalable with numerous features, all the while enabling businesses to simply and incrementally add and pay for features, mailboxes and applications as business needs change:

- Comes equipped with 32 mailboxes
- Grows to 300 mailboxes
- 8 ports, 82 hours of message storage
- Includes 2 seats of unified messaging
- Includes Basic Call Center
- Many features to give big business capabilities, including single digit dialing, external transfer, CLID integration, off-premise message notification and Web-based administration
- Centralized voice mail capabilities included
- Optional Enhanced Call Center
- Optional VPIM/AMIS networking

Call Center

Norstar Call Center applications make it easy to create a formal or informal call center. In-service experiences with businesses of different sizes show that, on average, high-quality call center services can reduce a company's 800/888 charges by 10%, reduce abandoned calls by up to 15% and increase agent productivity by 20 to 40%. Norstar supports two call center applications depending on customer need and requirements.

Basic Call Center

- 15 lines
- 10 active agents
- 2 queues
- 30 recorded announcements

Enhanced Call Center

- 30 lines
- 50 active agents
- 30 queues
- 50 recorded announcements

Nortel Norstar IP Gateway

The Norstar IP Gateway is an analog VoIP solution for both the Compact ICS and Modular ICS. It provides a cost effective networking solution for existing Nortel Norstar users and offers new users entry into VoIP with minimal investment while enhancing the migration path to a complete converged solution. A built-in browser based OA&M simplifies the installation and configuration and allows access to any site on the network:

- Each gateway supports 4 VoIP trunks
- Caller ID support
- Private network dialing
- Interoperability with Business Communications Manager, Meridian 1 ITG and Communication Server 1000
- Nortel distributed and supported

Nortel Norstar Personal Productivity Suite.

This powerful suite of applications includes Personal Call Manager; Norstar TAPA Manager; installation software for all of the CTA devices; demos of and information on Computer Telephony Integration (CTI) applications; CTA100, an external connectivity device for the majority of users; and CTA160i, an internal CTA device for easy installation.

Key Features

- Full 32-bit implementation means that a broader range of applications can be supported.
- Direct-connect CTI provides direct connection to a desktop PC and Norstar set, saving wiring costs.
- Server-connect CTI allows a single CTA device to be connected to the Norstar and any PC on the LAN to enjoy the benefits of CTI and TAPI.

Nortel Norstar TAPI Manager

- Simple, flexible tool for implementing CTI through either a direct-connect or client/server configuration
- Includes drivers for all Norstar Computer Telephony Adapters
- Supports broad range of applications running on Windows 95, Windows 98, Windows 2000, Windows NT, and Windows XP operating systems

Nortel Norstar Personal Call Manager

- Screen pops of incoming and waiting call information
- Point-and-click dialing
- Drag-and-drop conferencing and call transfer
- On-screen display of call status
- Voice announcement of incoming callers using recorded files
- Call logs (incoming and outgoing) with sort and print capabilities

Nortel Norstar CTI Adapter

Norstar Computer Telephony Adapter (CTA) devices bridge the gap between telephone systems and computers and are based on the Telephony Application Programming Interface (TAPI) standard developed by Microsoft to work with a wide variety of CTI applications. Two CTA devices are available: CTA100 is a desktop device and the CTA160i fits into a desktop PC expansion slot. Both devices offer the same high level of CTI integration for Norstar.

Key Features:

- Direct-connect CTI: Can be used in a configuration where the CTA device is connected directly to a desktop PC and Norstar set.
- Server-connect CTI: A single CTA device can be connected to the Norstar, enabling CTI and TAPI applications on any PC on the LAN.
- Auto-detect of the CTA device: Automatically detects to which COM port the CTA device is connected, eliminating the need to set the correct COM port during installation.

Market Information

Every Norstar telephone set comes equipped with a built-in display whether it is used as a courtesy telephone or a highly featured executive set. The display has been instrumental in driving simplicity and reducing the training expenses that a business may need to incur to become familiar with its telephone system. In addition, the telephones come equipped with speakerphone, headset, and wall mount capabilities built-in. This assures that there are no hidden costs for additional hardware to support these capabilities.

Technical Specifications

	Norstar 3 x 8	Norstar CICS	Norstar MICS
Power	Voltage V AC 110-120 Current A rms (max) 300 ma Frequency Hz – 45 – 70 Crest Factor 4.0	Voltage V AC 110-120 Current A rms (max) 1.9 Frequency Hz – 45 – 70 Crest Factor 4.0	Voltage V AC 110-120 Current A rms (max) 2.6 Frequency Hz – 47 – 63 Crest Factor 4.0
Dimensions	Height – 33 cm Width – 24 cm Depth – 7.5 cm Weight – 2 kg	Length – 43.5 cm Width – 23.8 cm Depth – 16.8 cm Weight – 6.7 lbs	Height – 63 cm Width – 30 cm Depth – 17 cm Weight – 14 kg

Ordering Information

For further information, please contact your local Nortel representative.

> Nortel Meridian 1 PBX Portfolio

Nortel's PBX solutions address the total communication needs of a business, especially one with different needs for different users. The systems are built on a foundation of state-of-the-art digital switching equipment and software-stored program control. Each powerful product also offers cost-effective, high-quality, versatile features for small, medium and large enterprise businesses or networked branch offices. In addition, the IP Trunk and Line card software provides organizations of varying sizes with solutions for increased cost savings and flexibility while maintaining simplified operations and administration.

- Nortel Meridian 1 PBX Portfolio
 - Nortel Meridian 1 PBX 11C-Chassis (rack-mounted chassis)
 - Nortel Meridian 1 PBX 11C-Cabinet (wall-mounted cabinet)
 - Nortel Meridian 1 PBX 61C
 - Nortel Meridian 1 PBX 81C
- Nortel IP Enabling Hardware for Meridian PBX Platform
 - IP Line Card
 - IP Trunk Card

Nortel Meridian 1 PBX Portfolio



Overview

As a platform for integrated voice and data, each Nortel Meridian 1 PBX delivers sophisticated messaging, contact center and computer telephony integration (CTI) applications for improved customer service, and mobility and wireless technologies for “anywhere, anytime” information access. With Meridian 1, small call centers get the same flexibility and reliability as a large organization with mobile employees who need “virtual office” features. Each system is scalable for seamless growth, easy to use and manage, and offers numerous features and services built around state-of-the-art technology.

Ideal For

- The Meridian Option 11 Chassis is ideally suited for small and growing businesses and enterprise branch offices requiring from 60 to 128 lines
- The Meridian Option 11 Cabinet was designed for single and multi-site businesses from 30 up to 800 lines.
- The Meridian Option 11C and 81C systems address the needs of medium- to large-sized businesses by offering greater port scalability and processor redundancy for enhanced reliability. The 61C can support up to 2000 lines while the 81C can support up to 16,000 lines. They are ideal for businesses where resilience is a major consideration such as in a contact center.
- The Meridian PBX portfolio has a solution for any size enterprise that needs reliable, powerful and flexible performance from their voice communications system

Business Challenges

- Are you considering VoIP, but are not quite ready for a full scale IP deployment?
- Is the ability to migrate to IP in the future important?
- Are you looking to deploy a cost-effective, highly flexible, extremely functional, robust telephony solution with the ability to expand on an as-needed basis?

- Does your organization need the ability to expand to up to 16,000 stations?
- Is dual processor reliability a consideration?
- Will your site host remote locations?

Typical Applications

- The flexible and feature-rich design allows the Nortel Meridian 1 PBX to be easily configured for contact center solutions, hospitality services, banking and finance operations as well as general business needs.
- Advanced voice features, data connections, LAN communications, CTI and sophisticated information services for up to 16,000 ports; LAN and WAN IP telephony
- Efficient distribution of incoming calls through Nortel Meridian Automatic Call Distribution (ACD) and/or Nortel Contact Center and self help interactive voice response (IVR)
- Network telephony services for global PSTN interface. Analog, ISDN and IP networks are seamlessly extended for central or distributed applications, either nationally or internationally.
- Integrated branch offices, remote workers and teleworkers extended via TDM or IP

Key Points

- The number one business communication system worldwide
- Scalable, distributed platform for “seamless” growth up to 16,000 ports
- Modular architecture for inherent flexibility and cost savings
- Commercial processors for scalable real-time processing capacity
- Real-time, industry-based, multi-tasking commercial software operating system
- Comprehensive feature offerings across the entire system portfolio
- Sophisticated PC-based Nortel Optivity Telephony Manager for easy-to-use system administration
- The most effective integrated applications (Integrated Conference Bridge, Integrated Call Director, Integrated Recorded Announcer, Integrated Call Assist, Digital Enhanced Cordless Telecommunications and CallPilot Unified Messaging)

- Powerful networking features for the public switched telephony network, private and virtual private network access
- Supports Voice over IP with IP gateways and telephones
- A range of telephone sets to serve the different needs of different users in an organization
- A hybrid solution with an IP telephony signaling server that brings the world of IP benefits to the Nortel Meridian users
- An evergreen design to facilitate future technology and feature enhancements

Nortel Communication Server 1000 Software

All Nortel Meridian PBX models operate on Communication Server 1000 Software which is currently at Release 4.5. The latest features are described below:

Feature	
New Platform	• Option 11 as a Branch Office – ability to convert a single Cabinet or Chassis system into a Media Gateway 1000B hosted by a CS 1000
Scalability	• ESN Location Expansion – increases the number of location codes that can be configured from 1,000 to 16,000
Enhancements	• IP Peer Capacity Enhancement – increases H.323 virtual trunks from 382 to 1,200 and supports up to 1,800 SIP virtual trunks per signaling server
Clients	• IP Client Portfolio Expansion – includes support for Phase II of the IP Phone 2002 and 2004 with integrated switch; the IP Phone 2001 single line set, the IP 2006 graphical display phone, the IP Phone 2007 with touch-screen display, IP Phone 2033 conference room phone, Mobile Voice Client 2050 PDA application and the IP Key Expansion Module (KEM) • IP Phone 2007 Touch-screen and the IP Phone 2033 Conference Phone
Productivity	• Personal Directory, Redial List, Callers List – features that provide advanced directory and call tracking capabilities for the Nortel Digital Phones and the Nortel IP Phones • Microsoft Outlook Integration with Integrated Conference Bridge Release 4 – allows bridge session to be scheduled directly from Outlook • Introduction of the Emergency Services Access for Europe, Middle East and Africa (EMEA) Market • Enhanced 911 Client Mobility – AUDIT – provides an easy method for ensuring accurate 9-1-1 call routing • IP Call Recording – provides advanced call detail recording for IP calls
Networking	• Network Address Translation (NAT) Traversal Enhancements – allows IP Phones to be easily and more securely deployed • Trunk optimization Enhancement – extends optimization to calls that have been modified by call transfer, conference, etc.

Feature	
New Survivable Remote Gateways	• Nortel Survivable Remote Gateway 505 - a cost-optimized solution for the <32 user branch office
System Management	• Optivity Telephony Manager Enhancements • Management of Survivable Remote Gateway • Corporate Directory enhancements • Serviceability enhancements such as SNMP alarm browser • Support for Microsoft 2003 Server • Configuration and maintenance of traditional routes and trunks

Nortel Meridian 1 PBX 11 Cabinet

Meridian 1 Option 11C Cabinet delivers advanced applications and carrier-grade, five-nines reliability for traditional voice and Voice over IP communications. Expandable to 800 lines, it supports desktop and system features of larger Meridian 1 systems, including digital and IP telephones, IP Gateways, mobility (802.11) communications, voice messaging, contact center, PC-based system management and multimedia applications.

- Delivers maximum investment protection by providing a smooth transformation into a Nortel CS 1000 or Media Gateway 1000B for extending branch offices over an IP network
- Best-in-class price performance – The 11C Cabinet boasts a mean time between failure rate measured in decades.
- Reliability with self diagnostics and backup monitoring
- IP Expansion option - supports distribution over IP
- Easy to use, manage and integrate into an existing network environment

Nortel Meridian 1 PBX 11 Chassis

Meridian 1 Option 11C Chassis has all of the attributes of the 11C Cabinet, but in a smaller chassis package. It is cost optimized for the small (60-128 line) branch offices.

- Can be easily expanded using multiple chassis for up to 800 ports
- Supports all Meridian 1 networking protocols and applications
- Wall-, table- or 19" rack-mountable for maximum flexibility

Nortel Meridian 1 PBX 61C

Meridian 1 Option 61C is a carrier-grade platform supporting both traditional voice and Voice over

IP communications for enterprises requiring from 200 to 2000 lines.

- Modular client/server architecture for flexibility, scalability and cost savings
- Redundant call processing core for extra reliability in mission-critical enterprises

Nortel Meridian 1 PBX 81C

Meridian 1 Option 81C, with five-nines reliability, delivers traditional voice and Voice over IP communications for large enterprises requiring from 200 to 16,000 lines.

- Internal 622Mbps OC-12 switching fabric supports scalable growth up to 16,000 lines
- Modular client/server architecture for flexibility, scalability and cost savings
- Redundant Pentium-based call processor core delivers up to 320,000 Busy Hour Call Completions (BHCC) supporting the most robust environments.

Features and Benefits

- Nortel Meridian 1 portfolio of digital communication systems is a leader in the world marketplace. It is currently used by more business people than any other digital communications system.
- The modular architecture of every Nortel Meridian 1 system provides inherent flexibility and cost savings. Its scalable, distributed processing and open standards adherence allow a business to add capacity and features as needed and accommodates future advances

in technology cost effectively and efficiently with built-in evergreen investment protection.

- The Nortel Meridian 1 offers hundreds of software features and services, including basic and advanced voice and data communications, easy-to-use system administration capabilities and an extensive array of call management, networking and voice messaging features – powerful applications for greater productivity.
- The value-added software features on Nortel Meridian 1 offer a wide selection of options and a modular format that permits users to tailor the system software to their day-to-day operations and applications. The software feature options provide management tools to help allocate resources in a cost-effective manner and improve productivity and time management.
- Nortel Meridian 1 systems feature high port density to minimize equipment, power and floor space requirements. Digital line cards with 32 ports can support 16 Nortel Meridian digital telephones for voice and data communications, over a single twisted-pair wire. Software programmable universal trunk cards can be configured on site to support a variety of central office trunks such as CO, FX and WATS and other trunk types including TIE, DID, recorded announcement and paging trunks. In addition, intelligent peripheral equipment (IPE) cards in the Nortel Meridian 1 off-load call processing tasks and perform self diagnostic tasks resulting in reduced installation costs and improved operations.
- Nortel Meridian 1 provides a platform for applications such as unified messaging with Nortel Messaging, Nortel MDECT, wireless business systems, contact center with Nortel Contact Center-Manager and Nortel CTI Communication Server, data services and ISDN networking with primary rate and basic rate interface.
- Integrated applications, like the Nortel Integrated Recorded Announcer, Nortel Integrated Conference Bridge, Nortel Integrated Voice Services and Nortel Integrated Call Director, support additional value-added applications to meet current needs in business communication.
- The Nortel Meridian 1 offers an unparalleled migration path to next-generation IP-based solutions supported over a converged network. Enterprises wanting to transform their existing Nortel Meridian 1 PBX into a converged IP PBX system can simply upgrade their existing Nortel Meridian 1 with the latest Nortel CS 1000 software and add an IP telephony signaling server for IP traffic and endpoint management. This transforms the Nortel Meridian 1 PBX into a hybrid solution, the Nortel CS 1000M. The Nortel CS 1000M is a reliable, high performance system capable of supporting up to 15,000 IP users per call server and providing hot-standby call server redundancy for critical applications. As a hybrid solution, users can be supported with a mix of IP, digital, analog or wireless Voice over IP phones depending on business and application requirements.
- Nortel systems meet the highest standards for quality and reliability. They are built with the most advanced manufacturing processes, use state-of-the-art components and incorporate the latest technological innovations to provide maximum system performance.
- Nortel systems are managed using the Optivity Telephony Manager, a PC-based administration tool that allows telephone adds, moves, changes, traffic analysis, reporting and more with point-and-click simplicity. Nortel CSM supports open standards such as LDAP and SNMP. Telephone programming is as easy as clicking on specific graphics. Web-based help files offer simple instructions on how to use the phones and features. Operations, administration, maintenance (O&A&M) and upgrades are via Nortel CSM or command-line interface.
- The Nortel Meridian 1 PBX is easy for people to use. Nortel Meridian digital and IP telephones bring all the powerful features and services of the Nortel Meridian 1 PBX to each desktop in a company, helping employees communicate better and improving productivity companywide. Businesses can choose from a wide selection of real-time and multimedia applications to match

the specific needs of each employee. They can choose from an application portfolio that includes a variety of business telephone configurations, customer engaging contact center and self help portals, messaging and unified messaging, desktop SIP-based collaborative multimedia applications, simplified OA&M with reporting, tracking and billing, network-wide seamless feature inter-operation, WAN-based solutions for branch integration, teleworkers, home-based and mobile employees, dynamic scalable security and secure wireless LAN deployments.

- The Nortel Meridian 1 PBX offers Nortel Messaging, which lets individuals manage all of their communications instantly from a single centralized mailbox. It combines voicemail, fax and email on a single, powerful, easy-to-use messaging system allowing users to:
 - Create and send voice messages to one or many people.
 - Add a voice message attachment to a fax or email.
 - Send and receive different message types from either a PC or a telephone.
 - Access all messages hands-free using simple voice commands.
 - Use Web-based access to messages.
 - Choose speech-to-text for reading email over the phone/cell phone.
- The Nortel Meridian 1 PBX can help you take full advantage of integrated services digital networking (ISDN), a set of standards capable of transmitting fully digital communications (voice, data, fax and image) over the same facilities. Today, networking includes centralized (shared) applications such as attendants, call centers, messaging and call processing over circuit-switched or IP links, while adding seamless feature capabilities such as displaying a caller's name and the incoming phone number over a private network, call forwarding and conferencing, while at the same time providing a wide range of networking features.

- The Nortel Meridian 1 PBX is fully capable of leveraging IP telephony on demand. Companies can get server-based IP applications that can be integrated with their existing network, such as CallPilot, Nortel Contact Center, Nortel MCS 5100 and Optivity Telephony Manager. And they can get the newest IP solutions designed to save money and keep them connected.
- Nortel Contact Center products improve operating efficiency with functionality that also provides the best in customer service. If a business relies on telephone inquiries, order taking and collections, the Nortel Meridian 1 PBX supports automatic call distribution and other call-handling software that allows a business to offer unsurpassed customer service. These advanced and networked call center services offer skills-based routing to geographically distributed agents for 24/7 operation. Easy graphical user interface (GUI) management and reporting gives businesses an in-depth analysis of a call center's operational efficiency, traffic and revenue-generating capabilities. Nortel Contact Center is a full-powered, state-of-the-art, server-based, flexible, scalable solution offering the best in customer relationship management.

Market Information

The Internet has redefined the workplace, creating the ability to share and act on information in real time anywhere in the world. Every day, more people are communicating more information across a constantly growing network. The more your business expands, the more you need to extend your capabilities to compete and to

succeed. Known for performance and reliability with more than 25 years of evolutionary and revolutionary development, the Nortel Meridian 1 PBX delivers flexible, scalable, reliable and responsive performance to keep you moving – coupled with a rich suite of powerful features and tightly integrated applications.

Technical Specifications

Platform	11C Chassis	11C Cabinet	61C	81C
Capacity	60 – 128 Expandable up to 800 ports	Expandable up to 800 ports	Expandable up to 2,000 ports	Expandable up to 16,000 ports
Memory	48 MB Flash, 16 MB DRAM	48 MB Flash, 16 MB DRAM	32 MB Flash 48 MB DRAM	Redundant CP PII Flash not required 128 MB DRAM, five network groups or less; 256 DRAM six network or more
Call Processor	Motorola 68040	Motorola 68040	Redundant CP PII	Redundant CP PII
Mass Storage Media	Flash ROM Integrated with CPU Software delivery via PCMCIA	System Core Card with Optional storage on PCMCIA	Redundant IODUC with one 3.5" 1.44 MB floppy disk drive; One 6 GB hard drive with CD ROM	Redundant Multi Media Disk Units with one 3.5" 1.44 MB floppy disk drive; One 6GB hard drive with CD ROM
I/O Ports	64	64	64	255
Busy Hour Call Completion	58,000 *	58,000 *	135,000 *	320,000 *
*Note: BHCC ratings are nominal only; actual capacity is dependent on s/w release, site configuration and peripheral type				
Trunking	Analog: Loop or Ground Start CO, FX, WATS, 2 or 4 wire E&M or 4-wire DX, DID, TIE, RAN, Paging, IP Trunk Gateway Digital: DTI, ISDN-PRI, (T1 & E1) ISDN-BRI, DPNSS, DASS IP: Internet telephony gateway trunk; DPNSS-PRI, IP peer virtual trunking; IP signaling server			
Telephone Compatibility	Digital: M3900 Series – 3901, 3902, 3903, 3904, 3905 M2000 Series – M2000, M2006, M2008, M2008HF, M2616, M2216ACD, M2016S IP Phones: - IP Adapter for Digital Telephones; IP Phones 2001, 2002, 2004, 2007, 2033, IP Softphones 2050, MVC 2050 Analog: M8000/M9000 Series 500/2500 type			
Attendant Services Position	M2250 Attendant Console Multi-line Central Answering Compatibility (ML-CAP)			
IP Gateways Supported	IP Trunk Gateway and IP Line Gateway			
e-mobility	802.11 Wireless IP Gateway for Meridian 1-24 ports; supports H.323 standard with Nortel Extensions (+) for advanced telephony features G.711 and G.729 Codecs			

Platform	11C Chassis	11C Cabinet	61C	81C
Contact Center Support	Nortel Contact Center Manager - configurable up to 3,000 agents with up to 1,500 actively logged on (subject to capacity analysis) Nortel Contact Center Express – up to 300 agents with up to 175 logged on (subject to capacity analysis)			
Nortel Self Service	VPSis Configurable to 4 T1/E1 spans (96/120 ports) on a single system. With clustering max capacity of VPSis is 15,000 ports (configuration dependent)			
Integrated Applications	Integrated Conference Bridge; Integrated Personal Call Director, Integrated Call Assistant, Integrated Voice Services, Integrated Recorded Announcer			
Remotes Solutions	9150, 9115, Survivable IP Expansion	9150, 9115, Survivable IP Expansion, Mini Carrier Remote	9150, 9115, Fiber Remote, Fiber Remote Multi-IPE, Mini Carrier Remote, Carrier Remote	
CallPilot Messaging	CallPilot 201i – 200 hours, 24 channels, up to 8000 mailboxes	CallPilot 201i – 200 hours, 24 channels, up to 8000 mailboxes CallPilot Tower & Rack – 1,000 hours, 96 channels, up to 20,000 mailboxes		
Network Management	Optivity Telephony Manager			
Input Voltage	AC: 110 to 240V, 50/60 Hz	AC: 110 to 240V, 50/60 Hz DC: -42 to -54V	AC: 180 to 280V 50/60 Hz; DC: -40 to -56.6V	AC: 180 to 280V 50/60 Hz; DC: -40 to -56.6V
Dimensions & Weight	Main/Expander Chassis Weight empty: 26.4 lb. (12 kg) Weight full: 32.2 lb. (14.6kg) Width: 17.3 in (439 mm) Depth: 12.8 in (326 mm) Height: 12.8 in. (326 mm) 8.4" (214 mm) Up to ten 19" rack/wall/ desk-mountable chassis are allowed per system	Main Cabinet/ Expander Cabinet: Weight empty: 26 lb. (12 kg) Weight full: 70 ob. (31.7 kg) Width: 22" (55.9 cm) Depth: 12" (30.5 cm) Height: 25" (63.5 cm) Up to five wall-mountable cabinets or 1 cabinet, 8 chassis are allowable per system (1 cabinet = 2 chassis)	Pedestal/Module/Top Cap Weight Empty: 40 lb. (18.2 kg)/50 lb. (22.7 kg)/151b. (6.8 kg) Weight Full: 70 lb. (31.8 kg)/130 lb. (59 kg)/15 lb. (6.8 kg) Width: 32" (81.2 cm)/32" (81.2 cm)/32" (81.2 cm) Depth: 26" (66 cm)/22" (55.9 cm)/22" (55.8 cm) Height: 10" (25.4 cm)/17" (43.2 cm)/4" (10.1 cm)	

Ordering Information

For further information, please contact your local Nortel representative.

Nortel IP Trunk Card



Overview

With today's widespread deployment of Internet protocol (IP) networks, organizations are looking for new ways to maximize their investments by converging their voice and data network infrastructures. Nortel IP Trunk is IP telephony gateway software for the Nortel Meridian 1 PBX that runs on an IPE card and converts real-time voice and fax information into IP packets. As a result, the Nortel Meridian 1 networks over an IP WAN (wide area network) or IP MAN (metropolitan area network) to other Nortel Meridian 1, Business Communications Manager 50/200/400 and Nortel Communication Server 1000 systems. Nortel IP Trunk software provides an integrated solution for high-quality voice transmission over an IP network with the benefit of ISDN networking features. It allows Nortel Meridian 1 to migrate to IP telephony while preserving features, applications and reliability. Enterprises can incorporate IP telephony into their networks at a pace that makes sense for their business requirements.

Ideal For

- New and existing multi-site organizations with Nortel Meridian 1 systems that need to network to other Nortel Meridian 1, Business Communication Manager 50/200/400 and/or Nortel Communication Server 1000 systems
- International sites already connected via IP data networks that want to save money by using IP telephony toll-bypass
- Organizations that pay high per-minute charges for local calls between sites by using IP telephony as a lower cost alternative to PSTN calls
- Multi-site organizations that need additional signaling between sites, for feature-enabling and sharing of centralized resources (such as voicemail)
- Organizations with sites already interconnected via both an IP network and multiple point-to-point tie lines
- Multi-site organizations interconnected via high-speed IP networks (MAN/optical)

Business Challenges

- Are you looking for feature transparency across your multi-site organization?
- Are you considering ways to reduce costs using an alternative to PSTN service?
- Are you interested in using IP telephony toll by-pass?

Typical Applications

Nortel IP Trunk software is an important element of Nortel's converged communication enterprise portfolio because it facilitates the convergence of voice and data on the Nortel Meridian 1 system. With this product, an existing IP-based data network can be used for voice and fax traffic. Since Nortel IP Trunk software supports ISDN signaling, organizations are able to take advantage of productivity enhancers like network-wide calling party name and number display. Centralized access to powerful Nortel Meridian 1 services like Nortel Messaging and attendant services can also be used network-wide through support of ISDN.

Key Points

- It provides IP telephony with feature transparency including centralized and networked applications between Nortel Meridian 1, Nortel Communication Server 1000 and Nortel Business Communication Manager 50/200/400 systems.
- Migration to IP telephony is transparent to the end user as no change in dialing sequence or feature operation is necessary.

- Nortel IP Trunk card installs neatly into an existing Nortel Meridian 1 shelf and is easily managed using Nortel Meridian 1 automatic least cost routing tables (NARS/BARS).
- Nortel IP Trunk card does not require a nailed up, dedicated connection between each system; Nortel IP Trunk resources are shared across the network.
- The Nortel IP Trunk hardware delivers carrier-class reliability with resource pooling and redundancy.
- Nortel provides the Nortel IP Trunk capability to enable customers to deploy IP telephony across an existing IP WAN infrastructure, while preserving their investment in their existing systems.
- Nortel IP Trunk software quickly IP enables all existing Nortel Meridian 1 phones for site-to-site IP telephony traffic, while seamlessly integrating with the PBX features and functions Organizations can deploy multi-site IP telephony without any user re-training, installation of poorly integrated (and high administrative cost) or external devices, and still maintain access to all of the PBX features and functions they need for maximum flexibility and efficiency.
- Nortel IP Trunk products eliminate the worry of doing a “forklift” upgrade and cut-over to a different vendor’s completely different IP-based system that may have unknown missing features and require user and administrator re-training, without losing the significant investment made in telephone sets and related equipment. Instead, Nortel IP Trunk products allow IP trunking to be used without having to replace all of the rest of the installed infrastructure.

Features and Benefits

The Nortel IP Trunk capability offers enterprises the ability to reduce communication costs by network consolidation, since a single network infrastructure can now be built to support both the voice and data networking requirements of offices at various locations. Routing voice calls over existing IP network facilities allows cost savings to be realized by avoiding per-minute call charges on voice calls, faxes and voice messaging.

The Nortel IP Trunk software solution compresses pulse code modulation (PCM) voice, demodulates group 3 fax and routes the packetized data over a private Intranet. It is a requirement that the organization has already installed a corporate IP network and that routers are available for WAN connectivity between networked systems. 100/10baseT Ethernet interfaces to the Nortel Voice Gateway Media Card or Nortel IP Trunk Card are required, as well as support of IP version 4 network layer and addressing in the WAN. There is no restriction on the physical medium of the WAN. It includes ISDN D-channel for enhanced signaling between Nortel Meridian 1, Nortel Communication Server 1000 and Business Communications Manager 50/200/400 systems, allowing them to be networked. It uses ISDN protocols with H.323 signaling and voice over a standard IP protocol stack. Nortel IP Trunk 3.0 runs on both the single-slot Nortel Voice Gateway Media Card (32-port), as well as the dual-slot ITG-Pentium card (24-port). Nortel IP Trunk 3.0 on these cards can also place and receive calls from systems running older installations of Nortel Internet Telephony Gateway Trunk.

Operations, administration and maintenance (OAM) is performed using Nortel’s Optivity Telephony Manager. Nortel Meridian 1 X11 Release 25 or Nortel Communication Server 1000 Release 3.0 or later software is required.

Nortel IP Trunk software provides the following benefits:

- Allows sharing of centralized applications across an IP telephony network, increasing efficiency and customer satisfaction, while reducing costs:
 - Centralized voicemail (Nortel Messaging) with multiple branch offices over an IP WAN, including message-light notification over the IP network
 - Network-wide attendant service attendants for answering calls from any site on the network
 - Network-based ACD allows multiple call centers to operate as a single coordinated resource
- Network-wide features available for all calls across the network, preserved when calls are transferred or forwarded:
 - Calling-line ID
 - Caller name display
 - Call park and call retrieve
 - ISDN, MCDN and H.323 signaling features
 - Reduced communications and support costs via converged architecture
 - Operates transparently to the end user when routing over the IP data network
 - Simple installation and maintenance via Nortel’s Optivity Telephony Manager software
 - Integrated with automatic route selection features of the Nortel Meridian 1
 - Complies with standard codecs (G.711, G.723.1, G.729B, G.729AB)
 - Supports standards-based layer 2 and 3 quality of service (QoS) to maintain high voice quality over a busy IP network

Nortel IP Line Card

Overview

Internet protocol (IP) Line software supports the deployment of IP phones in Nortel Meridian 1 PBXs and Communication Server 1000 networks, delivering feature- and application-rich telephony services over a single Ethernet connection. Working in conjunction with Nortel Voice Gateway Media Cards, Nortel IP Line Cards or a Nortel Communication Server 1000 (CS 1000) Signaling Server, provide gateway functionality for bridging packet-switched and circuit-switching, and acts as a terminal proxy server for IP phones.

Ideal For

- Any enterprise that wants a hybrid mix of IP, digital and analog phones to maximize its communications investment
- Businesses with an existing Nortel Meridian 1 PBX that want to incorporate IP telephony on a small scale. Deploying Nortel IP Line cards represents the smoothest, most cost-effective route to IP convergence for the installed base of 43 million Nortel Meridian 1 PBX users. As enterprises begin to scale their IP telephony deployment beyond a few IP phones, they can easily migrate their Nortel Meridian 1 to a Nortel CS 1000 with scalability to 10,000 IP phone per server - in this case Nortel IP Line Cards are re-deployed as DSP resource cards.
- Early adopters who want the latest technology on the world's leading communications system
- Companies that want to incrementally expand their network either by adding new sites or adding new users
- Companies that have a large number of adds, moves and changes
- Remote workers that need to access their corporate data and voice services in exactly the same way, whether in the office, at home or on the road

Business Challenges

- Are you looking for alternative ways to support remote workers?
- Are you interested in offering more choices to your desktop users?
- Does your site have an extensive number of adds, moves and changes?
- Are you considering deploying IP phones?

Typical Applications

Nortel IP Line software is an important element of Nortel's converged communication enterprise portfolio because it facilitates the convergence of voice and data by deploying telephony communications over a data network. Enterprises building a new site can wire for a single network versus wiring separately for voice and data. Enterprises may choose to implement a Nortel Meridian 1 or Nortel CS 1000 with 100% Nortel IP phones, or may choose to deploy Nortel IP Phones in conjunction with digital and analog phones. Nortel IP Line software is particularly beneficial in environments where there are frequent adds, move and changes, and in environments with a geographically distributed and/or mobile workforce (remote offices, telecommuters, field workers, traveling workers, etc.). For example, the Nortel IP Softphone 2050 runs on a PC and provides the same features and services as a desktop phone. Nortel IP Phones such as the Nortel IP Phone 2004, 2002 and 2001 can be deployed over any Ethernet connection with plug-and-play ease.

Key Points

When deployed with Signaling Server, it allows communication with SIP and H.323-based IP telephony devices.

- Provides support for IP phones connected to feature and application-rich telephony servers (Nortel CS 1000/1000M and Nortel Meridian 1)
- Co-existence of Nortel IP Phones with digital and analog phones on Nortel CS 1000 and Nortel Meridian 1, for migration to IP telephony at a pace that's appropriate to business requirements
- Supports standards-based layer 2 and 3 quality of service (QoS) to maintain high voice quality over any QoS-capable data network
- Part of the Nortel WLAN IP Telephony Solution
- Reduced communications costs via converged communications network
- Excellent migration path to IP telephony and ROI extension for existing Nortel Meridian 1 systems
- Full access to Nortel Meridian 1 and Nortel CS 1000 suite of enterprise communications features and applications

Features and Benefits

- Enables communication between a circuit-switched telephony network and IP clients
- Phones supported: Nortel IP Phones 2004, 2002 and 2001; Nortel IP Softphone 2050, Nortel Mobile Voice Client 2050 and Nortel WLAN Wireless Handset 2210² & 2211²
- Increased choice and flexibility in providing desktop voice capability for campus and remote users
- Leverages the businesses' existing data network infrastructure (data/voice convergence)
- Enables smooth roll-out of IP telephony services building on the existing voice network

- Load balancing so IP phones can use a pool of DSP gateway resources
- Simplified network management and support costs
- Simplified moves, adds and changes through support of DHCP
- Builds on the reliability and feature richness of the Nortel Meridian 1 and Nortel CS 1000 systems
- Complies with open standards, including standard codecs (G.711, G.723.1, G.729B, G.729AB)
- Consolidation of network services resulting in savings

Market Information

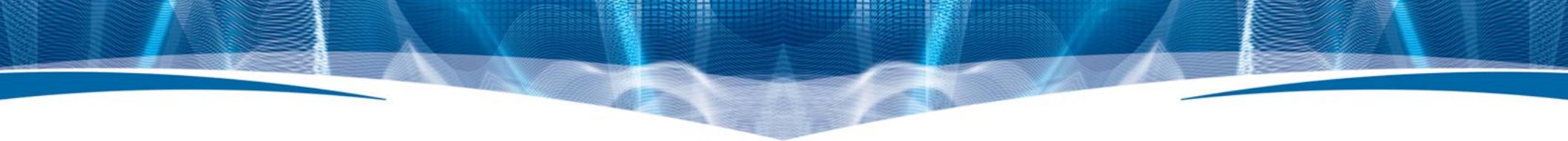
IP Telephony is gaining momentum as many companies see the benefits of converging voice and data. Nortel IP Line and Trunk Cards reduce your communications and support costs via the converged architecture. Integrating voice, data and multimedia creates a global network that delivers great cost benefits with a scalable architecture.

Ordering Information

For further information, please contact your local Nortel representative.

¹Dataquest

²Note – requires additional hardware



> Nortel Large Meridian Platform

Large organizations with the most demanding requirements for capacity, reliability, advanced applications and sophisticated networking turn to the Nortel Meridian SL-100. It offers carrier-grade services to an enterprise with very large line requirements or a campus environment requiring a central facility to serve a number of medium to large remote sites.

- Nortel Meridian SL-100

Nortel Meridian SL-100



Overview

The Nortel Meridian SL-100 * is the largest member of the Nortel Meridian family of enterprise communications systems. The Nortel Meridian SL-100 is ideal for very large enterprises requiring a carrier-grade system and services that can meet medium to very large line requirements, or a campus environment with a large central facility that also serves a number of remote locations.

The Nortel Meridian SL-100 combines the advanced hardware and software architecture of the Nortel DMS-100 switching system with the premier PBX software features of the Nortel Meridian 1 into a single enterprise solution. The carrier features of the DMS-100 combined with the enterprise features of the Meridian 1 provide a powerful platform of services to meet unique business requirements. There are two options available: the Nortel Meridian SL-100 SuperNode SE with a 50,000-port capacity and Nortel Meridian SL-100 SuperNode designed for a higher capacity (up to 100,000 ports).

Ideal For

- Large organizations with the most demanding requirements for capacity, reliability, advanced applications and sophisticated networking
- Campus environments requiring a central facility to serve a number of medium to large remote sites
- Very large government departments with special requirements (for example in the United States: Department of Defense locations that require a Defense Switched Network (DSN) certification through the Joint Interoperability Test Command (JITC))
- Other organizations benefiting from the capabilities of Nortel Meridian SL-100 - from educational to financial organizations, hospitals to government agencies, hotels and commerce or multi-tenant services

- Is your organization considering changing from a carrier provided Centrex service to privately provided services?
- Are military unique features and certifications required?

Typical Applications

- By combining the best of Nortel Networks carrier and enterprise capabilities, the Nortel Meridian SL-100 can serve an organization's total communications needs supporting a single large site or campus environment supporting up to 100,000 ports.
- In the United States, if deployed as an end office (EO) or multi-function switch (MFS) in the Defense Switched Network, this system provides the certified military unique features required by the United States military.

Business Challenges

- Are carrier grade services, features and reliability required?
- Does your organization have a need for more than 4,000 extensions?
- Does your organization have a campus environment with the need to support large remote locations?

Key Points

- Proven reliability – Five-nines reliability is delivered using Nortel Networks carrier-based architecture as the foundation for the Nortel Meridian SL-100.
- Flexibility – The Nortel Meridian SL-100 provides both carrier and Meridian 1 business features in a single enterprise solution. This allows the deployment of the features an organization needs where it needs them.

- Investment protection – As a business grows and changes, Nortel Meridian SL-100 systems and applications can grow right along with it - from 4,000 to 100,000 ports.
- Proven track record – Nortel Meridian SL-100 has delivered the valued features and applications to businesses for more than 20 years.
- Modular architecture provides inherent flexibility and cost savings.
- Powerful networking features are delivered for the public switched telephone network (PSTN), private and virtual private network access.
- Migration to future technology – Nortel Meridian SL-100 systems can easily be migrated to the Communication Server 2100 (CS 2100) to accommodate new IP Telephony advantages. If migrated, the Core Call Server will perform call processing for existing Meridian SL-100 components in parallel with media gateways and IP end-points, maximizing current investments. If upgraded, the Meridian SL-100 can support IP Phone 2001, 2002 and 2004 as well as IP adapters for digital phones and IP Softphones.
- System supports a range of telephone sets including analog, Meridian digital and Meridian business sets.
- Military unique features – The Meridian SL-100 is certified in the U.S. by the Defense Information Systems Agency to provide the military unique features for the United States Government Defense Switched Network.

Nortel Communication Server 2100 Software

Release SE07 Features

SE07 Features for Meridian SL-100

- ACD Agent Expansion – extends the maximum number of ACD agents that can be provisioned from 9,000 to 30,000.
- Enhanced Secondary Directory Number (DN) – allows multiple phone numbers to be associated with a common telephone reducing the need for multiple telephone devices in a shared facility such as a dorm room.

- Enterprise and Residential ICM Redirect – extends the ACD Call Redirection feature and its functionality beyond ACD groups, making it available for use on enterprise and residential lines. This provides added flexibility for disaster recovery or weather conditions.
- Group Intercom All Call (GIAC) – this feature was modified to provide one-way communication path to broadcast, rather than the original two-way. The number of group members has also been expanded from 30–99.
- SimRing Deny Redirection – improves the control of SimRing call routing and eliminates the confusion of calls going to multiple voice mailboxes.
- Basic Virtual Call Admission Control (VCAC) – addresses the ability to control the amount of traffic that enters the network via limited bandwidth links, preventing the over subscription and ensuring voice quality.
- SIP Converged Desktop II – allows end-users to use their PCs for the multimedia portion of their communication, while retaining their existing telephony system for voice.

SE07 Features for the Migrated Meridian SL-100/CS 2100

- Introduces the IP Phone 2001 – a single line, entry level IP Phone ideally suited to low volume requirements such as lobbies and common areas.
- Supports IP Phones 2001, 2002 and 2004 Phase II sets with integrated power over LAN options.
- USB Headset Adapter for IP Softphones – a small portable device available for the M6350 Soft Client providing mobile workers with a flexible solution for increased productivity.
- IP Key Expansion Module – an add-on module for the IP 2002 and IP 2004 provides up to 24 programmable keys per modules (up to 2 modules can be added to each set).
- Media Gateway 9000 (MG 9000) – offers all the advantages of a managed IP infrastructure, while preserving existing investment allowing customers to retain existing sets and migrate to IP at their own rate.

- Media Gateway 15000 – supports more than 48,000 ports and performs the gateway conversion between the IP packet network and the TDM switches.
- Media Server 2010 – is a new solution that delivers recorded announcements and advanced IP packet audio and conferencing services (including Music on Hold and SimRing) in IP networks. It is scalable up to 240 IP Ports.
- IP Client Manager 7.0 – a single blade option with the ability to support up to 3,000 users, providing significant cost improvement over the predecessor its IPCM 2.5.
- MCDN over H.323 – cost effectively extends the reach of VoIP VPN services between multiple call servers in the network allowing centralization of voice mail and contact center applications.

Features and Benefits

The Nortel Meridian SL-100 supports many applications available to the Nortel Meridian 1 family including unified messaging with CallPilot, contact centers with Nortel Contact Center Manager and multimedia applications with the Multimedia Communication Server 5100. These services can be hosted centrally and extended across the network to remote locations served by the Nortel Meridian SL-100.

- The Nortel Meridian SL-100 offers hundreds of software features and services, including basic and advanced voice and data communications, system administration capabilities and an extensive array of call management, networking and voice messaging features – powerful applications for greater productivity.
- Nortel Meridian SL-100 provides a platform for applications such as Nortel unified messaging solutions with CallPilot, mobility with 802.11 Wireless IP Gateway, contact center with Nortel Call Center Server, multimedia applications with Multimedia Communication Server 5100, ISDN networking with Primary Rate (PRI) and Basic Rate Interface (BRI) and Signaling System 7 (SS7).

- The value-added software features on Nortel Meridian SL-100 offer a wide selection of options and a modular format that permits a business to tailor the system software to meet day-to-day operations and applications.
- The modular architecture of every Nortel Meridian SL-100 system provides inherent flexibility and cost savings. Its scalable, distributed processing and open standards adherence allow a business to add capacity and features as they are needed, accommodating future advances in technology cost-effectively and efficiently with built-in “evergreen” investment protection.
- The Nortel Meridian SL-100 supports the Nortel Remote Gateway 9100 Series.
- It supports 802.11 Wireless IP Gateway for mobility.
- It supports the Integrated Conference Bridge application.
- The Nortel Meridian SL-100 supports M3900 Series Digital Telephones.
- It contains industry-leading business (CLASS) and residential features.
- Advanced and unified messaging are provided using CallPilot.
- The Nortel Meridian SL-100 offers revenue-generating call center capabilities using Nortel Contact Center Manager.
- Nortel systems meet the highest standards for quality and reliability. They are built with the most advanced manufacturing processes, use state-of-the-art components and incorporate the latest technological innovations to provide maximum system performance.

Market Information

In a world in which the workplace is being redefined on a daily basis, the ability to share information in real-time is critical. Every day more people are communicating across constantly growing enterprise networks. To keep pace with this change, the last thing you need is to be held back by your communications system. Nortel Networks Meridian SL-100 offers scalable, flexible, and reliable performance to keep your business moving. Whether you select the SuperNode SE system or the larger SuperNode system with its 100,000 port capacity, you get proven and powerful performance for your communications.

The Meridian SL-100 has true, built-in redundancy from top to bottom. This is why you will find the Meridian SL-100 in the switch rooms of Fortune 100 companies across the United States – environments where reliability and service cannot be compromised. Nortel has demonstrated leadership and commitment to our enterprise partners. From education, finance and health care to government, utilities, manufacturing and service industries – large enterprises of all types are using the advanced capabilities of the Meridian SL-100 communications system to accelerate their profitability and success.

Technical Specifications

Meridian SL-100	SuperNode	SuperNode SE
Call Processor	XA Core: Single Shelf Containing: Processor Element (PE) Power MPC7410/500 MHz. Duplicated per PE for fault detection. 512 MB on-board memory for Program Store. Scalable Real-time – in-service addition of PEs. Scalable Reliability – “n+m” reliability. Input/Output Processors Common Host I/O Processors (IOP). Individual personality “Packets” – two per IOP. OC-3/ATM MS Links. Remote Terminal Interfaces (RS-232). Provisionable mass storage devices: >= 4 GB disks; 1.3-4 GB DAT. Fault Tolerant File System. Shared Memory (SM) Shared Data Store, Master Copy of Program Store. Duplex memory; independently mated 32 MB blocks. Hot spare for reliability. 192 MB granularity; 1728 MB capacity.	
Line Capacity	60,000	36,000
Total Port Capacity	100,000	50,000
Telephones Supported	Analog Sets All Digital Sets M2000 series sets M3900 series sets M5000 series sets	

Meridian SL-100	SuperNode	SuperNode SE
Operating Environment Power Consumption	Call Control Frame Power - 2,500 watts or 8,540 BTU/hour Current Drain - 56.2 Amps Nominal Voltage - -50.25 Volts OAM&P Cabinet Power - 1650 watts or 5,640 BTU/hour Current Drain - 32.5 Amps Nominal Voltage - -50.25 Volts SuperNode Data Manager Cabinet Power - 870 watts or 3,980 BTU/hour Current Drain - 17.2 Amps Nominal Voltage - -50.25 Volts Note: Power consumptions vary depending on the actual components housed in each cabinet.	
Dimensions	C42 equipment cabinet 107 cm wide x 183 cm high x 71 cm deep (42 inches x 72 inches x 28 inches) Houses: XA-Core, Message Switch, ENET C28 equipment cabinet 71 cm wide x 183 cm high x 71 cm deep (28 inches x 72 inches x 28 inches) Houses: SuperNode Data Manager, Integrated Service Module/Input/Output Module Open Frame 72 cm wide x 213 cm high x 46 cm deep Houses: SuperNode Data Manager, Integrated Service Module/Input/Output Module	

Ordering Information

For further information, please contact your local Nortel representative.

* The Nortel Meridian SL-100 is suitable primarily for enterprise organizations in North America.

> Nortel TDM Desktop Portfolio

Nortel's latest series of digital telephones for the Nortel Meridian 1 and Nortel Communication Server 1000 (CS 1000) bring user friendliness and extensive features simultaneously to the desktop. To meet the needs of organizations of all sizes, the Nortel Meridian Desktop Telephones - M3900 series offers five telephone models and a variety of accessories. In business, the first point of contact with customers is often your attendant. The ability of the attendant to efficiently and effectively guide callers through the organization can often mean the difference between a lasting customer and a lost sale.

- Nortel Meridian Digital Telephones – M3900
 - M3901
 - M3902
 - M3903
 - M3904
 - M3905
- Attendant Positions
 - M2250
 - PC Console Interface Unit (PC CIU)

Nortel Meridian Desktop Telephones – M3900 Series

Overview

Nortel Meridian Desktop Telephones - M3900 series brings a wide range of new features and capabilities to the desktop easily and cost effectively. The Nortel M3900 series is Nortel's latest range of digital telephones for the Nortel Meridian 1 and Nortel Communication Server 1000 (CS 1000). The Nortel M3900 series consists of five telephone models and a variety of accessories to meet the diverse requirements of all organizations. Excellent voice quality, simplicity of use and ease of management are guaranteed with all sets in the Nortel M3900 series.

Ideal For

- M3901 – Designed for users who require minimum telephony functionality, this single line entry-level phone is ideal for common areas with low call volumes such as reception areas, hallways, school rooms, lobbies, cafeterias and restaurants.
- M3902 – Designed for users who require basic telephony functionality, this phone is ideal for a manufacturing floor, warehouse and other light telephone use areas.
- M3903 – Designed for users who require enhanced telephony functionality, this multi-line phone with display screen is ideal for office professionals and technical specialists and is well suited for moderate call volumes.
- M3904 – Designed for managers, executives and office administrators, this multi-line phone features a large LCD display screen capable of displaying a maximum amount of information and is well-suited for high call volume environments.
- M3905 – Designed specifically for a Call Center environment, this phone is ideal for Contact Center Agents and Supervisors.

Business Challenges

- Are you looking for flexibility and choice when it comes to desktop users?
- Do you have a variety of user types each with diverse requirements?
- Are you looking for value and lower total cost of ownership in your digital phone portfolio?

Key Points

- Lower cost of ownership
- Self-labeled keys
- Simplified administration, upgrades and maintenance
- Simplify accessories installation
- Increased user productivity through simplified user interface
- Enhancements to directory search making calling easier and finding numbers faster
- More efficient access to value-added features and services
- Context-sensitive keys for easy viewing of line/feature status
- Increased flexibility with more customization of virtual office features

Features and Benefits

- **Full duplex handsfree accessory cartridge** – M3904 FDHF (full duplex handsfree functionality) allows simultaneous two-way communication during a handsfree call.
- **One button feature access** – Users have more direct access to features such as the callers list, redial list and personal directory.
- **Corporate directory search enhancement** – Introduces the resume soft key to the corporate directory screens of the Nortel M3903, M3904 and M3905 sets. The resume key allows a user to return to the corporate directory find screen to enter additional characters and to continue searching without starting over from the beginning.
- **System-initiated language selection** – The system administrator can define a default language on a customer basis for Nortel M3902, M3903, M3904 and M3905 sets. The default language defined by the system administrator applies to all new Nortel M3900 sets configured for the customer group.
- **Set-to-set messaging enhancements** – Allow the system administrator to predefine ten messages for the Nortel M3903, M3904 and M3905 sets. The telephone user can select one of the messages as a set-to-set message. Telephone users can also edit a message before selecting it as their set-to-set message.
- **31-digit dialing** – The Nortel M3900 display screens accommodate dialing strings of up to 31 digits. This allows the screen to fully display long dialing strings, such as calling card numbers and access codes.
- **Special character support** – Nortel M3902, M3903, M3904 and M3905 sets support for all special characters found on a PC keyboard. Special character support allows a user to input special characters when using the edit mode in the personal directory and set-to-set messaging. For example, users can enter names with an accent in their personal directory (e.g., José).
- **PC Utility software** – The personal directory PC Utility application provides a faster, easier way to create or modify a personal directory for a Nortel M3904 and M3905 Desktop Telephone. A user can enter names and numbers into a personal directory file on a PC and download the file directly from the PC to the Nortel M3904/M3905 telephone through a serial port connection on a cartridge style accessory. A user can also upload (read) a directory from a Nortel M3904/M3905 to a PC and modify the directory.
- **Computer telephony interface adapter** – The computer telephony interface adapter (CTIA) is a cartridge style accessory with software that enables PC applications to monitor or control the Nortel M3900 Telephone for first-party call control type applications. It integrates the PC and telephone, allowing a user to manage calls more effectively using a PC application such as Microsoft Outlook. The CTIA comes with the Desktop TAPI service provider software. The PC software application required to complete the package, such as Microsoft Outlook™, is not provided.
- **Desktop TAPI service provider software** – TAPI compliant applications usually support placing calls, answering calls, holding and un-holding calls, transferring and conferencing calls, as well as other features. However, one of the most important functions of the TAPI service provider is interpreting the information that is presented to the telephone set's display and passing that information on to a TAPI application.
- **Full icon support** – The distinctive functional icons are now displayed on the Nortel M3900 series of sets along with the expansion modules allowing a user quick-and-easy understanding of the status of a call rather than just viewing a flashing icon.



Nortel M3901 • Entry-level single line set • 5 programmable features • 4 fixed keys (line, feature, hold, goodbye) • Ringing and handset volume control • LED indicator: message waiting, feature activation • Feature card • Desk or wall mount	Nortel M3902 • Basic single line set • 2-line x 24-character display • 3 self-labeling programmable feature keys • Handsfree key with LED • Navigation cluster • Desk or wall mount • Headset support	Nortel M3903 • Multi-line • 3-line x 24-character display • 2 self-labeling programmable line/feature keys • 4 context sensitive feature keys • Advanced feature access: virtual office, corporate directory, set-to-set messaging • Fixed feature keys: direct connect headset, call log and redial list (10/5) • Handsfree w/LED • Navigation cluster, quit and copy • Desk or wall mount	Nortel M3904 • Multi-line • 5-line x 24-character display • 6 self-labeling programmable line/feature keys • 4 context sensitive feature keys • Advanced feature access: virtual office, corporate directory, set-to-set messaging • Fixed feature keys: message, directory/log (includes personal directory, call log and redial list), applications, shift, "smart" mute w/LED, headset w/LED, hold, goodbye, volume control • Direct connect headset • Handsfree w/LED • Navigation cluster, quit and copy • Desk or wall mount	Nortel M3905 • 4-line x 24-character display • 8 self-labeling programmable line/feature keys • 4 self-labeled programmable feature keys • 6 ACD fixed feature keys w/LED • Headset, supervisor, emergency, make busy, not ready, in-calls • Supervisor plug in key (talk or listen only) • Navigation cluster, quit and copy • Dual headset jacks • Handset optional • 2 accessory ports
Typical Applications: • Low volume areas such as reception lobby, hallways and cafeterias	Typical Applications • Manufacturing floor, warehouse, light telephone use	Typical Applications • Office professionals, technical specialists	Typical Applications • Managers, executives, administrative assistants	Typical Applications: • Contact center agents and supervisors; Nortel Contact Center agents and supervisors

Market Information

The M3900 series delivers highly valued features and functionality to users while also serving as a platform for ongoing enhancements and IP migration.

Technical Specifications

	Nortel M3901	Nortel M3902	Nortel M3903	Nortel M3904	Nortel M3905
Platform compatibility	Nortel Meridian 1, Meridian SL-100 systems, CS 1000	Nortel Meridian 1, Meridian SL-100 systems, CS 1000	Nortel Meridian 1, Meridian SL-100 systems, CS 1000	Nortel Meridian 1, Meridian SL-100 systems, CS 1000	Nortel Meridian 1, Meridian SL-100 systems, CS 1000
Color	Charcoal or Platinum	Charcoal or Platinum	Charcoal or Platinum	Charcoal or Platinum	Charcoal or Platinum
Power supply	Loop powered from system up to 1,067 m (3,500ft)	Loop powered from system up to 1,067 m (3,500ft)	Loop powered from system up to 1,067 m (3,500ft)	Loop powered from system up to 1,067 m (3,500ft)	Loop powered from system up to 1,067 m (3,500ft)
Operating temperature	0°C to 50°C (32°F to 104°F)	0°C to 50°C (32°F to 104°F)	0°C to 50°C (32°F to 104°F)	0°C to 50°C (32°F to 104°F)	0°C to 50°C (32°F to 104°F)
Relative humidity	5% to 95% (non-condensing). At temperatures above 34°C (93°F) relative humidity limited to 53 mbar of water vapor pressure	5% to 95% (non-condensing). At temperatures above 34°C (93°F) relative humidity limited to 53 mbar of water vapor pressure	5% to 95% (non-condensing). At temperatures above 34°C (93°F) relative humidity limited to 53 mbar of water vapor pressure	5% to 95% (non-condensing). At temperatures above 34°C (93°F) relative humidity limited to 53 mbar of water vapor pressure	5% to 95% (non-condensing). At temperatures above 34°C (93°F) relative humidity limited to 53 mbar of water vapor pressure
Storage temperature	-50°C to 70°C (-58°F to 158°F)	-50°C to 70°C (-58°F to 158°F)	-50°C to 70°C (-58°F to 158°F)	-50°C to 70°C (-58°F to 158°F)	-50°C to 70°C (-58°F to 158°F)
Headset support	No	No	Direct connection via socket on back of set	Direct connection via socket on back of set	Direct connection via 2 sockets on back of set
Mounting	Desktop or wall	Desktop or wall	Desktop or wall	Desktop or wall	Desktop or wall
Supported accessories	None	ATA, CTIA, external alerter & recording interface	ATA, CTIA, external alerter & recording interface	ATA, CTIA, external alerter & recording interface, personal directory PC utility, Key-based accessory module & Display-based accessory module	ATA, CTIA, external alerter & recording interface, Key-based accessory module & Display-based accessory module
Software release	Release 24 or later; Nortel CS 1000 Release 3.0 or later	Release 25 or later; Nortel CS 1000 Release 3.0 or later	Release 25 or later; Nortel CS 1000 Release 3.0 or later	Release 25 or later; Nortel CS 1000 Release 3.0 or later	Release 24 or later; Nortel CS 1000 Release 3.0 or later

Ordering Information

For further information, please contact your local Nortel representative.

Attendant Positions M2250 and PC Console Interface Unit (PC CIU)



Overview

The M2250 is a powerful, fully digital attendant console that delivers efficient, high speed call processing. It transforms the attendant position into an efficient call answering/message center with advanced capabilities to help manage and streamline attendant services. Advanced features can be easily configured to support your company's unique requirements and to give attendants the flexibility they need to handle calls most effectively.

For those customers who want the features and capabilities of the M2250 with the flexibility of a PC based console, the PC Console Interface Unit (PC CIU) is the solution.

Ideal For

- The M2250 was designed to provide the attendant operator with an easy-to-use tool that enables them to function at maximum efficiency.
- The PC CIU was designed to provide options to those customers who would rather handle incoming calls using a PC.

Typical Applications

Any enterprise that is looking to centralize call answering

Key Points

M2250

- **Display** - large, easy-to-read indicators and a built-in 4-line by 40-character liquid crystal display. The display presents the essential information required for prompt call processing and professional call answering and screening. Both the display and the angle of the keyboard are adjustable allowing attendants to choose the most comfortable viewing and operating angle.
- **Supervisor Capabilities** – allow a supervisor to monitor attendant calls in progress and override attendant position busy.
- **Programmable Feature Keys** - support up to 20 features, such as Busy Verify, Call Park, Auto Dial, Paging and more.

- **Centralized Messaging** - with the M2250 can be centralized at the console, freeing secretaries for other duties. Employees can be notified by an indicator on their telephones that messages are waiting, and lost or delayed messages are virtually eliminated.
- **The Options Menu** - permits attendants to customize several console features, such as contrast adjustment, volume settings and choice of 15 languages.
- **Call Party Name Display** - provides the name and extension number of each caller within your system. Attendants know if the call is internal or external and can respond accordingly.
- **Attendant Administration** - allows the attendant to modify certain features assigned to the telephones in the office. A plastic overlay is used to guide attendants through the operation, making it quick, easy and cost-effective to modify features as business needs change.

PC Console Interface Unit (PC CIU)

- Provides connectivity between CS1000 or Meridian 1 and the PC-based attendant software via RS-232 connection to a customer provided PC
- Connectivity alarm monitoring
- Dual Hand/Headset interfaces with slider volume control
- Power Fail Transfer switch

- Sleek, low-profile design – sits conveniently under the PC monitor
- Dual headset/handset ports for fast connection

Features and Benefits

M2250 Console

- Incoming Call Indicator Keys and Loop Keys allow the attendant to either handle calls in sequence or prioritize answering for specific types of calls. If telephones are not answered, callers can automatically be returned to the console, ending long holding times, cutoffs and abandoned calls.
- 10 Programmable Keys support up to 20 additional features, some of which include:
 - Auto Dial
 - Busy Verification
 - Call Park
 - Charge Account Code
 - Display Source/Destination
 - Do-Not-Disturb
 - Message Indication/Cancel
 - Paging
 - Routing Control
 - Speed Call
 - Stored Number Redial
- Up to 20 Trunk Group Keys with LCD indicators
- Up to 20 Incoming Call Identification Keys with LCD indicators
- 6 Loop Keys with LCD indicators
- 8 Function Keys provide full attendant console functionality
- Built-in 4-line by 40-character display with an optional 2-line display mode enlarges characters for optimal viewing. Non-glare, backlit LCD with contrast adjustment and tilt adjustment, scrollable to 128 characters (source and destination information). The display provides valuable call information:
 - Time/Date
 - Call source and destination including alphanumeric
 - Call Party Name Display
 - Number of calls waiting

PC Console Interface Unit (PC CIU)

A PC-based attendant console typically consists of 2 components: the PC Console Interface Unit and PC-based attendant software application (third-party as sourced by the customer). Most PC-based Attendant software applications emulate the functions of the M2250 attendant console providing all of the features and benefits listed above, via a Windows™-based Graphical User Interface. In addition to the standard features of the M2250, a PC based application could include:

- Feature-rich drag and drop, cut and paste functionality
- Quick access to information screens
- Reduces desktop real estate
- Projects a professional company image
- On-line Directories with dial-by-name

To enhance reliability of the PC-based Console, a Meridian Digital Telephone (configured as a Night Service DN) can be connected to the interface unit so that if the PC fails, the set can still be used to answer calls. If there is a communication failure between the interface unit and the Meridian 1, the PC application goes into Position Busy. All calls are directed to another console if one is available and in service. If not, then calls are directed to a Night DN.

Technical Specifications

M2250 Dimensions

Length: 9.6 in. (245 mm)
Width: 16.75 in. (425 mm)
Height (front): 1 in. (24.40 mm)
Height (back): 2.5 in. (65 mm)
Height (with display panel up): 4.5 in. (115 mm)
Weight: 7 lb (3.15 kg)

PC CIU Dimensions

Length: 11.40 in. (289.56 mm)
Width: 13.00 in. (330.20 mm)
Height (front): 2.00 in. (50.80 mm)
Height (back): 2.00 in. (50.80 mm)
Weight: 5.2 lb (2.35 kg)

Ordering Information

For further information, please contact your local Nortel representative.

> Nortel Integrated Applications Portfolio

The Nortel Integrated Applications portfolio offers simple, cost-effective solutions to help increase employee productivity and heighten customer satisfaction levels while reducing costs. Geographically dispersed organizations or those wanting to control equipment costs can have cost-effective audio conferences and better manage incoming calls with Nortel's Integrated Applications portfolio for Nortel Meridian 1, Meridian SL-100 and Nortel CS 1000 systems.

The Nortel Integrated Conference Bridge makes scheduling, administering and attending a conference effortless for any organization. Nortel Integrated Call Director provides users who are constantly on the go or away from their desks with the ability to professionally and discreetly manage their call inflow by screening and routing their calls while ensuring they are accessible to their most important callers. And with the plug-and-play capability of Nortel Integrated Recorded Announcer, recorded announcements and music on hold have never been easier or more cost efficient. The Nortel Integrated Call Assistant is a multi-featured automated attendant that routes calls through caller interaction with voice menu prompting. The Nortel Integrated Voice Services is an innovative hospitality solution that enables a guest to easily order and confirm his or her own automatic wake-up and do-not-disturb requests without operator assistance. The Nortel Integrated DECT (Digital Enhanced Cordless Telecommunications) is a wireless in-building/campus private network telephony solution that takes advantage of a wide range of benefits to increase your efficiency and improve your productivity. As a suite or individually, Integrated Applications add a rich variety of features and services that take the hassle and expense out of setting up audio conferences and managing incoming calls for organizations with a variety of user needs:

- Nortel Integrated Conference Bridge
- Nortel Integrated Call Director
- Nortel Integrated Recorded Announcer
- Nortel Integrated Call Assistant
- Nortel Integrated Voice Services
- Nortel Integrated DECT (Available in Asia Pacific, Europe, Middle East, Asia and Greater China only)

Nortel Integrated Conference Bridge

Overview

Nortel Integrated Conference Bridge (ICB) is an application that provides integrated audio conference bridge capability for Nortel Meridian 1, Meridian SL-100 and Communication Server 1000 (CS 1000) systems. Organizations wanting to extend their communications reach to geographically dispersed customers, clients or colleagues can do so efficiently and professionally with Nortel Integrated Conference Bridge. The Nortel Integrated Conference Bridge provides quick "in-house" access to conference bridge service, instead of requiring constant coordination with external service bureaus. Nortel Integrated Conference Bridge is designed not only to enhance an organization's audio conferencing capability with a variety of convenient features and complete Microsoft Outlook™ integration, but also as an easy to use, self-service administrative tool employees can use themselves for scheduling their own conferences.

Ideal For

- Any business that wants to use audio conferencing as a means of consolidating communications irrespective of time, date and location
- Microsoft Outlook™ users who would like to be able to schedule, modify and delete conferences using Outlook™ as a single step process
- Corporate decision makers interested in a high-quality audio conferencing solution (Not only does it integrate with Nortel Meridian and Nortel CS 1000 systems to help reduce costs by avoiding the need for additional equipment, Nortel Integrated Conference Bridge can also bring geographically dispersed organizations together via high-quality audio conferencing.)
- Managers who appreciate the cost-savings and efficiency that this intuitive conference administration tool can bring to their organizations

Business Challenges

- Are you looking for an easy to use, cost effective, secure way to conduct audio conferences?
- Are security and reliability important to your business?
- Are you looking for a product that provides seamless integration, simple installation and a reduced footprint?

Typical Applications

- Any Nortel Meridian 1, Communication Server 1000 or Meridian SL-100 enterprise that is looking to bring "in-house" quality-based digital audio conference bridge services, which may currently be outsourced to an external service provider

Key Points

- Nortel Integrated Conference Bridge delivers cost-effective, reliable, interactive, multipoint audio conferences accessible from any telephone, anytime, anywhere in the world.
- Nortel Integrated Conference Bridge provides administrators and users alike with cost-effective, in-house conference capabilities without the inconvenience of external OEM equipment or more expensive and less secure third-party service bureaus.
- The application supports "ad-hoc" (e.g., spur of the moment) audio conferences along with daily, weekly, bi-weekly and monthly recurring scheduled conferences with easy "in-house" access.
- Access to Nortel Integrated Conference Bridge is provided at the user level for conference management and at the administrator level for configuration, editing conference parameters, bridge allocation, assigning control directory numbers, or analyzing traffic reports.

- The administration, scheduling and management of active conferences can be controlled by a Web-based browser via both the Internet and intranet on a PC.
- Nortel Integrated Conference Bridge integrates with MS Outlook™ Calendar to add conference bridge reservations from the Outlook™ interface.
- Enhanced Call Detail Reports and Billing Options offer intelligent reporting for bill-back capability of conference services. This includes total number of ports and duration booked and billing for all dialed out calls during the conference.
- Nortel Integrated Conference Bridge supports a telephone user interface (TUI) to allow users to set up a conference from a remote location.
- The Group call-out features enable the chairperson to simultaneously call several people on a pre-defined list saving time and enhancing user productivity.

Features and Benefits

- Nortel Integrated Conference Bridge offers features designed to make scheduling, administering and attending a conference effortless for any organization.
- To ensure conference security, Nortel Integrated Conference Bridge provides password protection on a conference-by-conference basis. Specific calls can be password protected, or all calls protected depending on the level of security that is desired. Specific conference passwords

can be assigned automatically by the system or customized by an end user scheduling a conference. Nortel Integrated Conference Bridge will allow three attempts to enter a password and if still incorrect, will advise the user to contact the bridge administrator.

- Flexible conference scheduling and administrative user interface options are available. An intuitive Web-based browser user interface (BUI) makes scheduling and managing active conferences quick and easy. A menu-driven telephone set option not only lets organizations schedule conferences via any DTMF set, but also allows chairperson and conferees to have control of in-conference features.
- Integration with MS Outlook™ allows scheduling of meeting and audio ports from a single interface.
- Each Nortel Integrated Conference Bridge card can function independently, providing up to 32 ports (e.g., ports equate to concurrent conferees) with support of up to ten simultaneous conferences per card. By linking two Nortel Integrated Conference Bridge cards together, 62 ports for a single conference call can be obtained.
- Nortel Integrated Conference Bridge is a global product and supports voice menu prompts for the telephone interface in 13 international languages that can be employed on a per-meeting basis.

Feature	Benefit
24/7 availability	Accessible from any phone, anytime, anywhere
Acquire chairperson	Enables a user to become chairperson should the chair be called away from the meeting, if appropriate passwords are entered
Ad-hoc	Allows creation of ad-hoc meetings (non-scheduled) without impact to reserved meetings
Assign chairperson port	Reserves a port for access by chairperson
Block-out scheduling	Permits recurring meetings to be established
Browser user interface	Intuitive Web-based BUI for administration
BUI administration	Support of configuration, schedules and reports
Conference extension	Meeting can be extended beyond allotted time in 15-minute increments
Copy meeting	Browser capability to copy meeting details to create a similar meeting

Feature	Benefit
Custom branding	Ability to customize login window, background, etc., with specific designs, company logo, etc. Nortel Integrated Conference Bridge wizard aids in uploading, etc.
Custom greeting	Permits recording of brand line greeting both at system level and for specific conferences
Dial out	Allows chairperson to call non-participants and join them into active conference
Email notification	Meeting confirmation/attributes to Scheduler
Emergency bridge	Always-on bridge that automatically dials list of predetermined numbers
Entrance/exit options	Enter/exit by name, tone or silence
Group callout	Permits chairperson to call pre-selected group
Help access menu	Enables chairperson to play list of commands
Lock/unlock conferees	Permits chairperson to allow/deny participants
MS Outlook™ integration	ICB meeting configured via Outlook™ interface
Meeting extension	Meeting can be extended beyond allotted time in 15-minute increments
Meeting termination	Issues warning(s) when meeting is about to end
Multi-language prompts	Selective application in language of choice – up to 15 languages supported
Password security	Controls access by chairperson/participants
Permanent meeting	Set up a 24/7 meeting with fixed access number and ports
Port expansion	Allows additional conferees to join the bridge
Question and answer mode	In lecture mode conferees can indicate questions to speaker via keypad entry
Roll call	Allows chairperson to check participants
Selective disconnect	Enables chairperson to disconnect a participant
Side bridge	Chairperson consults privately with a participant
Telephone user interface	Menu driven scheduling/reservation capability
Voting control	Allows chairperson to hold voting sessions with conferees

User capacity	Maximum of 500 users/executives/ superusers can be registered per card; maximum of 20 users/executives/superusers can concurrently schedule conferences per card
System Interfaces	DS-30X, CE-MUX, Card LAN, RS232, Ethernet adapter
Power Requirements	Supported by module power supply; no external power required; 3.5W max
Simultaneous Conferences	Up to 10 simultaneous conferences per card
Languages Supported	Languages supported for conferees: American English, British English, Brazilian Portuguese, Chinese, French, Japanese, Korean, Latin American Spanish, German, Italian, Dutch, Swedish, Romanian and Canadian French

Technical Specifications

System Compatibility	Meridian 1 PBX 11C Chassis, 11C Cabinet, 51, 51C, 61, 61C, 71, 81, and 81C; MSL-100, CS 1000 Series and CS 2100
Physical Location	Meridian 1 IPE shelf or a Gateway shelf
Port capacity	32 ports per card; dual-card operation reduces used port capacity to 62 for a dual card conference without chairperson control; chairperson control of dual meeting enables capacity of 60 ports
Conference capacity	Single-card configuration supports up to 10 concurrent conferences where the total does not exceed 32 conferees or a combination thereof; dual-card configuration supports up to 20 conferences concurrently where the total does not exceed 64 participants (32 ports, 2 cards) Unlimited number of scheduled meetings per ICB card

Nortel Integrated Call Director

Overview

Nortel Integrated Call Director is a versatile, self-service application that provides the ability to intelligently screen and route incoming calls to one or multiple telephony devices based on customized personal profiles, time and date. It allows users to distribute just one telephone number to their associates, rather than dealing with multiple phone numbers, thereby simplifying the "contact transaction" for their colleagues and customers. Nortel Integrated Call Director provides users with the ability to professionally and discreetly manage their call inflow by screening and routing their calls while ensuring their continual accessibility to service their most important callers. It also provides flexible features for different stages of a one-number telephone call such as greeting a caller, searching for the called party, or re-directing a call to the user's voicemail. With added functionality it can now provide remote users (mobile, LAN or public networks users) with system integration capabilities for call through and call back, conferencing and call transfer. By dialing a predefined number remote users can access the ICD card and have it call them back, thereby integrating them into their main switch. Users are passed by the card for security by entering user ID and password or by CLID recognition. Once accepted they are then free to make calls, transfer calls or conference call.

Ideal For

- Any organization that has road warriors, mobile sales forces, executives who are campus-based but in all-day meetings, or any employees who are constantly on the go
- Individuals with multiple telephones or other devices accessible through the telephony network such as traditional analog and digital phones, IP phones, cellular phones, pagers, fax, or voicemail
- Personnel who must keep in touch with colleagues and customers outside of normal business hours

Business Challenges

- Are you looking for a way to improve customer satisfaction, increase employee productivity and enhance customer engagement?
- Would you like your mobile workers to be more accessible?
- Are you interested in reducing the typical toll charges incurred by mobile workers?

Typical Applications

- Any enterprise with a mobile workforce that needs to be more accessible to customers

Key Points

- Nortel Integrated Call Director can increase employees' productivity levels while simultaneously enhancing customer satisfaction and engagement.
- It is a single-card slot housed within the IPE and is supported on Nortel Meridian 1 and Nortel Communication Server 1000 (CS 1000) systems. It provides seamless integration with digital line emulation, thus avoiding possible compatibility issues associated with external equipment. It leverages the inherent reliability of Nortel Meridian 1 and Nortel CS 1000 call servers.
- The ability to add additional users and ports, as the need arises, is accomplished via the purchase of simple keycode activated user expansions and upgrades, making Nortel Integrated Call Director an attractive enhancement to Nortel Meridian 1 and the Nortel CS 1000 portfolio.

- Each Nortel Integrated Call Director card contains an embedded server that allows users to access the service via the Web in order to create customized call screening and routing profiles themselves based on time of day and date scheduling.
- Nortel Integrated Call Director provides two intuitive user interfaces: a Web-based browser user interface (BUI) and a voice prompted telephone user interface (TUI). The TUI allows users to conveniently make changes to their settings from any DTMF telephone.
- The Nortel Integrated Call Director administrator can benefit from very extensive traffic, billing and event reporting capabilities with integration into call detail records (CDR). Traffic measurement files are generated and stored in the PCMCIA disk on a one file per day basis.
- Each card has an IP address to permit both individual subscribers (users) and the administrator access to the various services, such as defining personal routing profiles and call back numbers from a Web browser. Depending on the setup, a user can access the BUI either via their company's intranet and/or Internet. A TUI is provided for subscribers to initiate immediate overrides to an existing routing profile, or to a direct number if the subscriber is away from their usual place of work and does not have access to the Web. The TUI access is also essential to offer the flexibility necessary to remote dial users, be they mobile/cell, LAN or public phone users, to change their call back numbers depending on location and to make the feature more cost effective for their organization.
- Supports Nortel Meridian Mail/Nortel Messaging and other voice message systems that have express messaging capability. Nortel Integrated Call Director transfers subscriber's incoming calls to the express messaging number defined in the administrator's BUI. Subscribers can enter a different mailbox number if necessary, via the user BUI. An incoming call is automatically transferred to the subscriber's voicemail if the user cannot be reached.
- During the Nortel Integrated Call Director search phase for the connection to the user, the calling party can receive a recorded announcement, music while waiting, announcement plus music, or ring back tone. Four options for call disposal are available when the application is unable to locate the subscriber. These are: transfer to voicemail, transfer to an administrative assistant, transfer to another number, or disconnect. Remote dial users are offered a series of voice prompts in 17 different languages to assist with call processing.

Features and Benefits

- Features can be easily handled using one of two intuitive interfaces: either a Web-based browser user interface (BUI) or a telephone user interface (TUI). The BUI is used for defining and setting the user characteristics in the follow-me profile, follow-me schedule, temporary overrides and personal properties (passwords, mailbox number and the like). It is also used to define remote dial profiles for each user. This can be performed through the administration BUI for initial set up, or through the user BUI, where call back number and passwords can be set up. The TUI is accessible from any DTMF telephone and permits the user to record up to four personal greetings, assign the greeting to a profile, activate the override capability to change the profile and program Nortel Integrated Call Director to route calls accordingly. Call back number for remote dialing can also be changed through the TUI as well as making calls, transferring calls and conferencing through a series of voice prompts.

- Available in several different configurations: 8 port/50 users, 16 port/100 users, 24 port/150 users and 32 port/200 users. The maximum user capacities that can be reached at each of the port sizes are: the 8 port/50 user configuration can expand to a maximum 100 users; the 16 port/100 user card to a maximum 150 users; the 24 port/150 user card to a maximum 200 users and the 32 port card can grow to a maximum 300 user capacity per card.
- Multi-language capability: The voice menus for both users and callers can be selected in a preferred language with up to 17 languages supported globally.

Feature	Benefit
Intuitive user interface	Accessible by Web-based browser or telephone
Greeting choices	Selectable system, personal or no greeting
Custom profiles	Users control call routing based on their schedule
Call treatment	User defines how and when calls are to be routed
VIP password	Permits special call treatment for the callers
Name request	Announces caller's name for discretionary handling
Calling line request	Announces calling number to the call recipient
Search options	Provides sequential or simultaneous parallel search
Response during search	Provides message, music, message and music or ring back tone to caller
Call answer password	Adds security through user authentication password
Call reconnection	Reconnects call if accidentally disconnected, along with playing voice prompts to inform the caller of the call status
Incoming fax detection	Supports both manual and automatic incoming fax detection
Call disposal	Transfer to voicemail, attendant or other number
Dial restrictions	Checks validity of dialing parameters set by the user
Override profiles	Users can change their profile from a BUI or TUI for immediate or programmed implementation
Remote dial	Users can change call back number in TUI and BUI user properties

Technical Specifications

System Compatibility	Meridian 1 PBX 11C Chassis, 11C Cabinet, 51, 51C, 61, 61C, 71, 81, and 81C; MSL-100, CS 1000 Series and CS 2100
Physical Location	Meridian 1 IPE shelf or a Gateway shelf
Port capacity	Flexible to a maximum of 32 ports
User capacity	Maximum of 300 users
Voice Mail Requirements	Third party voice mail systems must have express messaging capability
Power Requirements	Supported by module power supply; no external power required; 3.5W max

Nortel Integrated Recorded Announcer

Overview

Nortel Integrated Recorded Announcer is a server-based card that provides high-quality, integrated recorded announcements (RAN) and music-on-hold (MOH) capabilities for Nortel Meridian 1 and Nortel Communication Server 1000 (CS 1000) systems. Businesses can increase their customer responsiveness by providing callers with easy 24-hour access to important recorded information. Nortel Integrated Recorded Announcer can be used for a variety of applications with its ability to deliver recorded announcements repeatedly and automatically. It can provide general information messages, call intercept treatment, after-hours business instructions, advertising and promotional announcements, hotel wake-up services and any other recorded service necessary to optimize the business environment.

Ideal For

- Organizations planning to purchase or connect with existing Nortel Meridian 1 (on X11 Release 19 or later software) and Nortel CS 1000 systems
- Any organization that requires the benefit of using announcements to keep customers informed and/or entertained in order to drive sales and boost customer satisfaction
- Organizations that need greater organizational efficiencies with "routine" calls (e.g., hour of operation, locations, etc.) handled by the recorded announcer, thus enabling customer facing personnel to attend to more involved customer calls

Business Challenges

- Are you looking for a cost-effective way to provide 24-hour easy access to important recorded information, such as your company's business hours and locations, special promotions, schedules of events, advertisements and more?
- Are you looking to reduce the costs associated with third-party recorded announcer systems such as additional cabling, separate battery backup and additional power supply equipment?

Typical Applications

- Any enterprise looking for a fully integrated, multi-featured, digital recorded announcer and music-on-hold service card that improves customer contact without increasing staff or operating costs.

Key Points

- Provides integrated RAN and MOH services and built-in trunk ports with universal trunk port emulation, saving the need to use additional trunk cards or servers and OEM RAN machines
- Available in different configurations and offers a comprehensive range of recording and maintenance features for simplified management of recorded announcements
- Avoids the need for external OEM equipment and housings in order to provide recorded announcements and music on hold to incoming callers
- Integration streamlines operation and consolidates installation, maintenance and support to a single entity; a cost-effective solution that provides a necessary and expected operation to the communication services of the system

- In conjunction with the music broadcast software feature, eliminates the need for dedicated conference cards for MOH purposes, thus offering hardware savings and additional card slots for other use, as well as considerable improvements in real time capacity and network traffic handling results
- Using the telephone user interface (TUI) within the Nortel Integrated Recorded Announcer application, access from any DTMF telephone using password security
- Recorded announcements either locally or remotely as often as required

Features and Benefits

- The Nortel Integrated Recorded Announcer delivers a simple, cost-effective alternative to standalone digital announcers that have traditionally operated as auxiliary adjuncts. Its integrated design eliminates the need for external battery back-up, power supply, cabling or switch room space normally required to accommodate third-party standalone RAN systems.
- Designed to provide simple plug-and-play installation, Nortel Integrated Recorded Announcer resides in a single card slot within an IPE module or Voice Media Gateway. Each card is available in a number of configurations that can be tailored to meet the requirements of any business entity. In addition, it delivers a comprehensive range of recording and administration features, all on a single platform.
- It supports the following applications:
 - First recorded announcement;
 - Second recorded announcement;
 - Intercept treatment;
 - Music on hold; and
 - Automatic wake-up for the hospitality market.
- Nortel Integrated Recorded Announcer supports both continuous and start/stop modes of playback. Immediate continuous mode recordings constantly play as callers “barge in” on the playback. Delay dial continuous mode initiates a ring back tone to callers until the recording begins again. Then the incoming caller hears the playback. Start/stop modes resets the recording to its beginning position when a call is terminated. All Nortel Integrated Recorded Announcer channels are totally independent, and it is possible for each channel to play different parts of a recording at the same time.
- Nortel Integrated Recorded Announcer is pre-configured with 24 minutes of storage for announcements and 6 minutes of royalty-free music for music-on-hold application. Storage for announcements can be expanded up to 5 hours.
- For flexibility, each card can be configured for 1 of 3 port channel (port) configurations: small (2 channels), medium (4 channels) or large (8 channels). If traffic requirements increase, the port capacity of the small and medium cards can be quickly and easily expanded to the higher configurations with a software keycode that activates the additional channels.
- To accommodate traffic requirements beyond the 8-channel capacity, up to 16 MIRAN cards can be linked together in a daisy chain and managed from a single terminal. As many cards as required can be supported by Nortel Meridian 1 or Nortel CS 1000, limited only by the number of IPE or media gateway slots available in the system.

Feature	Benefit
Text-based user interface	Provides menus and commands for all OA&M functions
Telephone user interface (TUI)	Access from any DTMF phone for recording or amending announcements
Browser user interface (BUI)	Access via a Web browser to perform OA&M functions
Calendar assignments	Schedule announcements based on time of day and month basis utilizing 366 day calendar
Time and date synchronization	Provides the option of setting the parameter manually or by synchronizing with the Nortel Meridian 1 or Nortel CS 1000 system clock
Music-on-hold	Trunks and routes can be selectively programmed to provide MOH to callers
Password security	Provided on any recording made from a DTMF phone; second-level password required for advanced maintenance
Announcement recording	Create voice announcements via commercially available sound editor applications
Music recording	Connect to external music sources such as a tape recorder, CD player, or radio
Pre-recorded message exchange	In-service recordings can be immediately exchanged with reserve recordings stored in memory
Time of day messages	Each channel can be assigned to play different messages at specific times during the day, week, or month
Multiple modes of operation	Continuous and start/stop modes of playback independent of each channel

Technical Specifications

System Compatibility	Meridian 1 PBX 11C Chassis, 11C Cabinet, 51, 51C, 61, 61C, 71, 81 and 81C; MSL-100, CS 1000 Series and CS 2100
Physical Location	Meridian 1 IPE shelf or a Gateway shelf
System Interfaces Options	DS-30X, CE-MUX
RAN Storage	Standard 24 minutes – Maximum 5 hours (using PCM/CIA)
Port Configurations	2 (Small), 4 (Medium), 8 (Large)
Concurrent Callers	Small 60, Medium 120, Large 240
Administration Interface Options	Browser, Telephony and Text
Speech Compression	G.725 Codec (32K)
PC Requirements	Windows 95 or later, 100MHz Pentium Processor or greater, 32 MB RAM, 1 GB hard drive minimum, 4x CDROM, speakers; Recommended sound card is Creative Labs AWE 32 Plug and Play Audio Card Model CT3601; Goldwave shareware software recommended for sound editing
Power Requirements	Supported by module power supply; no external power required; 3.5W max

Nortel Integrated Call Assistant

Overview

The Nortel Integrated Call Assistant is an IPE card that provides auto-attendant functionality for Nortel Meridian 1, Meridian SL-100 and Communication Server 1000 (CS 1000) systems. It is compatible with all Meridian 1 PBX options that support IPE. With Integrated Call Assistant, a caller is greeted by a voice-response user interface. The voice-response user-interface settings can be personalized to create an application that meets individual customer requirements, from very basic to complex. Incoming fax calls can be routed to a predefined fax number.

Ideal For

- The Integrated Call Assistant is an ideal solution for Meridian customers who want to make the most effective use of their resources and improve customer satisfaction by offering 24-hour information service.
- It was designed for customers who opt not to purchase Nortel Messaging and find third-party voice mail systems less convenient than an integrated solution.

Business Challenges

- Any Meridian customer looking for an integrated solution that is both cost effective and provides full feature, high-quality auto attendant functionality

Typical Applications

- Auto Attendant with voice menus: Basic, menu-driven call handling, which can be used for help desk applications or DTMF name & number dialing. Call handling can be CLID and time sensitive or dependent. The Integrated Call Assistant can also determine if a call is an incoming fax or a person and route the calls accordingly.
- ACD front-end call handler: It can play greetings and route calls through menu based prompts, by CLID and/or DNIS.

Key Points

- Increases customer service and staff productivity by routing calls even when an operator isn't present or available.
- Provides callers with easy 24-hour access to automated self-service menus, which speeds call processing by routing customers to vital decision-making information.
- Automatically routes callers to the services they want, allowing employees to focus on higher-level customer service and support issues. The improved efficiency combined with better customer communications translates into enormous time and cost savings for the enterprise.
- Employee productivity is also improved by removing them from time-consuming routine inquiries and call-routing functions that the Integrated Call Assistant can assume.
- It can be used as a call center's front-end single number for fax, with menus leading to sales, service and emergency routing.

Features and Benefits

- Integrated solution that is easy to install and maintain
- Easy to configure and administer from many locations including web browser GUI and telephone DTMF either on-site or remotely
- Automated solution for 24-hour access to menus that route customers to vital information and resources

- One number for phone and fax for increased customer convenience and cost reduction through elimination of separate fax lines
- Flexible low-cost auto attendant or ACD front-end call handler allowing customers to define their own applications as well as voice menu prompts; greetings and menus changed externally for emergency situations
- Call routing functionality that provides incoming callers with recorded messages and then routes them based on Calling Line ID or Dialed Number Identification (DNIS) or both
- 365-day calendar so messages and other menu choices can be programmed and played on the time, day and date specified
- Supports up to 8 languages

Technical Specifications

	PCMCIA Flash Card	PCMCIA Disk
Voice greetings (use in front of voice menus)	16 (Maximum 10 seconds each)	32 (Maximum 10 seconds each in 8 languages)
Voice menus	16 (Maximum 60 seconds each)	32 (Maximum 60 seconds each in 8 languages)
Language capacity	One	Eight (American English, British English, French, Latin American Spanish, Brazilian Portuguese, Chinese, Japanese & Korean)
Database name capacity	1,000	10,000
Personal verification recordings	Not available	3,000 subscribers (up to 3 seconds in length)
Administration interface options	Browser, Telephony and Text	
Power requirements	Supported by module power supply; no external power required; 3.5W max	

Nortel Integrated Voice Services

Overview

Nortel Integrated Voice Services is an innovative hospitality solution for Nortel Meridian 1 and Nortel Communication Server 1000 (CS 1000) systems that enhances guest Automatic Wake-Up (AWU) and Do-Not-Disturb (DND) services by integrating them into the Nortel Meridian 1 PBX. It enables the guest to easily order and confirm his or her own automatic wake-up and do-not-disturb requests without operator assistance, thus providing greater guest satisfaction and freeing up the operator to attend to other guest needs. Integrated Voice Services also enable the guest to access a voice prompted service menu directly from the room. The guest is greeted with simple prompts in the guest's language and is instructed in how to order an Automatic Wake-Up or Do Not Disturb call.

Ideal For

- Small properties that use a Meridian 1 PBX and are looking for improved guest services

Typical Applications

- The Integrated Voice Services application was designed for hotels or hospitals that want to give guests/patients the ability to activate Automatic Wake-up and Do Not Disturb features from their telephone set.

Key Points

- It integrates with the Property Management System (PMS) via the Meridian 1 PBX.
- The operator can still assist the guest with AWU or DND from the operator console, if desired. This allows a hotel property a great deal of flexibility in offering AWU and DND services to guests.

Features and Benefits

- At check in, the guest language preference is set by the PMS, is echoed by the Meridian 1 PBX and read by the Integrated Voice Services Card.
- Upon receipt of a request for a wake-up, the PMS sets up the request in the Meridian 1 PBX. The Meridian 1 PBX then handles all wake-up functionality in the same manner as it is currently executed.
- This application allows guests the option to set the AWU or DND feature themselves, which can significantly reduce the time an operator spends assisting with AWU and DND data entry.
- It contains a voice menu from which the user can select the desired service.
- Guest language is set by the PMS.
- Guests can add, modify or delete an automatic wake-up request.
- Guests are given confirmation of time requested for wake-up.
- Automatic Wake-up and Do Not Disturb can be ordered by staff on behalf of a guest; this service is password-protected.

Technical Specifications

System Compatibility	Meridian 1 PBX 11C Chassis, 11C Cabinet, 51, 51C, 61, 61C, 71, 81, and 81C; MSL-100, CS 1000 Series and CS 2100
Physical Location	Meridian 1 IPE shelf or a Gateway shelf
System Interfaces Options	DS-30X, CE-MUX, card LAN
Port Configurations	2 (Small), 4 (Medium), 8 (Large)
Number of Rooms Supported	200 (Small), 500 (Medium), 1000 (Large)
Administration Interface Options	Browser, Telephony and CLI
Power Requirements	Supported by module power supply; no external power required

Nortel Meridian 1/Nortel Communication Server 1000 Integrated DECT



Overview

Nortel Meridian 1/Nortel Communication Server 1000 Integrated DECT (Digital Enhanced Cordless Telecommunications) is a wireless, in-building/campus, private network-wide communications system. It is an integrated offering on the Nortel Meridian 1 or Nortel Communication Server 1000 system giving full feature access, high capacity and good spectrum utilization along with superior voice quality. The Integrated DECT product will operate on any release of X11 software from Release 23 with existing shelf components and backplanes.

The DECT architecture offers flexibility in its capacity in terms of both the total number of users and the concentration of users. The main component of the DECT system is the DECT mobility card (DMC), which provides the interconnection between the Nortel Meridian 1/ Nortel Communication Server 1000 switching features and the wireless system. Other components of the DECT system are radio fixed parts (RFP) base stations, wireless handsets and the Nortel Optivity Telephony Manager DECT application, plus an optional text messaging application.

Ideal For

- Individuals who spend time away from their desks
- Individuals without dedicated "office space"
- Individuals with multiple work areas
- Businesses in industries such as manufacturing, retail, professional services, education, hospitality and healthcare (GSM can be inappropriate near sensitive medical equipment)

Key Points

- Lightweight and Pocket-sized - A DECT handset is the mobile equivalent of the phone on a desk.
- Improves Productivity - With a Nortel Integrated DECT solution, key staff are always contactable, so urgent, on-the-spot decisions can be made ensuring minimum delay and improving internal communications. Employees are able to manage their day more effectively. With fewer missed calls the response time from your customer

service and sales teams improves, providing higher customer satisfaction.

- Reduces Costs - Not only will you see marked changes in your business productivity, but you'll also save money. Your phone bills will be lower because you won't need to make as many return calls; internal calls are free and any external calls made from your Nortel DECT handset are charged at the same rate as those made from your desktop wired phone.
- Integrated and Scalable - A Nortel Integrated DECT solution provides greater reliability, richer features and simpler management because it is a fully integrated solution. As your company grows and your needs change, the system can be expanded to include any additional requirements you may have, making it easy to tailor to your specific company needs.
- Superior Speech Quality - A Nortel Integrated DECT solution utilizes 32kbps Adaptive Differential Pulse Code Modulation (ADPCM) speech-encoding technique, which ensures that the DECT cordless phone delivers

excellent speech performance to the same standard as you would expect from a traditional wired telephone.

- Secure - DECT technology ensures maximum call security. The digitally encoded signal is encrypted and hence cannot be monitored by external intruders, guaranteeing total privacy for sensitive conversations.
- Flexible - The DECT solution leverages existing Nortel Meridian 1 or Nortel Communication Server 1000 platforms and complements circuit switched and IP telephony.

Features and Benefits

The DECT system utilizes 32Kbps ADPCM to offer the same speech quality as fixed networks. The DECT solution provides a wide range of features:

- **Hand-over:** You can walk and talk; your conversation is transferred automatically between strategically located base stations.
- **Twining:** You can easily swap from your DECT handset to your desk phone and continue your conversation with a single phone number for both sets. Alternatively, the system can allow privacy between the two sets, either on the same or different phone numbers.
- **Network Roaming:** You can move from one site to another within the entire campus/ private network with the same handset and telephone number.
- **Full roaming** - DECT offers seamless hand over.
- **Uniform Numbering plan:** Your DECT handset number can be the same as your desk one or different, but will always be part of the company numbering plan.
- **Pull-through Features:** You can access the same feature as on your desktop phone such as Calling Line ID, Calling Party Name Display, Conference, Call Transfer, Call Hold, Call Back, Call Pick-up, Call Park/Retrieve, etc.
- **Text Messaging:** You can send and receive text messages from/to your DECT handset.
- **Coverage:** The DECT system allows up to one million m2 per system (depending upon building characteristics).
- **Low Power Output:** DECT technology uses several advanced digital radio techniques to achieve efficient use of the radio spectrum with low risk of radio interference with sensitive equipment.
- **Wireless Encryption** - The digitally encoded signal cannot be monitored by external intruders, ensuring privacy.
- **Scalable** - This solution is scalable across Nortel Meridian 1 Option 11C chassis and cabinet, Option 61C, Option 81C, Communication Server 1000M and Communication Server 1000S and CS 1000E.
- **Fully Integrated Solution** - DECT cards are located within IPE module of Meridian 1 and CS 1000M and in media gateway of Communication Server 1000S, while in the CS 1000E the Integrated DECT solution is supported in the Media Gateway 1000T.
- **Nortel DECT Messenger** - The messenger function allows alarms and pre-configured text messages to be sent to a DECT handset from a wide variety of input sources, such as hard contacts, a serial input from an alarm system or an ESPA paging controller.

System capacity
(based on DMC8)

- Nortel Communication Server 1000 X21 Release 1
- Up to 640 handsets and 32 base stations
- Nortel Communication Server 1000M Release 3 and Nortel Communication Server 1000M Release 4
- Same as Nortel Meridian 1 Option 61C and Option 81C
- Nortel Communication Server 1000E Release 4
- Up to 1000 handsets and 56 base stations
- Nortel Meridian 1 Option 11C-Chassis X11 R23 and later
- Up to 640 handsets and 32 base stations
- Nortel Meridian 1 Option 11C- Cabinet X11 R23 and later
- Up to 640 handsets and 160 base stations
- Nortel Meridian 1 Option 61C and Option 81C X11 R23 and later
- Approximately 3000 handsets (based on typical office traffic levels) and 256 base stations

DECT base station	- Two base station options are available 6 simultaneous calls standard 12 simultaneous calls high capacity - Typical cell radius within a building 20–100m - Optional directional antenna - Small physical size: 235x172x45mm
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Technical Specifications

	4025	4060	4145 EX	DECT Industrial
				
Display	Large Display - 3 lines Alphanumeric display - 1 icon line plus 2 text lines	•5-line, 16-alphanumeric character display for icons, text- and context-sensitive soft keys	•Large Graphic Display - 4 lines Alphanumeric display - 3 text lines & 1 icon line Display backlight	•3 lines, 12 character alphanumeric display for icons, text- and context-sensitive soft keys
Features	- Visual voicemail and fax message waiting indication on handset with Nortel CallPilot - Built-in visual alerts for incoming calls - Calling line ID and Calling Party Name Display 50-name/number directory, including search facility - Pre-dial and number edit capability - Last 10-number redial and caller list including dial-back feature - Electro-luminescent backlight - High-quality hands-free functionality - Microphone mute for privacy and reduced ambient noise - Keypad locks for security	- Visual voicemail and fax message waiting indication with Nortel CallPilot - Built-in visual and vibrate alerts for incoming calls - Calling line ID and Calling Party Name Display 100-name/ number directory, including search facility - Support for DECT messaging with text and alarms - Pre-dial and number edit capability - Last-20-number redial and caller list including dial-back feature - Electro-luminescent backlight - High-quality full-duplex hands-free - Microphone mute for privacy and reduced ambient noise - Keypad locks for security - Compatibility with Microsoft Windows™ for desktop dialing	- Visual voicemail and fax message waiting indication on handset with Nortel CallPilot - Built-in visual alerts for incoming calls - Calling line ID and Calling Party Name Display 80-name/number directory, including search facility - Supports Text Messaging - Support for DECT messaging with text and alarms - Urgent Melodies (1-9) for urgent messages - Pre-dial and number edit capability - Last-10-number redial and caller list including dial-back feature - SOS Key - Microphone mute for privacy and reduced ambient noise - Keypad locks for security	- Voicemail message waiting 80 name directory - Incoming Call Log for 10 unanswered calls - Calling line ID 10 entry last number redial list - Vibration alert - Microphone mute - On hook/off hook dialing - Last-10-number redial and caller list including dial-back feature - Microphone mute - On hook/off hook dialing - Automatic encryption

	4025	4060	4145 EX	DECT Industrial
Battery Life	Extended battery life – 20-hours operational; 200-hours standby	Extended battery life – 15-hours operational; 200-hours standby	Extended battery life: 15-hours operational; 150-hours standby	10 hours talk time/100 hours standby
Languages	Spanish, French, English, Italian, Dutch, Swedish, Danish, Norwegian, Finnish, Portuguese and German	Spanish, French, English, Italian, Dutch, Swedish, Danish, Norwegian, Finnish, Portuguese and German	English, French, German, Italian, Spanish, Portuguese, Dutch, Swedish and Danish	English, German, French, Italian, Spanish, Dutch
Optional Accessories	- Belt clip - Easy clip - Carrying case - Desktop charger - Charger rack	- Belt clip - Easy clip - Carrying case - Headset - Desktop charger - Charger rack	- Belt clip - Safety clip - Carrying case - Desktop charger	- Belt clip - Safety clip - Headset
Technical Details	- Complies with ETU E.161, ETS300 329, ETS300 400, CTR 6, CTR 10, CTR 22 (DECT GAP compatible) - Operating frequency: 1880–1990 MHz 250 mW max transmitter output power 3 x standard AAA 850 (typ. 800) mAh NiMH battery - Operating temperature: 0° C to 45° C - Dimensions: 146 x 53 x 28 mm - Weight: 140 g	- Complies with ETU E.161, ETS300 329, ETS300 400, CTR 6, CTR 10, CTR 22 (DECT GAP compatible) - Operating frequency: 1880–1990 MHz 250 mW max transmitter output power 700 mAh NiMH battery - Operating temperature: 0° C to 45° C - Dimensions: 143 x 51 x 26 mm - Weight: 140 g	- ATEX approved for Europe - IEC approval for other regions - Compliant with EN 50014, EN 50020, EN 50281-1-1, EN 60529, IEC 60079-0 & IEC 60079-11 - Water & dust resistant to IP54 - Use battery type NO024967 only - Operating frequency: 1880–1990 MHz - Operating temperature: 0-40°C - Dimensions: 148 x 50 x 28 mm - Weight: 130 g incl. battery ± 10 g	- Handset volume: 203 cc - Dimensions: Handset: 145 x 52 x 27 mm - Charger: 53 x 71 x 8 - Operating temperature [RH at 40° C] - storage -30° to +60° C up to 95% - operation -10° to +55° C up to 90% - Weight (including batteries) - Handset: 140 g - Charger: 370 g
Systems Supported	Compatible with Nortel Communication Server 1000 & Meridian 1 PBX	Compatible with Nortel Communication Server 1000 & Meridian 1 PBX	Compatible with Nortel Communication Server 1000 Meridian 1 PBX & BCM	Compatible with Nortel Communication Server 1000 & Meridian 1 PBX

Market Information

The Nortel Integrated Applications portfolio of integrated web-accessible applications for Nortel Meridian 1 and Communication Server 1000 systems delivers flexible, scalable solutions to fit your business needs. As a suite or individually, Integrated Applications add a rich variety of features and services and deliver tangible and measurable cost reductions versus external service bureaus and third-party solutions providers.

Ordering Information

For further information, please contact your local Nortel representative.

> Nortel Wireless LANs

Nortel Wireless Local Area Network (WLAN) solutions enable enterprises and service providers to offer 802.11 wireless connectivity anytime, anywhere. Nortel's WLAN 2300 series represents the latest WLAN infrastructure technology and provides a cost-effective, flexible solution that delivers the performance, management tools, and resiliency required for delivering high-quality voice and multimedia applications over a wireless network. The WLAN 2300 series complements the WLAN 2202 Mobile Adapter and WLAN IP Telephony products to provide a turnkey voice over WLAN solution. Nortel's Wireless Mesh Network solution extends WLAN reach to the outdoors and other open spaces while providing cost efficiencies and expedited deployment using wireless backhaul technology.

- Nortel WLAN 2300 Series
 - Nortel WLAN Access Point 2330
 - Nortel WLAN Security Switch (2350, 2360, 2361, 2370, 2380)
 - Nortel WLAN Management Software 2300
- Nortel WLAN Mobile Adapter 2202
- Nortel WLAN IP Telephony
 - Handsets (2210, 2211, 2212)
 - Nortel WLAN IP Telephony Manager 2245
 - Nortel WLAN Application Gateway 2246
- Nortel Wireless Mesh Networks
 - Nortel Wireless Access Point 7220
 - Nortel Wireless Gateway 7250
 - Wireless Bridge 7230

Nortel Wireless Local Area Network (WLAN) 2300 Series



Overview

The Nortel WLAN 2300 Series is a complete 802.11 solution for enterprises wishing to deploy widespread wireless coverage for today's business, IP Telephony and converged multimedia applications. The solution combines the latest industry standards with a centralized architecture and advanced features to create a secure, cost-effective and highly scalable WLAN infrastructure. The WLAN 2300 Series includes the tools and features required for successful planning and implementation, whether deploying a first-time WLAN using a quick and simple approach, or graduating to a precisely engineered mobile infrastructure as part of a global enterprise mobility strategy. The Series' three primary elements include a multi-mode access point (AP), a portfolio of WLAN Security Switches and a WLAN Management Software system. Each plays a key role in the complete mobility solution.

- The Nortel WLAN Access Point 2330 - performs 802.11a/b/g mobile connectivity, encryption/decryption for wireless traffic, priority queuing and radio frequency (RF) monitoring, including rogue access point identification and containment. Access points exchange control and data traffic with their associated WLAN Security Switch.
- The Nortel WLAN 2300 family of security switches - controls the access points and performs key functions such as security, networking, quality of service (QoS) and roaming for mobile users. The WLAN Security Switch also correlates radio frequency data from multiple access points and coordinates their response to changing RF conditions and RF attacks.
- The Nortel WLAN Management Software system - is a comprehensive design and management tool that identifies ideal access point locations on detailed floor plans, configures all devices with a single click, and provides granular monitoring and reporting for complete visibility and control over the entire system.

Ideal For

- Enterprises wishing to deploy widespread wireless coverage for today's business, IP Telephony and converged multimedia applications
- Progressive Small/Medium businesses in industries like technology, finance, consulting, legal or others that are lead adopters of mobile technology and require the security of a high-end WLAN solution
- Mid-size enterprises to large global corporations looking to implement a WLAN corporate standard across all offices
- IP Telephony Convergence customers that require a high performance, resilient WLAN to support their applications

Business Challenges

- Are you interested in providing a consistent experience to users connecting and roaming to any location?
- Would you like tighter control and improved security for your mobile users and applications?
- Do you need the ability to grow your WLAN capacity over time in a cost-effective manner?

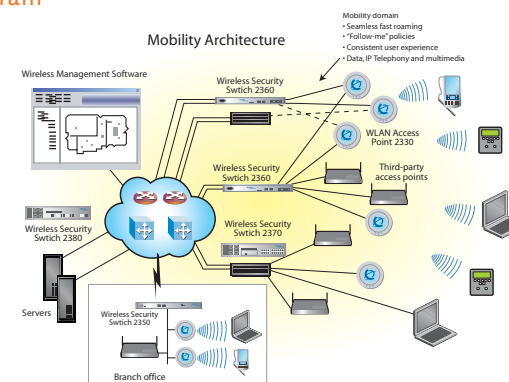
Typical Applications

- Corporate-wide WLAN installations in mid-large sized enterprises
- Transportation hubs such as airports, shipping yards, train stations and bus terminals that appreciate the ability for the WLAN 2300 series to run concurrent virtual service groups from a single WLAN infrastructure
- Multi-tenant units and service providers

offering a managed service in public areas for using virtual service groups with captive portals to resell internet connectivity

- Certain vertical markets active in WLAN: healthcare, education, finance, logistics and government segments have unique business problems solved by WLAN

Network Diagram



Key Points

Built to support Voice and Multimedia applications in today's networks

- Adheres to the latest QoS standards including SVP and WMM
- Minimizes the performance impact of 802.1x by offloading back-end AAA servers of key generation and management
- Fast, secure roaming among all APs with the minimal latency and jitter needed to support time-sensitive applications
- Dynamic RF management for service resiliency by protecting against unexpected interference, obstructions, outages and weak coverage zones
- Full n+1 redundancy of all network components to protect against service interruption

Flexible policy management keeps control over roaming users

- User-based policy management option for binding individual users with centrally defined AAA policies
- Security and QoS policies to follow users as they roam anywhere on the WLAN network

- Enforced access controls, VLAN/subnet assignments, bandwidth rate, QoS priorities and multicast memberships even if the user roams between floors and buildings
- The ability for administrators to assign time-of-day and location-based restrictions that block access from specific areas like parking lots, exam and emergency rooms

Easy implementation - from planning to production

- WLAN Management system so that network administrators have assistance in every phase of a WLAN project from planning and configuration through to monitoring, reporting, growth and ongoing operations
- A visual map of the ideal WLAN network including radio coverage, physical topology and AP locations
- Adjusts mappings for RF obstacles such as walls, pillars, windows and office partitions
- Produces a customized bill of materials for baseline implementation or hypothetical scenarios

- Switch and access point configurations for pushing out to all system elements with a single key-stroke
- Granular monitoring and customizable reporting keeps administrators on top of all activity for troubleshooting and support

Seamless deployment in any network

- Designed to operate as an overlay to existing IP networks without the need for network reconfigurations or expensive upgrades to core switch infrastructure
- Can be configured to enforce existing RADIUS authentication policies and extensions
- Only uses standard protocols that will not impact other devices
- Installed access points on any subnet or in any wiring closet, allowing the placement to be simple, convenient and focused on providing optimal wireless coverage
- Access points attached to their controllers across the network and self-configured
- Capability for one WLAN infrastructure to be securely partitioned to form up to 32 unique service groups, each with its own web-portal, security and QoS policies

Standards-based/Open Client approach for user and application compatibility

- Adheres to the latest IEEE and de-facto industry standards to ensure strong security and QoS while maintaining compatibility with user devices
- Supports security standards such as WPA, WPA2, 802.11i/802.1x with WEP, Dynamic WEP, TKIP, CCMP, EAP-TLS, TTLS and PEAP, PEAP-TLS
- Supports QoS standards including 802.1p & DiffServ, WMM and SVP
- Advanced features – such as dynamic RF management, roaming and user policy management – compatible with all 802.11 clients
- WLAN Management Software for easy planning by recognizing floor maps in all common formats including AutoCAD® DXF™, AutoCAD DWG, JPEG or GIF file types

Features and Benefits

Nortel WLAN Security Switch 2300 Series

The WLAN 2300 Series includes a family of four security switches, each designed to meet specific needs of enterprise-wide deployments. The portfolio breadth, combined with advanced features and a common management system, provides unparalleled deployment flexibility and scalability to meet the growing demands of mobile professionals. Each switch can be deployed and managed independently, or can participate with other 2300 Security Switches in large enterprise network deployments. In multiple switch architectures, client information and policies are shared among switches to permit fast roaming among all access points. Regardless of network size or topology, the WLAN Security Switch 2300 family can lower equipment costs substantially by offering the right-sized product for any deployment scenario.

Nortel WLAN Security Switch 2350



The WLAN Security Switch 2350 is the smallest switch in the 2300 Series and is ideally suited for extending WLAN services to small or branch office environments. The WLAN Security Switch 2350 auto-configures when first connected to the network and can control up to three access points. It offers the same features as the larger 2300 switches but in a smaller package.

Nortel WLAN Security Switch 2360 /2361



The WLAN Security Switch 2360 is ideally suited for mid-size office sites or wiring closet deployments and can control up to 12 access points that can be either connected directly to one of the eight Ethernet ports or indirectly through a Layer 2 or 3 network. A dual power supply option provides improved resiliency for converged services.

Nortel WLAN Security Switch 2370



The WLAN Security Switch 2370 is designed for dense deployments of up to 40 access points, which can either be directly connected to one of the 20 Ethernet ports or indirectly connected through a Layer 2 or 3 network. The 2370 adds dual Gigabit Ethernet uplink ports and dual hot-swappable power supplies for service resiliency.

Nortel WLAN Security Switch 2380



The WLAN Security Switch 2380 is the largest switch in the 2300 Series and is designed for large deployments and data center applications in enterprise and carrier environments. The 2380 can be licensed to control up to 120 access points, which are distributed across a Layer 2 or 3 network and connected through one of the four Gigabit Ethernet ports. Dual hot swappable power supplies provide superior resiliency for voice services.

Nortel WLAN Access Point 2330



The WLAN Access Point 2330 is a multi-mode 802.11a/b/g device that is controlled by the WLAN Security Switches and can be deployed in large numbers without creating a management burden. The 2330 is plenum-rated for ceiling installations and features an attractive enclosure that resembles a common smoke detector to blend in with office environments.

Nortel WLAN Management Software System

After deploying the WLAN 2300 system, the Administrator uses WLAN Management Software system for all the ongoing management and optimization. The tool coordinates RF sweeps to detect and locate rogues, with WLAN Management Software system displaying the newly discovered devices on the floor plan. The Administrator also uses WLAN Management Software system for user management. The tool locates users on the floor plan and displays the user's network usage statistics, roaming history and addressing details, summarizing the Identity-Based Networking services the system provides.

The WLAN Management Software system also provides the traditional management functions, detailing system-level events and statistics for the wired network, the air (RF) and users. WLAN Management Software system's RF topology mapping and coverage-verification tools simplify ongoing optimization, making it easy to adjust coverage areas or add new ones.

Feature Description	Benefit
Switched WLAN Architecture ('thin' AP model) • Switch offloads AP of networking, roaming and security functions • Device management is centralized • WLAN 2300 features a unique traffic flow architecture	• System approach forms the foundation for new capabilities such as RF management, inter-subnet roaming and location • Thin APs are less expensive than standalone APs • APs can self-configure for easy implementation
Standards-based security and QoS • 802.11 a/b/g • 802.11i, WPA/WPA2 (certification pending) • WMM (certification pending) • SVP (certification pending)	• Strong security and QoS capability while maintaining client interoperability
RF Management • Switch receives RF data from scanning APs • Switch/WMS identifies interference, coverage outages, 802.11 devices • Switch dynamically adjusts AP channel and power	• Self-optimization • Self-healing • Base technology for Rogue AP detection and 802.11 device location
Wireless Threat Protection • Guards against layer 2 radio vulnerabilities like DoS, flood, jamming attacks, etc. • Alerts administrators of attack and locates	• Complements 802.11i for improved service resiliency
Rogue AP Protection • Identifies unauthorized AP and maps location on floor plan • Launches containment measures from neighboring APs	• Complements 802.11i for improved service resiliency
User load balancing • Sends new users to alternate APs based on capacity utilization	• Improved performance and user experience for all clients
Fast Roaming • Special handling of encryption keys and authentication processing to avoid redundant authentication while roaming	• Minimizes latency and jitter when roaming • Delivers improved IP Telephony
Location Services • Locates and tracks active 802.11 devices	• Location-based authentication • Asset tracking • Site security
Resilient Design: • Dual Ethernet ports on Access Point 2330 • Redundant hot-swappable power supplies on switches • N+1 redundant architecture	• Improved reliability of WLAN service • Improved user up-take/service stickiness • Allows service providers to differentiate on SLA
Symmetrical traffic flow • Tunnels each user's session back to originating switch while roaming	• All applications continue to work when roaming • Multi-cast • "Push-to-talk" • IP, IPX, AppleTalk, etc. • Scalable - remains simple in large multi-switch deployments • Simplifies management and troubleshooting • Permits use of stateful firewalls in the flow - asymmetric flow can break firewalls
Broad Wireless Security Switch portfolio: • Each designed for a common deployment scenario • Common software, features and management	• No need to buy more product than required • Enables a corporate standard to be implemented across all regions and offices

Feature Description	Benefit
Wireless Security Switch 2350 Branch Office Switch • A small switch is deployed on-site to manage a few branch office APs • Fundamentally a different approach from deploying a "remote" thin AP	• Switch is local instead of somewhere else on the network across a WAN connection • WLAN works if WAN link fails • No firewall/VPN reconfigurations are required to support "thin" AP control protocols over WAN link • Faster switch responses translate into improved performance. Much faster authentication and roaming
Flexible policy management • By user, group, SSID, device, location, time-of-day, day of week • Security Policies - VLAN, L3/4 filters, roaming restrictions • QoS Policies - bandwidth, priority queuing • AAA Policies - server, backup, grouping or local	• Solution fits with existing policy architecture • Allows identity-based networking (user-based policies), which centralizes policies on backend AAA servers for easier management and scalability • Block access from parking lot, but not foyer • Restrict WLAN service to secured areas only after 5PM
Site Planning tool with WLAN Management Software 2300 • Imports existing floor plans - including common AutoCAD files • Calculates required number of APs and switches and their configurations • Identifies ideal AP locations on floor plan • Creates a bill of materials • Based on capacity and throughput requirements	• Takes the guesswork out of AP placement and configuration • Quicker time-to-service • Can mitigate the need for a costly site survey
Ekahau™ Site Survey tool integration • WMS 2300 can import site survey information	• Provides a very accurate RF map based on site survey results • More accurate planning and location services
Virtual Service Groups • Up to 32 per radio (64 per AP) • Each has unique SSID, VLAN, Subnet, AAA and policies. • Each can have a unique and customizable authentication web portal (captive portal).	• Share one WLAN infrastructure among multiple user groups • Owners of public infrastructure can resell wireless connectivity to service providers • Allows a provider-based virtual service group to offer Internet Telephony from enterprise WLAN
Controls third-party Access Points from Cisco and 3Com • Most features excluding RF management • Authentication, user policy enforcement and inter-subnet roaming • Cisco Aironet 350, 1100, 1200	• Faster time-to-service • Lower cost • Smooth transition
Scanning with external antennas • Allows for RF scanning to be performed with external antennas	• More accurate site planning through more accurate RF mapping • More accurate user location and rogue AP detection
802.1x/EAP Offload • The switch terminates and processes 90% of the EAP tasks • Offloads these implementations: EAP-TLS, PEAP and EAP-MD5	• Decreases load on back-end RADIUS servers • Allows for WLAN implementation w/ 802.1x without RADIUS modifications • Can perform local 802.1x without relying on WAN link
Guest Access Provisioning • A streamlined "front-desk" application for provisioning a temporary guest ID • Each ID can have access restrictions and time expirations	• Allows receptionist with no technical training to offer WLAN service • Controlled guest access provides greater security than "Guest" SSID • Can be used to give guests access to more than just the internet • Time expiration prevents lingering open accounts

Market Information

According to Gartner Group, the worldwide WLAN market opportunity exceeded \$1.5B in 2004 with the wireless switch segment contributing the fastest growth. This trend reflects a recent shift in customer preferences from distributed WLAN architectures that can be difficult to deploy, secure and manage to

centralized solutions like the WLAN 2300 series that combine a wireless switch with controlled access points. The WLAN 2300 is strongly differentiated to competitors through its ability to handle voice and multi-media traffic, providing a high-level of scalability and tight control over users and security.

Technical Specifications

	Nortel WLAN Security Switch 2350	Nortel WLAN Security Switch 2360/2361	Nortel WLAN Security Switch 2370	Nortel WLAN Security Switch 2380
Number of Fast Ethernet ports/ Power over Ethernet	2/1	8/6	20/20	20/20
Number of Gigabit Ethernet ports	–	–	2 GBIC	4 GBIC/ 1000BASE-T
Number of Access Points Supported	3	12	40	Licensed 40/80/120
Third Party AP Support	Yes	Yes	Yes	Yes
Form Factor	Small	1U rack mount	2U rack mount	2U rack mount
Power Supply	Single	Single (2360) Dual (2361)	Dual-redundant Hot-swappable	Dual-redundant Hot-swappable
Application	SMB/ branch office	Mid-size office/ Wiring Closet	Large Site / Wiring Closet/ Data Center	Data Center
Dimensions: (W x D x H):	1.25 in x 7.5 in x 5.75 in 3.2 cm x 19 cm x 14.6 cm	1.72 in x 17.4 in x 10.08 in 4.4 cm x 44.2 cm x 25.6 cm	3.5 in x 17.4 in x 18.2 in 8.8 cm x (W) 44.2 cm x (D) 46.2 cm	17.4 in x 18.2 in x 3.5 in 44.2 cm x 46.2 cm x 8.8 cm
Weight	1.5 lbs (0.7 kg)	8.5 lbs (3.8 kg) with one power supply 9.5 lbs (4.3 kg) with two power supplies	19.50 lbs (8.85 kg) with no power supply 22.75 lbs (10.32 kg) with one power supply 26.00 lbs (11.79 kg) with two power supplies	21.75 lbs (9.79 kg) with one power supply 25.00 lbs (11.25 kg) with two power supplies
Power	External Power Supply: Input: 100-150 VAC, 47-63 Hz, auto-sensing Output: 48 VDC, 0.75A Amperage draw maximums: At 115V (RMS): 0.8A At 230V (RMS): 0.4A	Power VAC range, Hz range: 90-132 VAC/180-264 VAC, 50-60 Hz, auto- sensing Amperage draw maximums: 115Vrms: 4Arms At 230Vrms: 2Arms	Power VAC range, Hz range: 90-250 VAC, 47-63 Hz to 350 watts, hot- swappable power supply Amperage draw maximums: At 120Vrms: 8Arms At 230Vrms: 3.5Arms	Power VAC range, Hz range: 90-250 VAC, 47-63 Hz to 350 watts, hot-swappable power supply Amperage draw maximums: At 120Vrms: 8Arms At 230Vrms: 3.5Arms

	Nortel WLAN Security Switch 2350	Nortel WLAN Security Switch 2360/2361	Nortel WLAN Security Switch 2370	Nortel WLAN Security Switch 2380
Operating Temperature	-10°C to +50°C (14°F to +122°F) Storage Temperature -20°C to +70°C (- 4°F to +158°F)	-10°C to +50°C (14°F to +122°F) Storage Temperature -20°C to +70°C (- 4°F to +158°F)	-10°C to +50°C (14°F to +122°F) Storage Temperature -20°C to +70°C (- 4°F to +158°F)	-10°C to +50°C (14°F to +122°F) Storage Temperature -20°C to +70°C (- 4°F to +158°F)

Nortel Access Point 2330	
Radio Support	802.11 a/b/g
Power over Ethernet (802.3af)	Yes
External antennas	Yes - (high-gain directional antennas)
Dimensions	Diameter: 6.6 in (16.76 cm) Height: 1.85 in (4.69 cm) Weight 12.5 oz (354 g)
Power	48VDC Power over Ethernet as per the 802.3af standard guidelines
Operating Temperature	0°C to +50°C (+32°F to +122°F) Storage Temperature: -20°C to +70°C (-4°F to +158°F)

Ordering Information

For further information, please contact your local Nortel representative.

Nortel Wireless Local Area Network WLAN Mobile Adapter 2202



Overview

The Nortel Wireless Local Area Network Mobile Adapter 2202 complements the WLAN 2300 system and provides a cost-effective mobility upgrade for existing laptops or PDAs.

Ideal For

- Customers investing in WLAN who would like to upgrade an inventory of existing laptop computers or PDAs for wireless networking
- Traveling employees that need to connect to the corporate network to access information and resources
- Enterprises wanting to upgrade their existing WLAN Adapters to support 802.11i

Business Challenges

- Improve the productivity of traveling employees
- Extend the life of existing assets
- Minimize the cost of equipping employees with mobile connectivity

Typical Applications



- The WLAN Mobile Adapter 2202 provides instant wireless networking for Laptop computers and PDAs.

Key Points

The WLAN Mobile Adapter 2202 provides 802.11 a/b/g connectivity for complete user mobility and flexibility. The credit card size multi-mode network adapter can fit into a laptop computer or PDA.

Features and Benefits

High speed wireless LAN connection – The Mobile Adapter 2202 supports up to 54 Mbps data rate for 802.11 a or 802.11g in standard mode.

Enhanced “Super A/G mode” – The Mobile Adapter 2202 supports enhanced high-speed data throughput up to 108 Mbps for 802.11a or 802.11g in Super A/G mode.

Backward compatible – The Mobile Adapter 2202 is backward compatible to the IEEE 802.11b WLAN infrastructure.

Enhanced Security – The Mobile Adapter 2202 provides wireless data encryption with 64-bit, 128-bit, or 152-bit encryption.

Support for WPA – The Mobile Adapter 2202 supports WPA (Wi-Fi Protected Access).

Hardware AES Accelerator – The Mobile Adapter 2202 includes hardware acceleration for Advanced Encryption Standard (AES).

Built-in dual diversity antenna – The Mobile Adapter 2202 card has a built-in dual diversity antenna.

Seamless roaming – The Mobile Adapter 2202 supports seamless roaming within the IEEE 802.11a, 802.11b, or 802.11g WLAN infrastructure.

Adjustable power levels – The Mobile Adapter 2202 provides adjustable power levels for cell sizing on 802.11a/b/g.

Technical Specifications

Mobile Adapter 2202	
Frequency Band	802.11a Radio: 5 GHz 4.90 - 5.00GHz for Japan 5.15 - 5.25GHz (lower band) for US/Canada, Japan 5.25 - 5.35GHz for US/Canada 5.4 - 5.725GHz for Europe 5.725 - 5.850GHz for US/Canada 802.11g Radio: 2.4 GHz 802.11b Radio: 2.4 GHz USA - FCC 2412-2462MHz (Ch1-Ch11) Canada - IC 2412-2462MHz (Ch1-Ch11) Europe - ETSI 2412-2472MHz (Ch1-Ch13) Japan - STD-T66/STD-33 2412-2484MHz (Ch1-Ch14) Frequency selection will vary according to current local regulations.
Operating Channels Supported	2.4 GHz (802.11b) US/Canada: 11 (1 - 11 with 3 non-overlapping channels) Major European countries: 13 (1 - 13 with 3 non-overlapping) Japan: 13 (1 - 13) 5 GHz (802.11a) US/Canada: 12 non-overlapping channels 5.15 - 5.35 GHz, 5.725 - 5.825 GHz Major European countries: 19 non-overlapping channel 5.15 - 5.35 GHz, 5.47 - 5.725 GHz Japan: 4 non-overlapping channels 5.15 - 5.25 GHz 802.11g US/Canada: 11 channels in base mode ETSI, Japan: 13 channels Channel selection will vary according to current local regulations.
Operating Voltage	DC operating voltage: 3.3V nominal, 3.0 V minimum, 3.6 V maximum The power supplied to the WLAN-Mobile Adapter 2202 shall not exceed 15W under normal or fault operation.
Power Consumption (3.0V nominal)	11a (Normal):Tx: 1680 mW; Rx: 810 mW; Standby: 60 mW 11a (Turbo):Tx: 1800 mW; Rx: 930 mW; Standby: 60 mW 11g (Normal):Tx: 1500 mW; Rx: 840 mW; Standby: 60 mW 11g (Turbo):Tx: 1620 mW; Rx: 930 mW; Standby: 60 mW 11b (Normal):Tx: 1470 mW; Rx: 750 mW; Standby: 60 mW
Current Consumption	11a (Normal):Tx: 560 mA; Rx: 270 mA; Standby: 20 mA 11a (Turbo):Tx: 600 mA; Rx: 310 mA; Standby: 20 mA 11g (Normal):Tx: 500 mA; Rx: 280 mA; Standby: 20 mA 11g (Turbo):Tx: 540 mA; Rx: 310 mA; Standby: 20 mA 11b (Normal):Tx: 490 mA; Rx: 250 mA; Standby: 20 mA

Mobile Adapter 2202	
Output Power	Worldwide 2.4 GHz: 18 dBm (~65 mW) peak power US 5 GHz a. 5.150 - 5.250: peak power to 50mW (17dBm) per FCC 15.407 specification (UNII band operation) b. 5.250 - 5.350: peak power to 250mW (24 dBm) per FCC 15.407 specification (UNII band operation) c. 5.470 - 5.725: not allowed d. 5.725 - 5.850: peak power to 1W (30 dBm) per FCC 15.247 specification (ISM band operation) Europe 5 GHz a. 5.150 - 5.250 and 5.250-5.350: European regulations limit power; this limitation varies by current local regulations b. 5.470 - 5.725: European regulations limit power; this limitation varies by current local regulations Japan 5 GHz a. 5.150 - 5.250: Output power varies according to current local regulations b. 5.250 - 5.350: not allowed c. 5.470 - 5.725: not allowed d. 5.725 - 5.825: not allowed Maximum power setting will vary according to current local regulations.

Ordering Information

For further information, please contact your local Nortel representative.

Nortel Wireless Local Area Network (WLAN) IP Telephony

Overview

Nortel WLAN Handsets 2210, 2211 and 2212 are mobile phones for workplaces with Nortel communication servers. Nortel WLAN Handsets reside on the wireless LAN with other wireless devices using direct sequence spread spectrum (DSSS) radio technology. They operate over an 802.11b wireless Ethernet LAN providing users a wireless voice over IP (VoIP) telephony extension, sending and receiving packets at up to 11 Mbps. Quality of service on the wireless LAN for IP Telephony is provided through the WLAN Telephony Manager 2245. The WLAN Application Gateway 2246 is an open application interface (OAI), which enables third-party software applications to communicate with the Nortel WLAN Handsets.

By seamlessly integrating with the infrastructure IP telephony system, wireless telephone users are provided with high-quality mobile voice communications throughout the workplace. The wireless telephone gives users the freedom to roam throughout the workplace while providing all the features and functionality of an IP desk phone. The Nortel WLAN IP Telephony Handset is one of the components of the Nortel WLAN IP Telephony Solution.

Ideal For

- Small, mid-size and large enterprises that are looking to implement a wireless LAN infrastructure for enhanced productivity
- Organizations in industries such as healthcare, education and government, where mobile access to online information is a key business requirement
- Service providers who plan to have an 802.11 WLAN offering

Business Challenges

Many organizations have "mobile" staff who need to stay in touch no matter where they are in the campus. These mobile personnel need the ability to stay in constant contact, cover more ground, answer questions quickly and make faster decisions. With WLAN Handsets they can easily stay in touch with customers, co-workers, clients, patients and suppliers - communication is streamlined and business moves more quickly.

Typical Applications

The Nortel WLAN Handsets 2210, 2211 and 2212 offer more than just telephone communication. Utilizing Nortel WLAN Application Gateway 2246, the handsets can function as two-way messaging devices allowing integration with other enterprise systems to provide mobile workers with access to critical information.

- Access critical databases
- Control equipment remotely
- Connect to the Internet
- Send and receive messages, faxes and email
- Integrated Applications including Nurse Call (when a computer detects an alarm, it rings your phone)

Key Points

- Leverages wireless LAN infrastructure for voice and data applications
- Dramatically improves mobility, responsiveness and productivity
- Superior voice quality on converged wireless networks
- Simple to operate without extensive training

- Provides all the features of a wired telephone set
- Soft-key feature access
- Audible and vibrating ringers
- Enterprise mobility when used with Nortel WLAN 2300 Infrastructure

Features and Benefits

Nortel WLAN Handset 2210



A lightweight, durable handset, specifically designed for mobile workplace use within a facility using supported Nortel IP telephony call servers and 802.11b access points (APs) in a wireless LAN. This compact handset offers features and accessories that address the needs of a variety of businesses at an attractive price. The WLAN Handset can receive calls directly, receive transferred calls, transfer calls to other extensions and make outside and long distance calls (subject to the restrictions applied in the facility). The WLAN Handset is solely for use on-premise; they are not cellular or satellite phones. It has a standby time up to 40 hours and talk time of up to four hours.

Nortel WLAN Handset 2211



Engineered for demanding environments, the industrial-grade durable design has all the features of the Nortel WLAN Handset 2210, in addition to 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.

To reduce the effects of broadcast and multicast traffic from devices in other network segments, the wireless LAN can be placed on a separate VLAN or subnet. The handset is small enough to be highly mobile, yet rugged enough for heavy usage.

The Nortel WLAN Handset 2210 has features similar to the Nortel IP Phone 2004, including:

- 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
- Message waiting indication/voice mail access
- Group call
- Make set busy/ACD not ready
- Multiple appearance DN/single call/multiple call
- Multiple DNs on a single set
- Page
- Call hold
- Last number redial
- Speed call – system

In addition, it supports wired equivalent privacy (WEP) as defined by the 802.11b specification.

Nortel WLAN Handset 2212



- Integrated VPN Client-compatible with Nortel VPN Gateways that can be used both within and external-to-campus
- Back-lit display for 24-hour use
- Resistant to liquids
- Security - 40 bit WEP, 128 bit WEP, Cisco FSR, WPA-PSK, WPA2-PSK
- Quality of Service

- SVP in conjunction with IP Telephony Manager 2245
- WMM subset of 802.11e support
- Familiar Feature Set - IP Phone 2004 emulation
- 4hrs Talk Time / 70hrs Stand-By
- Open Application Interface (OAI) support

The WLAN Handsets provide the richest functionality and are designed for a broad range of enterprise applications, from general office to industrial to vertical markets such as healthcare, retail, education and hospitality. These compact handsets offer a rich set of features including a high-resolution graphic display, menu-driven functions and messaging capability, all within a light, ergonomic design. Push-to-talk functionality is available in the industrial-grade WLAN Handset 2211 for broadcast communication between employees, eliminating the need for two-way radios or walkie talkies.

The lightweight Nortel WLAN Handsets are extremely simple to use, require minimal training and are durable enough to withstand the rigors of workplace use. The rugged monolithic design has no moving parts or external antenna so there is nothing to break or to come loose. Batteries may be quickly swapped without tools, for continuous service in critical environments including healthcare. A complete set of accessories is available to suit users in a wide variety of applications, including headsets, chargers and carrying cases.

WLAN Handset features include:

- Standby time up to 40 hours
- Extended talk time up to four hours
- 802.11b standard-compatible
- Seamless integration with Nortel Communication servers telephone systems
- Handsets are firmware upgradable over the air
- Superior voice quality on converged wireless networks
- Simple to operate without extensive training
- Provides most of the features of a wired telephone set
- Soft-key feature access
- Audible and vibrating ringers

- 802.11b standard-compatible
- UNISim VoIP protocol support
- Text messaging support via open application interface (OAI)
- Easy handset configuration with Configuration Cradle accessory
- Push-to-talk mode (2211 only)
- Audible and vibrating ringers
- Integrated TFTP client DHCP or static IP addressing
- Personal Directory, Corporate Directory, Callers List and Virtual Office with CS1000

Nortel WLAN IP Telephony Manager 2245



A network appliance that works with the AP to provide quality of service (QoS) on the wireless LAN. UNISim is a proprietary protocol developed by Nortel for communication between a Nortel IP phone and a Nortel call server. All UNISim packets to and from the Nortel WLAN Handsets 2210, 2211 and 2212 pass through the Nortel IP Telephony Manager 2245 and are encapsulated for prioritization as they are routed to and from the supported Nortel IP telephony solution.

The Nortel WLAN IP Telephony Manager 2245 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 Nortel IP Telephony Manager 2245, thus ensuring high-quality voice in a mixed client environment. Once 802.11e is ratified, Nortel will adopt the new specification.

Nortel Application Gateway 2246



An OAI that enables third-party software applications to communicate with Nortel WLAN Handsets 2210 and 2211, OAI is a messaging protocol interface that is open to any developer. Many applications are currently integrated with OAI and 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.

Market Information

Nortel is the only vendor in the industry with the wealth of experience in voice, data, wireless and security technologies for enterprises and service providers. This experience uniquely positions Nortel WLAN IP Telephony as best in class for its ability to deliver a mobile network that provides a secure, adaptable, multi-service solution.

Nortel is exclusively positioned to address the requirements that focus on security, manageability and high availability. Our core strengths and extensive R&D expertise across the wireless, service provider and enterprise businesses are being leveraged to extend this knowledge into the wireless enterprise market. Nortel is the only vendor that can deliver a secure wireless platform that spans the world of private and public wireless networks.

Ordering Information

For further information, please contact your local Nortel representative.

Nortel Wireless Mesh Network Portfolio



Overview

Nortel Wireless Mesh Network solution is a new, enhanced WLAN architecture that redefines the boundaries of WLAN technology, enabling wireless connectivity for enterprises and public end users. The Nortel Wireless Mesh Network is well suited for providing broadband wireless access in areas that traditional WLAN systems are unable to cover and where the seamless voice and mobility capabilities of cellular systems are not required. Nortel Wireless Mesh Network includes a peer-to-peer architecture - with smart antennas, integrated routers and adaptive routing as well as security capabilities - to backhaul data wirelessly to wired broadband networks. With powerful business models for government applications, enterprises and service providers, this latest addition to Nortel WLAN portfolio brings together the best of our wireless and wireline solutions for reliable wireless access.

The Nortel Wireless Mesh Networks solution consists of these key elements:

- **Nortel Wireless Access Point 7220** - A wireless mesh is formed among multiple Nortel Wireless Access Point 7220s by utilizing auto-discovery and self-routing technology. This unit also acts as a WLAN Access Point for user access.
- **Nortel Wireless Gateway 7250** - This device provides user mobility and data traffic security between access points.
- **Nortel Wireless Bridge 7230** - A cost effective point-to-point broadband wireless transmission system, it provides Ethernet services for transmission over 5.8 GHz unlicensed bands and is suitable for deployment in FCC regulated countries.
- **Nortel Enterprise Network Management System** - Software management capability provides centralized facilities for monitoring and managing network operations.

Ideal For

The Nortel Wireless Mesh Network portfolio solution is ideal for WLAN coverage of large open areas, both indoor and outdoor, and should be considered where Ethernet cabling is prohibitive to install or to minimize the requirement for leased backhaul. Deployment scenarios that are particularly well suited for Nortel Wireless Mesh Network include:

- Campus environments (enterprises and universities), manufacturing, shopping centers, airports, sporting venues, special events
- Military operations, disaster recovery, temporary installations, public safety
- Municipalities, including downtown cores, residential areas, parks
- Carrier managed service in public areas or residential communities

Business Challenges

- Do you need to provide Internet access outdoors but are finding cabling costs and leased backhaul costs too expensive?
- Do you need to provide Internet access indoors but don't have an existing LAN and installing cabling is prohibitive?
- Do your current deployed hot spots satisfy your user's desire for ubiquitous access or for mobility?
- Do you want to extend your LAN with WLAN technology but are concerned about security?
- Do you need to quickly deploy a network or install a temporary network at a low cost?
- Do you require a centralized management platform to monitor, configure and control your WLAN deployment?
- Do you want a solution that will leverage consumer devices (wireless handsets, personal

communications devices, etc) that are inexpensive, readily available and already exist in large numbers in the market?

- Do you want to offer broadband access in a large area without having to invest in expensive radio spectrum?

Typical Applications

Areas where traditional WLAN systems are unable to cover and where the seamless voice and mobility capabilities of cellular are not required. Some examples are:

- Higher education – cost-effective campus-wide university coverage for faculty and students
- Manufacturing – wireless data applications for improved efficiency and overcoming building infrastructure challenges
- Public areas – broadband connectivity for transient users with 802.11 wireless enabled laptops and PDAs in airports, hotel, convention centers, shopping malls, sporting venues, special events, etc.

Network Diagram

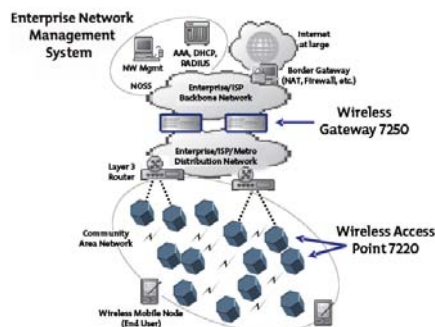


Figure 1: Typical network deployment



Figure 2: The right solution for each customer environment

Key Points

- Uses standard IEEE 802.11 technology
- Enables WLAN deployment and simplified coverage for vast open areas, both indoor and outdoor
- Brings "hotspots" together into a community area network (CAN), providing larger homogenous coverage and seamless mobility within the CAN
- Eliminates the need for extensive Ethernet cabling or leased lines through the use of wireless communication between access points in the mesh network
- Enables wireless backhaul using directional antennas in a circular array; directional antennas have a high gain and provide greater coverage and throughput while minimizing interference
- Auto-configuration and centralized management capabilities to simplify network operations
- Avoids service outages by providing efficient routing using auto-discovery and self-healing algorithms
- Provides a highly secure environment for both end users and the network

Features and Benefits

Nortel Wireless Mesh Network solution provides a cost-effective method for extending WLAN coverage more broadly into business and end user markets:

- Based on unlicensed 802.11 technologies, the Nortel Wireless Mesh Networks solution allows service providers to add wireless broadband services to their portfolio without requiring them to invest in expensive radio spectrum.
- Building on existing and growing acceptance of using wireless technology for end user and business applications, service providers and enterprises alike can leverage consumer devices (wireless handsets, personal communications devices, etc), that are inexpensive, readily available and already exist in large numbers in the market.
- The Nortel Wireless Mesh Network solution uses wireless links for backhaul, allowing enterprises or service providers to install WLAN with a

minimal amount of new or additional Ethernet cabling or other backhaul facilities.

- In the case of service providers, using wireless links for backhaul reduces the ongoing costs of leasing facilities for data transport.
- Service providers and enterprises can now expand WLAN coverage to areas where network limitations or cost made it prohibitive with other solutions.

The Nortel Wireless Mesh Network solution provides a secure platform for WLAN access and is highly flexible in terms of capacity, coverage and availability:

- The solution includes the latest security standards to protect user access and protects both the network and the user by providing security on the wireless transit links between access points.
- Since the Nortel Wireless Mesh Network solution provides self-organization and auto-configuration capability, increasing capacity, coverage, and/or availability simply means deploying more Nortel Wireless Access Point 7220s.
- Minimal cabling is required, so setting up temporary installations for emergencies, special events, etc., is easy to do.

This solution provides specific benefits for enterprises, service providers, wireless Internet service providers (WISPs) and multi-layers of government (federal/municipal).

- Enterprises – the Nortel Wireless Mesh Network solution is ideal for WLAN coverage of large open areas, both indoor and outdoor, and should be considered in areas where Ethernet cabling does not exist and is prohibitive to install.
- Service providers – the Nortel Wireless Mesh Network solution enables new revenue opportunities through differentiated service offerings, extended service reach, and increased usage of high speed data into existing and new markets.
- WISPs – the Nortel Wireless Mesh Network solution offers rapid, flexible and cost-effective deployment to provide community-based high-

speed wireless Internet access as an enhancement or alternative to dial-up, DSL, or cable modem service.

- Government – the Nortel Wireless Mesh Network solution allows federal, municipal, or homeland security entities to cost-effectively leverage the benefits of WLAN access in a wide range of areas. Some examples are:
 - Improved productivity of public safety and utility employees by moving the office to the field.
 - Enhanced security coverage at ports and border crossing areas.
 - Permanent or temporary wireless access for disaster recovery, command posts, etc.

Market Information

Nortel Wireless Mesh Network solution is designed to help drive significantly reduced costs for transport of high-speed wireless data from Wi-Fi networks to broadband networks, building on Nortel's vision to deliver wireless everywhere. The Nortel Wireless Mesh Network provides a cost-effective, secure solution that is enabling new business models for wireless LAN. Nortel is leveraging its leadership as one of the industry's most innovative wireless data network providers to deliver secure, seamless, wireless roaming capabilities across converging public and private networks, as well as hotspot environments to end users, demonstrating "Business without Boundaries."

Technical Specifications

7220 Access Point	
Wireless AP 7220 Access Link 802.11b (2.4 Ghz) Radio System	Center frequency – 2412 MHz to 2462 MHz (i.e., North America) Data rate: 11 Mbps max – Supports 1, 2, 5.5, 11 Mbps (IEEE 802.11b) – IEEE 802.11b standard rates Access antenna options – Co-linear whip, 5 dBi nominal antenna, SMA connectors – PIFA integrated antenna, 1 dBi nominal SMA connectors Radiated EIRP – +21 dBm typical (PIFA integrated antenna) – +25 dBm typical (co-linear whip antenna)
Wireless AP 7220 Transit Link 802.11a (5 Ghz) Radio System	Center frequency – 5740 MHz to 5840 MHz Data rate: 54 Mbps max – Supports 6, 9, 12, 18, 24, 36, 48, and 54 Mbps – IEEE 802.11a standard rates Antenna system gain from radio module card inside the unit – 10 dBi nominal Radiated EIRP – +24 dBm typical @ 54 Mbps – +28 dBm typical @ 6 Mbps
Environmental Specifications	• Operating temperature range: - 40°C min, 50°C max
Regulatory	• Weather rating: NEMA 4, IP56/Category 2 testing • Safety: UL, CSA • Emissions/radio: FCC Class B, Part 15, RSS 210

7220 Access Point	
Hardware Specifications	• Wired network interface: Auto sensing 10/100BaseT • Ethernet, 1.5kV surge protection per IEC60950 • Power input nominal: 100V - 240V AC (45Hz – 65Hz) • Power consumption Operating: - Indoor or outdoor > 0°C 8W typical - Outdoor < 0°C 8W – 14W (- 40 0°C) Startup: - Indoor or outdoor > 0°C 8W typical - Outdoor < 0°C 24W (short duration) - 8W – 14W (- 40 0°C) • Dimensions (without mounting brackets or antennas) - 300mm (12 inches) tall x 200mm (8 inches) diameter • Weight: 2.4 kg (5.3 lbs) • Color: Gray
Optional Accessories	• Mounting brackets (right-angle or straight horizontal attachment) • 25m, CAT5 Ethernet cable for network access point (NAP) operation (indoor/outdoor version) • Street light photo-electric control power tap 'luminaire' 120/208/240 V • 13dBi and 18dBi TL external antennas
Component Specifications	
Standard	• 128 MB memory • Processor – 850 MHz • PCI expansion slot – one (available for additional Ethernet interface or hardware accelerator card) • LAN/WAN interfaces - Two 10/100 BaseT Ethernet - Management/console (DB9)
Optional	• One additional 10/100 BaseT Ethernet interface (provides additional LAN/WAN connectivity, if required by network design) • 128 MB RAM upgrade • Hardware encryption accelerator card
Physical Specifications	• Length: 21 in. (53.3 cm) • Width: 17.25 in. (43.8 cm) • Height: 3.5 in. (8.9 cm) • Weight: 10.0 lb. (4.5 kg)
Operating Environment Specifications	• Electrical: 90-264 VAC, 2.0 @ 90 VAC, 47-63 Hz • Temperature: 32°-104° F (0°-40° C) • Relative humidity: 10-90% non-condensing
7230 Wireless Bridge	
Data Rate	Up to 48 Mbps
Transmission Range	Up to 25 miles (40 km) with integrated antennas Up to 50 miles (80 km) with optional external antennas
Frequency	5.725 – 5.850 GHz
Channel Bandwidth	20 MHz
Modulation	OFDM – BPSK, QPSK, 16QAM, 64QAM
Transmit Power	FCC: 18 dBm (max)
Physical Dimensions	Outdoor Unit (with integrated antenna) Height 305 mm / 12 in Width 305 mm / 12 in Depth 58 mm / 2.3 in Weight 1.5 kg / 3.3 lb
Environment	Outdoor Unit and External Antenna: Temperature: -35-60°C/-31-140°F

Ordering Information

For further information, please contact your local Nortel representative.

> Nortel Web and Web Content Switching

Nortel Web Switches have been number one in the fixed Layer 4-7 switch market position for five years straight (Dell'Oro). They consistently outperform all other manufacturers in the content switching space and prove that brains and muscle are important. Enterprises, hosting and content providers, and e-businesses alike will appreciate the scalability and robustness of the Nortel Ethernet Routing Switch Web Switching Module, which provides the confidence that comes from using the best of breed.

Nortel's best-in-breed portfolio of application switches allows enterprises to contain and reduce operating costs and to defer or eliminate upgrades to the server and application platforms. These Nortel switches deliver functionality and application performance – and they maximize return on investment for the enterprise. The Nortel Application Switch, available in fast Ethernet and gigabit Ethernet models, improves business productivity and simplifies operations while protecting the organization from denial of service attacks and application abuse. This Nortel switch portfolio also helps service providers efficiently enable differentiated services for businesses.

- Nortel Ethernet Routing Switch Web Switching Module (WSM)
- Nortel Application Switch 3408
- Nortel Application Switch 2424
- Nortel Application Switch 2424-SSL
- Nortel Application Switch 2216
- Nortel Application Switch 2208

(WSM) Nortel Web Switching Module



Overview

Nortel's award-winning L4-7 Switches are industry trusted content switches designed specifically to meet the needs of demanding businesses, delivering Layer 2 and 3 switching, plus advanced Layer 4 through 7 processing with full wire-speed throughput on every port. Nortel L4-7 Switches offer local and global server load balancing, application redirection, device load balancing (such as firewall, cache, VPN, link, SSL accelerator, etc.), active-active high availability configurations, bandwidth management, class of service and sophisticated security services (denial of service and application abuse protection, level 7 deny filters, etc.).

The Nortel Ethernet Routing Switch Web Switching Module (WSM) leverages the carrier-grade reliability and high port density of the Nortel Ethernet Routing Switch 8600 and enables the application switching on any port within the system using sophisticated Layer 4 through 7 processing. It contains many of the capabilities of the award-winning stackable Nortel Application Switches in a modular format that is affordable, scalable and easy to customize for every user's unique needs. This combination creates a complete, high capacity, carrier-class switching system of unprecedented scale. New features within the code include enhanced health checking capabilities, intrusion detection system load balancing, an increase in access filters and the ability to perform switching based on a combination of multiple Layer 7 attributes among others. The Nortel WSM has four external gigabit SX Ethernet or 10/100 TX ports. Multiple modules (up to six) can be installed into a single 10-slot chassis. The Nortel Ethernet Routing Switch 8600 that is enabled with a Nortel WSM provides a high-density application switching platform with the ability to support up to 340 10/100 Mbps or 116 10/100/1000 Mbps ports that are Layer 2 through 7 enabled.

Ideal For

The Nortel Ethernet Routing Switch 8600 with a Nortel WSM is ideal for enterprises, hosting and content providers, e-businesses and service providers that require a high performance switching solution for IT data centers, server farms, network and hosting infrastructures. Further, any business with an existing 8600 can easily turn its current high-density Layer 3 switches into a highly intelligent, content-aware application switch with full carrier-class resilience.

Business Challenges

Any business building highly scalable Web or network infrastructures or requiring the ability to intelligently manage and control the flow of data will benefit from this product. Load balancing services on any TCP or UDP port, content

switching and bandwidth management are key services of Nortel L4-7 Switches. In addition, deployment of L4-7 switches is the key enabler for value added services such as caching, SSL offload, high availability and content routing.

Typical Applications

In order to provide the intelligence, scalability, resilience and resource optimization to any network, data center or Web/application server, the Nortel WSM offers many applications that can be run concurrently on a single switch. These applications include:

- Server load balancing
- Global server load balancing
- Cache redirection
- Application redirection (including SSL)
- Bandwidth management
- Content intelligent load balancing

- Firewall load balancing
- High availability
- Streaming media load balancing
- Intrusion detection load balancing
- Wireless load balancing
- VPN load balancing
- Domain name service Layer 7 load balancing
- Layer 7 deny filtering for network and device protection (Web Switches only)
- Denial of service protection
- High speed filtering and NAT
- Application abuse protection

Key Points

- Combines the port capacity and density of the Ethernet Routing Switch 8600 with Nortel content-aware switching technology to turn any existing Layer 2-3 Ethernet 8600 platform into a highly intelligent, content-aware device for Layer 2-7 Web switching
- Provides local and global server load balancing and health checks to optimize existing server infrastructure and minimize costs
- Load balancing and application redirection combined with Layer 3 and 4 resilience (VRRP) to facilitate improved application availability and a fully redundant Nortel Ethernet Routing Switch 8600
- Enabled firewall and VPN load balancing, which can run simultaneously with server load balancing for economical security deployment without bottlenecks
- Content intelligent switching and true session-level persistence for delivering maximize profitability while minimizing infrastructure impact
- Enhanced security without degrading site performance via content filtering, advanced Layer 4-7 Delayed Binding and industry leading application support for firewall, VPN and Intrusion Detection System (IDS) load balancing
- Meters, controls and accounts for bandwidth use – by client, server farm, virtual service, application, user class, content type and other traffic classes – and supports guaranteed minimum, metered available and maximum burst bandwidth rates

- Integration into the Nortel Ethernet Routing Switch 8600 for network device consolidation and ease of management
- Due to an array of line cards, allows connectivity flexibility to multiple technologies including Ethernet 10/100, gigabit Ethernet, CWDMM, ATM and POS for content intelligence regardless of connectivity type
- Supports unique features to enable new, highly profitable services such as streaming media, wireless Internet and intrusion detection system load balancing
- Sophisticated security services such as denial of service and application abuse protection, Layer 7 denial filters, high-speed filtering and NAT

Features and Benefits

- High-performance switching
- Server, firewall, cache, WAN gateway, virtual private network, wireless application protocol, real-time streaming protocol, domain name service and intrusion detection server load balancing
- Full inspection of URLs, cookies and host headers across multiple requests and responses
- TCP, UDP, HTTP, FTP, SSL, SMTP, LDAP, DNS, RADIUS, WAP, RTSP, Telnet and NNTP and IP server load balancing
- Application redirection for any traffic type, including wireless
- Persistent connections using multiple Layer 4 through Layer 7 parameters
- Comprehensive server health checks for content verification and availability
- Gigabit-class, content-intelligent bandwidth management enables SLAs and usage-based services
- Bandwidth, link, hash, least connections, maximum connections and round robin load balancing metrics for unparalleled infrastructure optimization
- Full network address translation enables multi-site load balancing and traffic redirection

- Global server load balancing to distributed servers based on health, user proximity, server weights and response time
- Virtual matrix architecture enables dynamic utilization of all processors and memory
- Complete site redundancy via active-active, active-standby, hot-standby and stateful fail over for high availability
- Up to 256 virtual servers per module
- Up to 1024 application servers per module
- Up to 1024 services per module
- Up to 2K packet filtering rules per port
- Up to concurrent 512,000 Layer 4-7 sessions per module

Market Information

Many award-winning Nortel Application Switch features are delivered and enhanced with the Nortel Ethernet Routing Switch Web Switching Module for the Nortel Ethernet Routing Switch 8600. The Nortel WSM leverages the same OS software platform as Nortel switches, which is used across all Nortel content switching products. In addition, the use of the Nortel Ethernet Routing Switch 8600 allows the business to benefit from the rich feature set and performance provided by this platform. The ability to connect to an array of different technologies allows for content networking and application switching to be deployed into new areas providing enhanced network optimization and productivity for enterprises and differentiation for high-end service providers.

Technical Specifications

Components and Interfaces	• Four external Gigabit Ethernet or 10/100 TX ports • Direct interface the Ethernet Routing Switch 8600 backplane • Up to eight Nortel Web Switch Modules per Ethernet Routing Switch 8600 chassis • Up to 336 10/100Base-TX with 4 1000Base-SX front-facing ports, OR • Up to 116 Gigabit Ethernet Ports (112-1000 Base-SX/LX/XD GBICs ports with 4-1000Base-SX front-facing Nortel Web Switching Module ports), OR Up to 32 1000Base-SX Ports
Performance Specifications	• Mean Time Between Failure 80,000 hours • Frame Length 9k (for WSM to WSM traffic) and 1.9K through the 8600
Physical Dimensions	(H) 1.5 inches x (W) 15.4 inches x (D) 18.5 inches [3.8 cm x 3.8 cm x 47.0 cm]
Weight	(single module) approximately 10 lbs
Environmental Specifications	Operating temperature: 5° to 40° C Storage temperature: -25° to 70° C Operating humidity: 85% maximum relative humidity, non-condensing Storage humidity: 95% maximum relative humidity, non-condensing Operating altitude: 10,000 ft (3,000 m) maximum Storage altitude: 10,000 ft (3,000 m) maximum Free Fall/Drop: ISO 4180-s, NATA 1A Vibration: IEC 68-2-6/34 Shock/Bump: IEC 68-2-27-29
Processing Capacity and Performance	10 purpose built WebICs 20 RISC Processors 80 MB of memory Web switching of 128 Gbps Wire speed filtering for more than 48,000 security and policy services Support for more than 4 million concurrent sessions at 2.4 million session per second

Nortel Application Switch



Overview

Nortel has once again raised the bar in the intelligent networking arena with the Nortel Application Switch. A giant leap forward in application-aware networking, this Nortel solution enables multi-application switching that allows enterprises to maximize existing investment in servers and networks through application-intelligent traffic management, load balancing and sophisticated security services. The Nortel Application Switch also allows service providers to efficiently enable differentiated services for enterprise businesses. With integrated SSL acceleration, SSL VPN, security and high-performance content-aware switching, the Nortel Application Switch provides best-in-class application integration and return on investment.

Ideal For

- Enterprises that are interested in designing their network for business applications and in maximizing the return on their existing investments in servers and networks through application intelligent traffic management, integrated application support, and sophisticated security features
- Any organization that uses Web enabled business applications (ERP, CRM, etc.) or next-generation applications (wireless LAN, VoIP, Web services, etc.) and wishes to extend the reach of its business
- Enterprises, hosting providers, content providers, ebusinesses and service providers that require high-performance switching for their IT data centers, network and hosting infrastructures
- Organizations wishing to protect and enhance their business through increased online service availability and performance
- Service providers that need to efficiently enable differentiated services for their enterprise customers

Business Challenges

- Do you want the ability to rapidly deploy new on-line initiatives to enhance existing customer/partner/employee services or to capture new markets?
- Are content prioritization, increased network and enhanced online security key to your business success?
- Do you want the ability to contain and reduce operating costs, defer or eliminate upgrades to the server and application platforms while delivering functionality, application performance and maximizing return on investment?

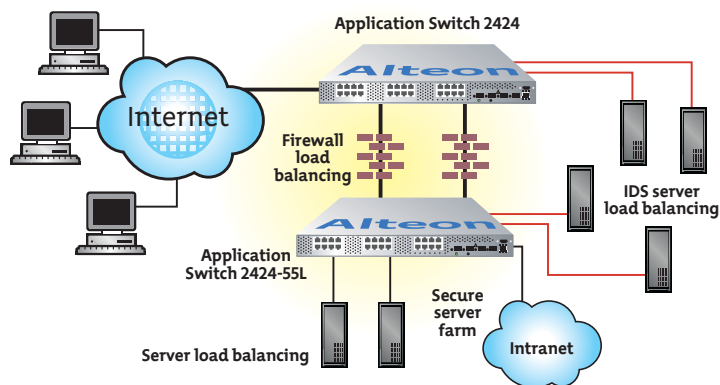
Typical Applications

- Enterprises that are interested in designing their network for business applications and in maximizing the return on their existing investments in servers and networks through application intelligent traffic management, integrated application support and sophisticated security features
- Service providers that need to efficiently enable differentiated services for their enterprise customers

Ordering Information

For further information, please contact your local Nortel representative.

Network Diagram



Key Points

- **Improved business productivity** by utilizing intelligent traffic management capabilities to differentiate and route traffic at blazing speeds based on business priorities and network conditions. Nortel switches use sophisticated deep packet inspection and pattern matching capabilities to identify application traffic or a user session within an application and monitor, discard, prioritize, rate limit or rate shape the traffic.
- **Fail-safe business continuity** by eliminating single points of failure and providing device and application fail over. Nortel Application Switches accomplish these objectives through sophisticated load balancing and application health checking features as well as a high availability architecture, (supports VRRP with active-active or active-standby configurations).
- **Secure access to business applications and networks** through SSL acceleration server offload and SSL VPN, which provides a simple remote access security solution that extends the reach of enterprise applications to mobile workers, telecommuters, partners and customers.
- **Protected applications and networks** via multi-layer security. Nortel Application Switches enable tight security without performance degradation via multiple security acceleration/ load balancing services and integrated security applications such as SSL acceleration. In addition, it protects against denial of service attacks and application abuse.
- **Scales business applications efficiently** because servers or other network devices may be added to load balanced clusters without service interruption. Nortel Application Switches also enable the plug-n-play addition of integrated application (SSL appliance, etc.) capacity.
- **Simplifies application deployment** and delivery, enables application optimization and securely scales delivery of business-critical applications such as VoIP, Web Services, ERP, CRM, Wireless, P2P, etc. Example application support: BEA Weblogic, Microsoft .Net Platform, IBM WebSphere, Microsoft Exchange and Oracle 9iAS.

- **Maximizes return on IT investment** since Nortel Application Switches allow enterprises to use existing infrastructure more efficiently, simplify network design, provide security and scalability and adjust the network quickly to meet rapidly changing business requirements. As a result, enterprises can reduce infrastructure and operating expenses, maximizing return on investment in network and data center assets.
- **The industry leader** in performance, functionality, scalability and reliability for content switching in the Layer 4-7 fixed switch market for six straight years (Dell'Oro).
- **Distributed architecture** to ensure that all processor intensive intelligent decisions are off loaded evenly across all processors.
- **Feature-rich switch** enabled by Nortel OS not only performs standard content switching but also allows for advanced applications such as firewall load balancing, application redirection, wireless access and full RTSP streaming support.
- **Integrated SSL functionality** provides SSL acceleration and support for SSL VPNs. SSL functionality is fully integrated with the existing Nortel SSL Accelerator appliances. This not only provides scalability, resilience and manageability on an unparalleled scale, but also offers other SSL functions such as SSL VPN support allowing secure, remote access to corporate networks from any location.
- **Easy to manage and robust**, this device is deployed in some of the most mission-critical and highly accessed sites today. Application Switch Element Manager is the graphical user interface (GUI) tool that is used for managing the Application Switch Portfolio. It makes retrieval of configuration information from a device a simple point and click operation. It also allows the network manager to remotely manage Application switches.
- **OSPF and BGP routing** makes integration into existing large-scale networks a simple and painless task.

Features and Benefits

Application Optimization

- Policy-based application redirection and load balancing based on application and content intelligence
- Application health checking and sophisticated application load balancing to simplify deployment and enable high availability application architectures
- User-scriptable health checks for enabling customized application health checking
- Intelligent Application Traffic Management to enable the inspection of application flows for pre-defined attributes, classifying flows based on these attributes, applying traffic policies (monitor, discard, prioritize, rate limit, or rate shape), and reporting usage of such applications
- Peer to Peer traffic inspection, redirection, bandwidth rate limiting and rate shaping
- Bandwidth Management with rate limiting and rate shaping based on Layer 4-7 attributes
- Web services-aware specialized traffic management features to enable secure, fault-tolerant Web services
- Link load balancing (inbound and outbound) for simplified, optimized multi-homed networking
- Open Application Programming Interface and standards-based XML interface for the Element Management System (EMS) to enable applications or appliance communication directly with the switch
- Geographic redundancy through Global Server Load Balancing (GSLB) to allow application content to be distributed globally by directing requests for application content to the best site based on server health, proximity to the client, and response times; requests for content enabled to be sent to the optimal site in the event of a failure, disaster, or network performance degradation at one site
- Support for persistent applications (such as multi-page forms, payment transactions and shopping carts) in which the client interacts with the same server for the life of a session

- Multi-application support on a single platform such as local and global server load balancing, intelligent traffic management, application redirection, application-layer security, security acceleration, secure remote access (SSL VPN), filtering, bandwidth management, inbound and outbound link load balancing, etc.
- High availability architecture support (active-active, active-standby and hot-standby modes) through advanced implementation of the Virtual Router Redundancy Protocol (VRRP)
- Supports more than 51,000 Layer 7 sessions/second and 110,000 Layer 4 sessions/second with zero session loss (real world testing, Tolly Jan. 2003)

Application Security

- Multi-layer security to protect applications and networks at multiple points of attack through comprehensive application-layer intrusion prevention and Denial of Service protection, packet filtering, application abuse protection, SSL acceleration, SSL VPN, network address translation (NAT) and secure management
- Comprehensive Denial of Service protection to secure networks and applications against malformed packet, traffic flood, high profile virus and worm attacks, such as ping of death, Smurf, Fraggle, etc.
- Security device load balancing to enable increased performance and reliability for intrusion detection systems (IDS), virtual private networks (VPN), Firewalls, SSL Accelerators, etc.
- SSL VPN secure remote access to allow enterprises to offer mobile workers, telecommuters and partners secure clientless VPN access to business applications and web portals.

Management

- Secure Management through allowable source IP address filtering, authentication and authorization of remote administrators (including RADIUS and TACACS+ support), as well as encryption of management information (HTTPS, SNMP v3, SSH v2)

- Datacenter virtualization (Utility Computing) for service providers or enterprises through the use of features such as Management Virtualization and traffic separation via support for VLAN gateways, filtering and multi spanning tree instances
- Multi-protocol IP switching based on Routing Information Protocol (RIP) v1, Open Shortest Path First (OSPF), Border Gateway Protocol (BGP) 4, Spanning Tree, static routes and more to enable switches to learn and cache IP addresses, which provides direct IP switching for locally attached networks and the ability to route between VLANs and IP subnets within the switched network without an external router
- High port density in a simplified, small form factor, Fast Ethernet and Gigabit Ethernet models with port density ranging from 10 to 28, all in a one rack unit platform

Market Information

Nortel's key strength in its applications switches is the single focus on the Nortel OS software that is used across all content switching products. This provides a rich feature set that can be confidently used without the threat of forklift upgrades or cross-product switches to provide functionality. The Nortel Application Switch consistently outperforms all other manufacturers in the content switching space and proves that brains and muscle are important. A 2003 Tolly testing Layer 7 performance test showed that the Nortel Application Switch outperformed Cisco and F5 switches with 3-4X competitors Layer 7 performance capacity. Coupled with this, the simple manageability and robustness of these Nortel switches far out pace any competition and allow customers to deploy the switch with the confidence that comes from using the best of breed.

Technical Specifications

Application Switches	3408	2424	2424-SSL	2216	2208
Total Ports	12	28	28	18	10
10/100 BASE-T	–	24	24	16	8
10/100/1000 BASE-T	8	–	–	–	–
SFP-GBIC (Fiber or Copper GE)	4	4	4	2	2
IP Routing Interfaces	256	256	256	256	256
Virtual Server Support	1,024	1,024	1,024	1,024	1,024
Real Server Support	1,024	1,024	1,024	1,024	1,024
Policy Filters	2,048	2,048	2,048	2,048	2,048
Concurrent Sessions	2M	2M	2M	1M	600K
Layer 7 Performance (sessions/second)	51K*	51K*	51K*	30K*	15K*
Layer 4 Performance (sessions/second)	110K*	110K*	110K*	40K*	20K*
Integrated SSL Acceleration (tps.)**	No	No	Base: 300 Max: 1000	No	No
Integrated SSL VPN	No	No	Yes	No	No
Height (inches/RU)	1.75/1	1.75/1	1.75/1	1.75/1	1.75/1
Network Protocol & Standard Compatibility	10/100/1000 Base-TX (IEEE 802.3) 1000Base-SX/LX (IEEE 802.3) Spanning Tree (IEEE 802.1d) Logical link control (IEEE 802.2) Flow control (IEEE 802.3x) Link negotiation (IEEE 802.3z) VLANs (IEEE 802.1Q) Frame tagging (IEEE 802.1Q) on all ports when VLANs enabled SNMP v3. IP RIPv1 BGP v4 OSPF TFTP (RFC 783) BootP (RFC 1542) BootP (RFC 951) Telnet (RFC 854) EtherChannel-compatible trunking				
Power Specification: Measurement	Auto-ranging power supply: 100-240 VAC @ 3.5 Amps, 50-60 Hz Maximum power consumption: 250 Watts				
Environmental Condition: Operating Specification	Temperature: 0° to 40° C (+32° to +104° F) Relative humidity: 85% maximum, non-condensing				

Certifications	EMC USA: FCC Part 15, Subpart B Class A Australia: AS/NZS CISPR 22:2002 Canada: ICES-003 Japan: VCCI Class A Europe: EN 300 386 v1.3.1 (2001-09) Taiwan: BSMI Registration Certificate Rest of World: CISPR 22 Class A Safety IEC 60950 (International) National Deviation per CB Member Countries to IEC 60950 UL 1950 (USA) CSA 22.2, No. 950 (Canada) EN 60950 (Europe)
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* "Real-world" testing scenarios with zero session loss
** "Real-world" testing scenarios

Ordering Information

For further information, please contact your local Nortel representative.

> Nortel Security Portfolio

Leaders in today's organizations want three things from network security. First, they need insurance – protection from threats and attacks. They need to secure corporate information assets. They want to know that the network cannot be compromised and used to stage an attack or serve illegal or illicit content. Second, leaders must have performance – speed and scale with security. Organizations use applications and services to achieve higher productivity, reach new markets, partner for success and serve clients with new levels of service. Trading performance for security is not an option. When deploying new applications and services such as voice over IP, SIP and multimedia, user experience is imperative. Last, today's leaders need compliance. They must be able to show that a valid, documented set of security policies is in place, and that the policies are enforced and monitored. This demand for compliance comes from clients, owners, shareholders, regulators and partners.

The world of security has changed. It is more than a firewall and VPN. Today, security is an important factor in every aspect of the network. From network access through to application and service performance security must be part of the planning, design and operation practices.

Nortel responds with a security strategy to address these needs. Nortel security products have optimized security for applications and services, including VoIP, SIP, wireless and multimedia. This means that network performance and resiliency are maximized. No organization can afford to compromise its business-critical networks and information. With Nortel, organizations can deploy and use new applications and services with confidence – trusting that all communications are secure and protected.

Nortel delivers an adaptive defense against hacks, attacks, worms and viruses. Critical applications and services are protected and prioritized. The response to threats is immediate and effective. Throughout the network security policies are implemented, enforced and adapted to block real-time threats. New devices, increased mobility and more sophisticated threats make security policy and enforcement more important than ever. Nortel delivers solutions for detection and response.

With Nortel, total end-point integrity is the mission. Productivity is protected with devices continuously analyzed for threats. As a result, the network and its devices are effectively protected from infections and attacks. This increases availability and performance. In addition, Nortel's end-point solutions are simple and cost-effective making them easy to deploy and support.

Nortel knows that full security management is required to maintain operational efficiency. Open solutions deliver active defense responses with automatic detection, blocking & repair. Nortel's partnership program certifies cost-effective support for multi-vendor solutions and policy-based central solutions for easy provisioning and audit. Comprehensive reporting for ongoing security analysis and follow-up completes the suite of required management capabilities.

The Nortel difference:

1. A long history of delivering the world's most resilient and high-performance networks.
2. An in-depth understanding of application and service deployment, including VoIP, SIP, wireless and multimedia.
3. Unmatched experience in building and deploying wireless network solutions for organizations and service providers.
4. Real-world security experience and innovation with over 100 million VPN customers, the first accelerated firewall and leadership in secure routing.

We help our customers build secure networks to deliver useful services and applications. Resilience and performance ensure availability and trust. Analysis, reports and flexible deployment options help customers implement and comply with their security policies. Our experience in voice, data, voice over IP, SIP, multimedia and wireless networks is unmatched – as is our commitment to continuous security innovation for these networks.

Products in the Security Portfolio include:

VPN Gateways

- Nortel SSL VPN
- Nortel VPN Gateway 3050
- Nortel VPN Gateway 3070

VPN Routers

- Nortel VPN Router 221
- Nortel VPN Router 251
- Nortel VPN Router 600
- Nortel VPN Router 1010
- Nortel VPN Router 1050
- Nortel VPN Router 1100
- Nortel VPN Router 1750
- Nortel VPN Router 2700
- Nortel VPN Router 5000
- Nortel VPN Client

Switched Firewalls

- Nortel Switched Firewall 5100 series
- Nortel Switched Firewall 6000 series

Threat Protection System

- Intrusion Sensor 2050-IS
- Intrusion Sensor 2070-IS
- Defense Center 2070-DC
- Intrusion Sensor 2150-IS (available Q4-2005)
- Intrusion Sensor 2170-IS (available Q4-2005)
- Threat Intelligence 2050-TI (available Q4-2005)
- Threat Intelligence 2070-TI (available Q4-2005)
- Real-time Threat Intelligence License (available Q4-2005)

Application Switch – Security Features

- Nortel Application Switch 3408
- Nortel Application Switch 2424
- Nortel Application Switch 2424-SSL
- Nortel Application Switch 2216
- Nortel Application Switch 2208

Nortel VPN Gateway 3050/3070



Overview

The Nortel VPN Gateway Portfolio includes secure access solutions that extend the reach of enterprise applications and resources beyond the boundaries of traditional VPNs to remote employees, partners and customers. They deliver greater reliability and cost savings, as well as a single point of authentication, which administrators appreciate. Organizations of varying sizes will benefit from remote access options, encryption and deployment choices. By leveraging the native capability of widely deployed web browsers and SSL VPN and also supporting traditional IPsec-based VPN clients, the Nortel VPN Gateways and SSL VPN functionality offer the industry's most convenient, flexible and cost-effective secure access solution on the market today.

Nortel VPN Gateways perform on-the-fly content transformation to instantly convert most intranet resources into externally-viewable, secure HTML pages. They employ an advanced network address and port translation (NAPT) utility to build SSL-secured VPN tunnels for client/server communications from browser-equipped user devices without installing a VPN tunneling client.

The gateway can be quickly deployed at existing Internet connection points and has virtually no network prerequisites for seamless deployments into existing networks. The Nortel VPN Gateway provides enterprises with a clientless alternative for securely provisioning resources to remote users, without the need to install and manage client tunneling software on their PCs.

Ideal For

- Large enterprises that need to provision remote access services to a high number of teleworkers, mobile employees, partners and customers
- Any organization that would like to extend the reach of its enterprise portal (e.g., IBM Websphere, SAP, Plumtree, BEA, PeopleSoft) beyond the traditional LAN/WAN
- Small- and mid-sized organizations looking to invest in a flexible remote access solution that can grow with their business

- Does your current LAN/WAN/RAS architecture offer only limited user mobility?
- Would you like to instantly provision secure connections to partners without constraining pre-requisites?

Typical Applications

The Nortel VPN Gateway can be deployed to solve a number of applications:

Enterprise extranets

Integrating business partners with existing production systems can streamline supply chains and reduce inventory and production cycles. But providing business partners with a simple, secure connection to a particular production application or enterprise portal can be difficult. Not having to deploy VPN software on partner PCs can eliminate the need to deploy a dedicated VPN router at the partner site.

Business Challenges

- Are you challenged with managing VPN client software on users' PCs?
- Are you wrestling with adapting secure remote access to mobile/wireless infrastructures?
- Are you experiencing difficulty in supporting mobile users located on unknown networks?
- Are you experiencing a high number of help desk calls from remote access users?

Mobile employee access

Mobile employees are frequent travelers who require access to a broad range of applications. Primary applications include e-mail, scheduling, file transfer and popular Customer Relationship Management (CRM) or Sales Force Automation (SFA) applications. Nortel VPN Gateways provide

true freedom of mobility by giving mobile workers more opportunities to communicate and share information. Workers can access applications from a portable laptop computer, a PC at a customer site, web browser-equipped PDA, or any available Internet terminal at hotels, airports or convention centers.



Figure 1: Nortel VPN Gateway for Remote Access

Externalizing intranet applications

Nortel VPN Gateways allow enterprises to securely externalize internal portal resources by dynamically redirecting pages securely through the VPN Gateway via HTTPS. Enterprises can create instant "extranet" access to applications and resources without having to deploy SSL capabilities on each application/portal server. Administrators can avoid having to rewrite internal pages/links for resources that they wish to make "externally" accessible.

SSL acceleration

Nortel VPN Gateways can also be deployed as a dedicated SSL acceleration-only appliance that offloads computational intensive SSL processing from web servers. Offloading this function to a Nortel VPN Gateway can yield a 5 to 50x server performance improvement over non-accelerated HTTPS servers — optimizing the web server to perform its primary function. Server-side traffic from the Nortel VPN Gateways can be decrypted, allowing application switches to regain packet visibility necessary for all Layer 4-7 services such as load balancing, content intelligent switching and session persistence.

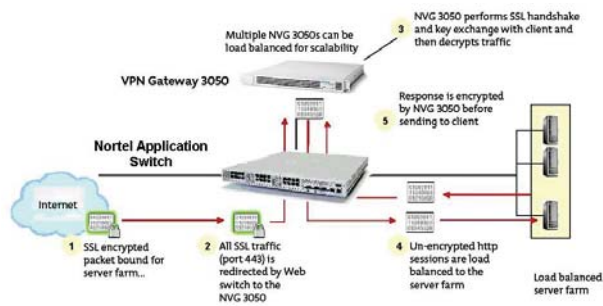


Figure 2: Nortel VPN Gateway for SSL Offload and Acceleration

Security within the enterprise perimeter

Not all applications on a corporate network require the same level of security. Subscription or license-based databases have strict access constraints, departmental applications contain sensitive information, Human Resources applications provide confidential personal data and financial systems require restricted access. These applications, among many others, warrant additional security within the corporate network. Nortel VPN Gateways can provide application-specific authentication for internal access control and client-to-application encryption within the private network for confidentiality and privacy to both wired and wireless users.

- **High scalability, availability and performance** – Supports thousands of concurrent SSL and IPsec VPN user tunnels and provides hundreds Mbps of aggregate VPN throughput. Gateways provide VPN acceleration, load balancing and can be clustered in groups of up to 32 units to support highly robust VPN designs.
- **Strong remote endpoint security** – Nortel's VPN Gateways provide a suite of safeguard features to protect against malicious intent and user negligence. The VPN Gateways support the Nortel VPN Tunnel Guard feature which enforces endpoint security checking for both client and client-less VPN endpoints.

Nortel SSL VPN is available on several Nortel security/VPN platforms:

- Nortel Application Switch 2424-SSL
- Nortel VPN Router Portfolio (1740/2700/5000)
- A tiered licensing model of 50, 100, 250, 500 and 1000 user license levels provides flexible and scalable deployment options.

Key Nortel VPN Gateway Advantages

- High performance, availability and scalability
- The most flexible secure remote access gateway available supports multiple modes of SSL operation including clientless, enhanced clientless and transparent (client-based).
- Lower cost and simplified management mitigate the need to install and support VPN clients.
- Improved reliability and user mobility allow secure access from browser-equipped (SSL) devices.
- Available as an upgrade on many Nortel products

Market Information

The emergence of SSL VPN as a secure and highly flexible means to provide secure access to enterprise resources has clearly changed the traditional enterprise remote access VPN landscape. The ability to provide a customized and dynamic Web portal front-end for users without having to deploy and to configure a traditional VPN client to either managed (employee) or unmanaged (partners) users and devices is an extremely compelling value proposition for a wide enterprise audience.

The SSL VPN market is the fastest growing security segment and is expected to reach more than \$600 million by 2006. Leading industry analysts enthusiastically endorse the technology for remote access, citing benefits of simplicity, mobility and cost savings of up to 50% versus alternative remote access solutions.

Features and Benefits

- **Reduced access complexity** – The VPN Gateways remove the ongoing client support and maintenance requirements associated with traditional remote access solutions.
- **Deployment flexibility and investment protection** – Supports multiple SSL VPN access modes (browser only, Java applet or full SSL VPN access via Net Direct) and can also terminate the VPN client.

Nortel's VPN Portfolio (made up of VPN Gateways and Routers) offers true freedom of mobility to a broad range of applications by giving mobile workers more opportunities to communicate securely and share information. Workers are assured consistent, secure access to Voice/Data/Multimedia applications (SIP, Video, IM etc.) from a portable laptop computer, a PC at a customer site, Web browser equipped PDA or any available Internet terminal at hotels, airports or convention centers. Nortel's VPN Portfolio also enforces endpoint security checking for all types of endpoints to ensure remote users/devices don't become a vehicle for viruses or other unwanted intrusions into the secure enterprise network through the VPN tunnel.

The Nortel SSL VPN solution is optimized for VoIP - meaning our Net Direct capability will invoke a technology we call "Fast Path" that optimizes the connection when VoIP/SIP protocols need QoS. The bottom line is that Nortel customers don't pay a "voice quality price" when they deploy SSL VPN security. We have the test data to prove it from recent testing done with The Tolly Group - www.nortel.com/corporate/events/2005b/tolly_eseminar/index.html

Technical Specifications

Hardware specifications	VPN Gateway 3050	VPN Gateway 3070
Maximum concurrent VPN session	2000	5000
Deployment positioning	Medium to large enterprise	Large enterprise and VPN service providers
CPU	(1) Intel P4 2.4GHz	(2) Intel Xeon 2.8GHz
Memory	1GB DDR 266MHz	2GB DDR 266MHz
On-board LANs	(2) 10/100/1000-TX	(2) 10/100/1000-TX
Expansion	(1) dual 10/100/1000-TX	(1) dual 10/100/1000-TX or -FX (fiber)
Drives	(1) 40GB IDE (1) CD-ROM	(1) 80GB IDE (1) CD-ROM

Nortel has demonstrated leading performance among SSL VPN competitors in third-party testing (Light Reading), and has been recognized as an industry leader by Gartner Group and Forrester Research in their published SSL VPN reports. Nortel VPN/security-related recognition:

- Infonetix VPN market share leadership - #2 in 2004
- Gartner Group Magic Quadrant Leaders for both IPsec and SSL VPN
- Forrester Research Leader's Category for SSL VPN
- Network Computing "Tester's Choice" award for IPsec VPN
- Network Computing's Well-Connected Award for Security/IPsec VPN
- ICSA, VPNC and NIST VPN/Security certifications

Hardware specifications	VPN Gateway 3050	VPN Gateway 3070
Functional capabilities	Security Features: Authentication • RADIUS and challenge/response • LDAP, Windows NT Domain • Native local user database • SC SafeWord, RSA SecurID • ActivCard • Novell NDS/eDirectory • Netegrity SiteMinder • X.509 Digital Certificate • Microsoft Active Directory Single Sign-on (SSO) • WFS, Web apps HTTP, form based authentication • HTTP headers • SSO with Netegrity SiteMinder • Domain/network specific sign-on SSO Authorization • Dual-profile authorization • Base profile includes network, service and application level information (Layer 3, 4/7) • Extended profile adds source network, client security and authentication method • Endpoint security status and access method (Tunnel Guard IPsec/SSL) Security protocols • SSL v2.0, 3.0 • TLS 1.0 (RFC 2246) • IPsec ESP, AH Cipher suites • All ciphers covered by SSLv2.0, 3.0 and TLSv1.0 except the IDEA ciphers and the FORTEZZA ciphers Accounting • Syslog/RADIUS account start and stop including user name, gateway address, session ID, session time and cause of termination Client security • Nortel VPN Tunnel Guard • Auto-logoff with countdown • Rewriting to no-cache/no-store headers • Cache cleansing of files/history • Dynamic access policies	
Nortel VPN Client Support	• Split Tunneling • VPN Tunnel Guard (for both IPsec and SSL) • Nortel VPN Client Mobility • Portal full-access tab • Certificate-based authentication • Support for PDAs and smart phones	
VPN high availability	Load Balancing • IPsec/SSL service Load Balancing via clustering • Load Balancing of back-end services to include Source IP and round robin Session persistence • Source IP, SSL session ID, cookie information Application health checking • SSL w/TCP/IP/Port • Scriptable, configurable intervals • Performance Managed service features • Support for 250 VPN domains per Gateway • VPN binding with 802.1q • Authentication/DNS mapping • Split administration • License pooling • Clustering support for up to 255 VPN Gateways	

Hardware specifications	VPN Gateway 3050	VPN Gateway 3070
Application support	- Access to web-based, client/server and native terminal server applications - Network-layer native desktop application access via SSL or IPsec mode - Web content and protocols - HTML/DHTML - JavaScript/Java Applets/XML - HTTP/HTTPS - VBScript - File share protocols - Windows—SMB/CIFS - Generic—FTP - E-mail/messaging protocols - Microsoft Exchange (MAPI) - IBM/Lotus Domino/Notes - IMAP, SMTP, and POP3 - Terminal access protocols - Telnet - SSH - Remote desktop protocols - Citrix ICA - Microsoft WTS (RDP) - Management - Secure administrative Web GUI (HTTPS) - Serial port to CLI - Local logging, external Syslog - SNMP v2 and v3 - RFC 1213 MIB for Management of TCP/IP-based internets - RFC 2737 MIB entPhysicalTable - RFC 2863 Interfaces Group MIB - RFC 3418 SNMP MIB - RFC 2574 user-based security model (USM) for SNMPv3 - RFC 2575 view-based access control model (VACM) SNMP - Web portal customization - Hexadecimal color customizable - Company logo (.gif), text - Novice/Int/Advanced user views - Portal pass-through - Browser support - Windows (98, 2000, XP) - Internet Explorer 5 or better with Sun's JRE 1.3 or better - Internet Explorer 5 or better with Microsoft's JVM 4 or better - Unix - Netscape Navigator 7 with Sun's JRE 1.3 or better - Mozilla 1.3 or better with Sun's JRE 1.3 or better - Modes of operation - Clientless—HTML to browser - Enhanced Clientless—Proxy with Java Applet - Full Network Extension—SSL Client (Net Direct) delivered via download or Nortel VPN Client access - Licensable options - IPsec and SSL VPN users - Secure Services Provisioning - Portal Guard	

Ordering Information

For further information, contact your local Nortel representative.

Nortel VPN Router Portfolio

Overview

The Nortel VPN Router portfolio provides routing, IPsec and SSL VPN, firewall, bandwidth management, encryption, authentication and data integrity for secure connectivity across managed IP networks and the Internet. From a small branch site to a large network environment, Nortel VPN Routers provide cost and performance advantages, security and control. In addition, the portfolio provides best-in-class features and benefits, flexibility, scalability and cost savings. With the Nortel VPN Router portfolio, enterprises achieve anytime, anywhere remote access and site-to-site VPNs.

With secure routing technology (SRT) built into their DNA, Nortel VPN Routers are the next generation family of products delivering security and IP services in a single integrated platform. Designed for the enterprise edge – the intersection of an enterprise's private and public IP networks – the Nortel VPN Router Portfolio is optimized to leverage the cost advantages of the Internet while providing secure communications across the public infrastructure. As a highly scalable family of devices, the Nortel VPN Router Portfolios offer a complete IP services portfolio, from the low-end Nortel VPN Router 200 series to the high-end Nortel VPN Router 5000, meeting specific enterprise network requirements. This enables the Nortel VPN Router Portfolio to address the smallest branch site or largest headquarters and every environment in between. With a comprehensive set of software-based IP services, the Nortel VPN Router Portfolio allows enterprises to deploy services as and when needed with the activation of software license keys – all without costly hardware upgrades or network downtime. Each Nortel VPN Router can be purchased and installed as an IP access router, IP VPN gateway, or stateful firewall device depending on enterprise need and budget. Its range of LAN/WAN interfaces makes it an easy fit into existing enterprise networks. Service providers similarly can deliver new revenue-generating IP and security services without disruptions to existing customer-based or carrier infrastructures.

Ideal For

- Enterprises building secure, scalable, resilient, high-performance virtual private networks (VPNs)
- Secure mobile converged solutions for "anytime, anywhere" remote access VPNs and site-to-site VPNs - intranets and extranets

Business Challenges

- Do you want to leverage the Internet or a managed IP transport service to reduce telecommunications backbone costs? Nortel VPN Routers enable organizations to leverage the Internet or a managed IP service for secure mobile remote access and site-to-site connectivity - intranet and extranet connections for much less than any competing technologies such as frame relay or leased lines.

- Is network security important to your organization? The Nortel VPN Router Portfolio integrates all of the necessary VPN technologies into a single platform – routing, firewall, bandwidth management, encryption, authentication and data integrity, for secure tunneling across the Internet.
- Do you want to lower your enterprise's total cost of ownership? The Nortel VPN Routers lowers capital and operational expenses and yet guarantees the most secure, resilient network connectivity.

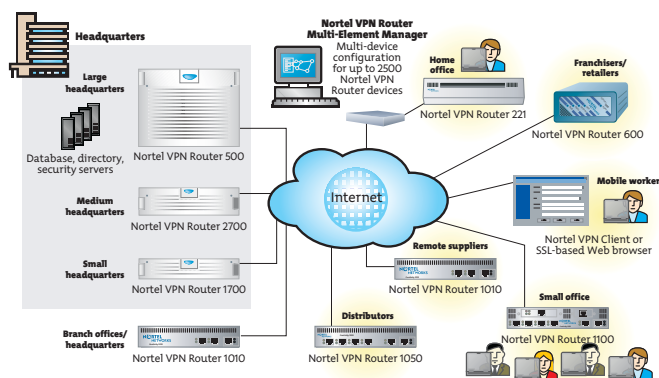
Typical Applications

Nortel offers a complete VPN solution with the Nortel VPN Router Portfolio. These high-performance VPN platforms enable users to access the enterprise network anytime, anywhere,

through a secure virtual private network. The Nortel VPN Routers are used to create IP VPNs, which provide connections to employees, customers, suppliers, partners and organizations –fostering communication and collaboration and guaranteeing secure network connectivity at the lowest cost of ownership.

The Nortel VPN Router Portfolio integrates all of the necessary VPN technologies into a single platform – routing, firewall, bandwidth management, encryption, authentication and data integrity for secured tunneling across the Internet. The integration of multi-IP services into a single platform ensures the highest levels of security, as well as the lowest total cost of ownership.

Network Diagram



The Nortel VPN Router architecture

Key Points

- Security is built into the Nortel VPN Router Portfolio DNA with secure routing technology (SRT). Nortel VPN Router Portfolio devices are designed with security in mind – both in the secure transmission of data, as well as the inherent security of the device and its management.
- A single integrated hardware device provides routing, firewall, bandwidth management, encryption, authentication and data integrity for secure tunneling across managed IP

Typical VPN applications include remote access, teleworking, road warrior and browser-based SSL VPN applications. The Nortel VPN Router Portfolio also delivers best-in-class site-to-site VPNs, corporate intranets, SOHO and small/medium/large enterprise branch sites in local, regional, national and global network configurations. The site-to-site solution includes site-to-site encrypted tunneling; IPsec encryption from the switch to the desktop; integrated configuration and management software; simplified interfaces for both switch administration and for the IPsec client; an integrated authorization, authentication and accounting (AAA) server and flexible and scalable VPN deployment options.

- networks and the Internet. One box provides a full range of features for building high-performance, scalable, secure IP VPNs.
- Mix-and-match IP services capability include advanced routing, full VPN capabilities and stateful firewall, which can be purchased and implemented independently, as and when needed with the flexible and simple activation of software license keys.
- Integrated SSL and IPsec VPN capability in the Nortel VPN Router platform enabled with the Nortel SSL VPN Module 1000 PCI option card available with Nortel VPN Router Server

Release 5.0 ensures secure, anywhere, anytime ubiquitous access, regardless of access technology, IPsec or SSL.

- The Nortel VPN Router Portfolio interoperates with existing routing, authentication, directory and security services. Standards-based IP routing services enable a Nortel VPN Router to be integrated into an existing router network or to be deployed on its own to build a highly redundant and flexible, secure network.
- Cost savings are realized by using the Internet or a managed IP service as the wide-area transport, allowing connections to be local to users. Nortel VPN Routers' SRT guarantees reduced CAPEX and OPEX for enterprise VPN deployments.
- This highly scalable portfolio ranges from the low-end Nortel VPN Router 200 Series (Nortel VPN Router 221 and 251) to the high-end Nortel VPN Router 5000. Nortel VPN Router platforms can address the smallest branch site or largest headquarters with every environment in between. Nortel VPN Routers also make it easy to scale the network, allowing for fully-meshed network connectivity.
- Nortel VPN Router Server Release 5.0 enables application/session persistence with sub-second VPN tunnel re-establishment, which enables true IPsec mobility for the first time.
- Nortel VPN Routers can also leverage the service provider's backbone for a consistent level of performance and SLAs. Additional provider services may be available.

Features and Benefits

- **Best in class virtual private networking (VPN)** - As a market leader in IP virtual private networking (IP VPN), Nortel VPN Router Portfolio has been delivering secure end-to-end IP VPNs for years. IP VPN capabilities are standard in every Nortel VPN Router unit, with all base configurations shipping with a minimum of five VPN tunnels. All Nortel VPN Routers include the following VPN capabilities:
 - Standards-based tunneling - Support for IPsec, L2TP, PPTP and L2F standard tunneling protocols delivers interoperability with a wide

range of multi-vendor VPN software and hardware.

- Encryption - Support for DES, 3DES and advanced encryption standard (AES) provides ultimate end-to-end security for transmitted data.
- Authentication - Support for RADIUS, LDAP, SecureID, X.509 digital certificates, as well as token and smart cards, offers the broadest range of authentication options in the industry.
- Comprehensive VPN client support - Nortel VPN client software for MS Windows systems, including Windows 2000, NT, Millennium and XP is provided free of charge with every Nortel VPN Router unit. Nortel VPN clients are also available for UNIX and Macintosh operating systems. Secure access from wireless and hand-held devices is additionally supported via third-party IPsec clients.
- **SSL VPN Module** - The Nortel SSL VPN Module 1000 offers fully-featured third-generation Secure Sockets Layers (SSL) VPN services on the Nortel VPN Router. Available as an option on the Nortel VPN Router 1740, 2700 and 5000 models, the SSL VPN module delivers new tightly-integrated SSL/IPsec services to enterprises, while enabling Nortel VPN Router customers to incrementally add SSL remote access into their existing Nortel VPN Router devices. SSL is a convenient secure remote access alternative to IPsec that leverages the native capabilities of widely deployed Web browsers and avoids the need to install and administer client tunneling software on remote PCs. The SSL VPN Module 1000 incorporates dedicated SSL processor, memory and accelerator hardware to deliver uncompromising levels of performance and scalability without adversely impacting other key functions on the Nortel VPN Router platform. SSL services can take advantage of common user profiles, authentication techniques and management already in place for IPsec users to minimize administrative overhead. An integrated Universal Access Portal further front-ends and simplifies the VPN user experience by transparently invoking the most appropriate VPN access (IPsec or SSL) based on a user's access needs.

- **VPN Client** - The Nortel VPN Client provides user-side ('client') functionality for secure remote access over IP networks using Nortel VPN routers and VPN servers. Nortel VPN Client software works on virtually all user workstation access platforms, including Windows 2000, NT, ME, XP, Mobile (Pocket PC), IBM-AIX, SUN-Solaris, Linux and Macintosh operating systems.
 - Enables enterprises to establish and enforce centralized security policies to extend remote access without exposing the internal network to unauthorized use.
 - Eliminates the requirement to distribute and install client software on all access devices, because the client can 'silently' self-install when a session is activated.
 - Fits easily into the typical multi-vendor access network, where end user devices are likely to span multiple operating systems, access speeds, and platform types.
 - Allows end-users to roam across network boundaries (e.g., from wireless LAN to fixed LAN) without breaking the secure VPN connection and disrupting end-user applications.
 - Optimizes the user experience through load-balancing to eliminate bottlenecks and overload conditions, failover to route around network trouble spots and data compression to conserve transmission bandwidth and time.
- **Stateful firewall** - The Nortel VPN Router stateful firewall combines an easy-to-use interface with rich filtering rule sets to provide multiple lines of defense for an enterprise's private network. With extensive logging, a wide range of application layer gateways (ALGs) and built-in protection against hacker attacks, the Nortel VPN Router's stateful firewall delivers wire-speed throughput while protecting the enterprise network and its data from unauthorized access. The firewall can be combined with VPN termination and network address translation (NAT) services to flexibly apply filtering policies to data sent across either tunneled or non-tunneled interfaces.

- **Secure routing services** - Standards-based IP routing services enable Nortel VPN Routers to be integrated into an existing router network, or be deployed on its own to build a highly redundant and flexible secure network. With support for open shortest path first (OSPF), routing information protocol (RIPv1 and v2) and virtual route redundancy protocol (VRRP), Nortel VPN Routers can dynamically route traffic around failed connections or devices, as well as load balance traffic across parallel paths - whether for tunneled or non-tunneled traffic. Secure routing technology on Nortel VPN Routers avoids complex encapsulation protocols and associated overhead when forwarding IP traffic through secure IP VPN tunnels.
- **Bandwidth management/quality of service - with advanced services** - Differentiated services (DiffServ), RSVP and sophisticated queue management can ensure that service levels are met for any mission-critical data. The Nortel VPN Router Portfolio can prioritize traffic not only by IP traffic type, but also by users, groups and VPN tunnels, allowing fine granularity in QoS control.
- **LAN/WAN flexibility** - With integrated support for 10/100 Mbps Ethernet, frame relay, PPP, T1/E1 CSU/DSU, HSSI, V.35, X.21, ADSL and V.90 modem interfaces, Nortel VPN Routers offer great flexibility for placement within the enterprise network. They can act as the primary WAN/Internet access device via frame relay, dial-up or leased line connection, or be connected to an existing WAN or Internet access device via a standard Ethernet interface. Dial back-up allows traffic to be sent over an alternate connection in case the primary WAN or LAN link fails.
- **Comprehensive management services** - Provisioning is performed using the Nortel VPN Router Multi-Element Manager, an intuitive, graphical configuration tool that simplifies and streamlines the process of provisioning Nortel VPN devices - including routing, VPN, firewall, QoS, and policy services - across headquarters, branch and remote sites. Two licensing options are

available: one to support up to 250 Nortel VPN Routers and one for up to 2500 devices.

- Remote management options allow Nortel VPN Routers to be provisioned from a data center or network operations center (NOC).
- Quick-start utility guides the non-technical user through the initial configuration process, eliminating the need for an on-site installer.
- Fault management via SNMP, alarm monitor and a historical fault browser quickly detect problems.

- A rich set of security and system logging tools lets administrators track all transactions and events.

Note: For more details, see the Network Management Section in this document.

Market Information

	Product(s)	Comment
Nortel	Nortel VPN Router Series 100, 221, 251, 600, 1010, 1050, 1100, 1700, 1740, 2700, 5000	The most complete VPN solution, tightly integrated VPN encryption, stateful firewall and routing functions in one purpose-built platform; from branch office to central site in one product line, no mixing and matching; high-performance.
Cisco (Altiqa)	VPN Concentrators: VPN 3000 Series 3002, 3005, 3015, 3030, 3060, 3080	Currently does not integrate into Cisco's secure policy manager framework. Primary role on remote access VPN solution only; not positioned as a branch VPN solution; no stateful firewall; no WAN option; no CLI.
Cisco (Routers)	IPsec VPN Enabled Routers 800/900, 1700, 2600, 3700 and 7100/7200 series	IOS-based routers were designed for "open" clear text Internet connectivity. They must be "hardened" from a security perspective by users to simply meet a basic level of security. Enterprises are forced to spend time, effort and money to research router vulnerabilities in an effort to harden the router with hardware encryption. IOS routers also have limited firewalls, limited client based on IRE/Safenet, no internal databases like RADIUS or LDAP for authentication, authorization and accounting.
NetScreen	VPN Gateway/Firewall Netscreen 5XP, 5XT, 25, 50, 200, 500, 1000 and 5000	Good performance but limited remote client. Additional purchase of user-based client licenses is required. Netscreen relies on external RADIUS servers for authentication with limited ability to compress traffic for either branch or client.
Nokia	VPN/Firewall Appliances IP Series 30, 120, 330, 350, 380, 530, 650, 710, 740	Solution-based on Check Point VPN-1/FW-1 software; limited feature client; limited VPN throughput. Separate Nokia management is required for hardware platform.

	Product(s)	Comment
Nokia	VPN Gateways CryptoCluster Series CC500, 2500, 5200	VPN clustering solution is based on Network Alchemy product acquisition; no integrated firewall option; no WAN option; Nokia-developed client option.
SonicWall	VPN Gateways/Firewalls: SOHO2, Tele2, XPRS2, PRO, PRO-VX	Slow performance numbers; no L2TP; VPN is upgrade on SOHO2, XPRS2; no QoS/bandwidth management; limited RAS client; not a large enterprise grade solution, however performance can be enhanced with Probos accelerator equipment.

Technical Specifications

Nortel VPN Router 221 (Up to 5 user/branch tunnels)	Nortel VPN Router 251 (Up to 5 user/branch tunnels)	Nortel VPN Router 600 (Up to 50 user/branch tunnels)
Processor/Memory • 100 MHz MIPS processor 4 MB Flash – 15 MB RAM Max 3Des throughput • 4.5 Mbps Standard Equipment • 10/100 Mbps Ethernet • 4 port 10/100 Mbps Auto-sensing Ethernet switch • Console Port (RS-232, DB-9f) Standard Software • Nortel VPN Router 221/251 O/S with 5 VPN tunnels and IP routing Physical Dimensions Length: 7.4 in. (188 mm) Width: 5 in. (128 mm) Height: 1.4 in (36 mm) Weight: 10.9 oz. (310 gms.)	Processor/Memory • 166 MHz ARM processor 4 MB Flash – 15 MB RAM Max 3Des throughput • 4.5 Mbps Standard Equipment • 4 port 10/100 Mbps Auto-sensing Ethernet switch • ADSL – G.992.1, Annex A, Annex B or UR-2 • Console Port (RS-232, DB-9f) Standard Software • Nortel VPN Router 221/251 O/S with 5 VPN tunnels and IP routing Physical Dimensions Length: 9.1 in. (230 mm) Width: 6.3 in. (161mm) Height: 2.1 in (53 mm) Weight: 1.0 oz. (468 gms.)	Memory • 128MB memory Processor • 300 MHz Celeron processor Expansion Slots • One PCI Expansion Slot Max 3Des throughput • 20 Mbps Standard Equipment • 2 x 10/100BaseT Ethernet ports • Management/console port (DB-9) Standard Software • Nortel VPN Router O/S with 50 VPN tunnels and IP routing LAN/WAN Options • Additional 10/100BaseT Ethernet • T1/E1 with CSU/DSU • V.90 Dial Modem • ISDN BRI (S/T and U Interfaces) • ADSL • V.35/X.21/RS-232 Serial • 56/64K CSU/DSU Physical Dimensions Length: 11 in. (27.9 cm) Width: 8.5 in. (21.6 cm) Height: 4.0 in (10.2 cm) Weight: 6.0 lb. (2.9 kg) Operating Environment Electrical 90-264 VAC, 50-60 Hz Temperature 32°-131° F (0°-55° C) Relative Humidity: 5-85% non condensing
		

Nortel VPN Router 1010 (Up to 30 user/branch tunnels)	Nortel VPN Router 1050 (Up to 30 user/branch tunnels)	Nortel VPN Router 1100 (Up to 30 user/branch tunnels)
Memory • 128MB memory; 64 MB Flash Processor • 300 MHz Celeron processor Max 3Des throughput • 20 Mbps Standard Equipment • 2 x 10/100BaseT Ethernet ports • Management/console port (DB-9) Standard Software • Nortel VPN Router O/S with 5 VPN tunnels and IP routing Physical Dimensions Length: 8 in. (20.3 cm) Width: 8.5 in. (21.6 cm) Height: 1.75 in (4.4 cm) Weight: 2.7 lb. (1.2 kg) Operating Environment Electrical: 100-264 VAC, 50-60 Hz Temperature 32°-104° F (0°-40° C) Relative Humidity: 10-90% non-condensing	Memory • 128MB memory; 64 MB Flash Processor • 300 MHz Celeron processor Max 3Des throughput • 20 Mbps Standard Equipment • 2 x 10/100BaseT Ethernet ports • 4-port 10/100 Ethernet switch • Management/console port (DB-9) Standard Software • Nortel VPN Router O/S with 5 VPN tunnels and IP routing Physical Dimensions Length: 8 in. (20.3 cm) Width: 8.5 in. (21.6 cm) Height: 1.75 in (4.4 cm) Weight: 2.7 lb. (1.2 kg) Operating Environment Electrical: 100-264 VAC, 50-60 Hz Temperature 32°-104° F (0°-40° C) Relative Humidity: 10-90% non-condensing	Memory • 128MB memory; 64 MB Flash Processor • 300 MHz Celeron processor Expansion Slots • Two PCI Expansion Slots Max 3Des throughput • 20 Mbps Standard Equipment • 2 x 10/100BaseT Ethernet ports • 4-port 10/100 Ethernet switch • Management/console port (DB-9) Standard Software • Nortel VPN Router O/S with 5 VPN tunnels and IP routing LAN/WAN Options • Additional 10/100BaseT Ethernet • T1/E1 with CSU/DSU • V.90 Dial Modem • ISDN BRI (S/T and U Interfaces) • ADSL • V.35/X.21/RS-232 Serial • 56/64K CSU/DSU Physical Dimensions Length: 10.5 in. (26.9 cm) Width: 8.5 in. (21.6 cm) Height: 1.75 in (4.4 cm) Weight: 3.8 lb. (1.7 kg) Operating Environment Electrical: 100-264 VAC, 50-60 Hz Temperature 32°-104° F (0°-40° C) Relative Humidity: 10-90% non-condensing
		

Nortel VPN Router 1750 (Up to 500 user/branch tunnels)	Nortel VPN Router 2700 (Up to 2000 user/branch tunnels)	Nortel VPN Router 5000 (Up to 5000 user/branch tunnels)
Memory • 128MB memory Standard • 256MB Maximum Processor • Intel Pentium III Expansion Slots • Four Expansion Slots Max 3Des throughput • 100 Mbps Standard Equipment • 2 x 10/100BaseT Ethernet ports • Management/console port (DB-9) Standard Software • Nortel VPN Router O/S with 50 VPN tunnels and IP routing (Secure Router bundle) • Nortel VPN Router O/S with 500 VPN tunnels and IP routing (VPN bundle) LAN/WAN Options • Additional 10/100BaseT Ethernet • 1000BaseSX/T (GigE) Ethernet • 1 port T1/E1 with CSU/DSU • 4 port T1/E1 with CSU/DSU • V.90 Dial Modem • ISDN BRI (S/T and U Interfaces) • ADSL • V.35/X.21/RS-232 Serial • 56/64K CSU/DSU • High-Speed Serial Interface (HSSI) Physical Dimensions Length: 21 in. (53.3 cm) Width: 17.25 in. (43.8 cm) Height: 5.25 in (13.3 cm) Weight: 28.0 lb. (12.7 kg) Operating Environment Electrical: 90-264 VAC, 2.0A @ 90 VAC, 47-63Hz Temperature 32°-104° F (0°-40° C) Relative Humidity: 10-90% non-condensing	Memory • 256MB memory Standard • 512MB Maximum Processor • 1.33 GHz Pentium III Expansion Slots • Three PCI Expansion Slots Max 3Des throughput • 200 Mbps Standard Equipment • 2 x 10/100BaseT Ethernet ports • Management/console port (DB-9) Standard Software • Nortel VPN Router O/S with 5 VPN tunnels and IP routing (Secure Router bundle) • Nortel VPN Router O/S with 2000 VPN tunnels and IP routing (VPN bundle) LAN/WAN Options • Additional 10/100BaseT Ethernet • 1000BaseSX/T (GigE) Ethernet • 1-port T1/E1 with CSU/DSU • 4-port T1/E1 with CSU/DSU • V.90 Dial Modem • ISDN BRI (S/T and U Interfaces) • ADSL • V.35/X.21/RS-232 Serial • 56/64K CSU/DSU • High-Speed Serial Interface (HSSI) Other Hardware Options • SSL VPN Module • Encryption Accelerator Card Physical Dimensions Length: 21 in. (53.3 cm) Width: 17.25 in. (43.8 cm) Height: 5.25 in (13.3 cm) Weight: 28.0 lb. (12.7 kg) Operating Environment Electrical: 90-264 VAC, 2.0A @ 90 VAC, 47-63Hz Temperature 32°-104° F (0°-40° C) Relative Humidity: 10-90% non-condensing	Memory • 512MB memory Standard • 1.5 GB Maximum Processor • Dual 2.2 Ghz Intel Xeon processors Expansion Slots • Five PCI Expansion Slots Max 3Des throughput • 375 Mbps (450 Mbps for AES) Standard Equipment • 1 x 10/100BaseT Ethernet ports • 1 x 10/100/1000BaseT Ethernet (GigE) port • Management/console port (DB-9) • Dual Redundant, auto-switching power supply system with dual line cards • Dual Redundant, storage system Standard Software • Nortel VPN Router O/S with 5000 VPN tunnels and IP routing LAN/WAN Options • Additional 10/100BaseT Ethernet or 1000BaseSX/T (GigE) Ethernet • 1-port T1/E1 with CSU/DSU • 4-port T1/E1 with CSU/DSU • V.90 Dial Modem • ISDN BRI (S/T and U Interfaces) • ADSL • V.35/X.21/RS-232 Serial • 56/64K CSU/DSU • High-Speed Serial Interface (HSSI) Other Hardware Options • SSL VPN Module • Encryption Accelerator Card Physical Dimensions Length: 23 in. (53.3 cm) Width: 17.25 in. (43.8 cm) Height: 5.25 in (13.3 cm) Weight: 43.0 lb. (19.5 kg) Operating Environment Electrical: 100-127/200-240 VAC, (x2), 6.2/3.1A, 50-60 Hz Temperature 32°-104° F (0°-40° C) Relative Humidity: 10-90% non-condensing
		

Ordering Information

For further information, please contact your local Nortel representative.

Nortel Switched Firewall

Overview

The Nortel Switched Firewall (NSF) combines the industry's best security firewall with the industry's best network switching and acceleration. It is optimized to support SIP, VoIP, wireless and delay-sensitive multimedia applications. NSF protects IT data centers, service provider networks, and hosting infrastructures from hacks, attacks, worms and viruses. It integrates Nortel accelerator technology and Firewall-1/VPN-1 from Check Point Software Technologies to create a high-performance, resilient security solution.

Any firewall has two basic functions:

- Policy inspection – Inspect all traffic and compare it to defined security rules.
- Policy enforcement and data forwarding – Forward or block traffic based on the rules and signatures.

The network should be protected by the best security firewall available. This is why Nortel has partnered with Check Point Software Technologies to create the Nortel Switched Firewall.

Ideal For

- Applications needing multi-Gbps throughput, high session connection rates and thousands of concurrent users
- Customers that have deployed Check Point firewall/vpn on an older platform that need better performance. Conversion to a Nortel Switched Firewall platform is easy and re-uses their existing Check Point license
- Cost-conscious organizations that centrally manage a deployment of global firewalls
- Protection from current and future hacks, attacks, worms and viruses
- Organizations deploying SIP, VoIP, multimedia or other delay-sensitive applications or services
- Service providers (wireless or wireline) protecting and enabling access to SIP and multimedia applications and services

Business Challenges

- Provide needed security without compromising performance or resiliency
- Achieve throughput and connection capacity necessary to support all of today's and tomorrow's applications and services
- Deploy security solutions optimized to support SIP, VoIP, web-services and multimedia applications

Typical Applications

- **Block hacks, attacks, worms and viruses** – Nortel Switched Firewall has both network-level and application-level protection. It guards against:
 - Denial of Service attacks
 - Oversized packets
 - SYN floods
 - Fragmentation attacks
 - Nimda
 - Code Red
 - Cross Site Scripting, and other network- or application-based attacks

- **Support applications necessary for web-services and multimedia deployment** – NSF has the broadest application support in the industry. Over 150 pre-defined applications help to ensure that any web services deployment can traverse the Switched Firewall without performance limitations. Application examples include:
 - Microsoft CIFS
 - SMTP, FTP, HTTP, DNS and telnet traffic
 - SOAP/XML
 - Instant Messaging and Peer-to-Peer Applications
 - Windows Media, RealVideo and Session Initiation Protocol (SIP)
 - H.323-based services, including Voice over IP (VoIP) and NetMeeting
 - Oracle SQL and ERP
- **Nortel Switched Firewall 5100 series** – Deployed to provide application intelligent firewalling at small to medium business locations and at branch offices of larger organizations. Large organizations are able to manage their 6000 series firewalls and the branch firewalls with the same tools and processes.
- **Nortel Switched Firewall 6000 series** – Deployed in medium to large organizations and service providers to provide high-performance, application-intelligent firewalling.

Key Points

- Replace aging platforms running Check Point Firewall-1/VPN-1. The firewall license migrates and staff re-training is minimized.
- The Nortel Switched Firewall has the best price/performance ratio on the market making it the best choice for performance-hungry networks.
- The NSF is fully supported by Nortel with an ongoing strategic relationship with Check Point.

Features and Benefits

- Protects wired and wireless networks from existing and new threats and attacks, including Denial of Service, viruses and worms
- Integrates advanced Firewall-1/VPN-1 Next Generation from Check Point, a key Nortel Network security partner
- Provides application-aware security services that protect new and emerging applications and services such as SOAP/XML, SIP, VoIP and Peer-to-peer
- Delivers up to 7 Gbps of throughput in high-availability configurations
- Reduces cost of ownership by eliminating discrete firewall instances and improving overall firewall management and operation

Technical Specifications

Nortel Switched Firewall Product Matrix

Model / Feature	5106	5111	5114/5124 ¹	6416/6426 ¹	6616/6626 ¹
Throughput (Gbps)	0.350	1.2	1.6	5.0	7.0
Connections per sec ²	3,600	12,000	10,000	20,000 / Director	20,000 / Director
Accelerated concurrent sessions	0	0	0	750,000	750,000
Total concurrent sessions	250,000	300,000	500,000	2,000,000	2,000,000
Layer 3 protocols	OSPF	OSPF	OSPF	OSPF, RIP 1&2	OSPF, RIP 1&2
VPN Throughput 3DES ¹ (Mbps)	55	88	88/350	88/350 per Director	88/350 per Director
VPN concurrent tunnels	10,000	10,000	25,000	25,000	25,000
Virtual Firewalls	No	No	Yes – 250	No	No
VLANs/IEEE 802.1q	Yes	Yes	Yes	Yes – up to 242	Yes – up to 242

Model / Feature	5106	5111	5114/5124 ¹	6416/6426 ¹	6616/6626 ¹
Health checks & load balancing	No	No	No	Yes	Yes
Multi-link trunking	No	No	No	Yes	Yes
Plug-and-play	No	No	No	Yes	Yes
Single system image upgrade	Yes	Yes	Yes	Yes	Yes
Expansion options	No	Via upgrade	Via upgrade	Yes	Yes
High availability	Yes	Yes	Yes	Yes	Yes
Ethernet TX ports: 10/100	2	4	0	24	0
Ethernet TX ports: 10/100/1000	2	2	2	0	8 ³
Ethernet Fiber ports	0	0	2 x 1000SX	4 x GBIC	8 x GBIC ³

Notes:

1. The NSF 5124 has a VPN Acceleration capability to improve encryption performance from 88 to 350 Mbps. The NSF 5026 is a Director platform with the same VPN Acceleration capability. Multiple (up to 6) NSF 5026 may be clustered with 6400 or 6600 Switched Firewall Accelerators to create a high-performance VPN cluster with up to 2 Gbps of 3DES throughput.
2. Multiple Directors (up to 6) can be load balanced to achieve up to 100,000 Connections per second in an accelerated cluster.
3. Any 12 ports can be enabled at one time on the Switched Firewall Accelerator 6600.

Market Information

The firewall market is well established. Nortel retains some specialized market share with NSF and Contivity firewalls. Many organizations must reassess their firewall strategy and needs. Deploying VoIP, SIP, multimedia and wireless technologies drive this reassessment. Performance factors such as throughput, delay, connections per second and total connections mean that older firewalls may need to be replaced. The Nortel Switched Firewall is ideal to support these new applications and services.

Nortel Switched Firewall 5100 series

Overview

The Nortel Switched Firewall 5100 series inspects traffic to help ensure that no attacks, viruses or worms are transported across the firewall.

The series includes:

- Wire-speed packet forwarding for assured performance
- Simplified network topology for easier management and troubleshooting
- Rapid service restoration using common protocols
- Protection from application-level attacks via Check Point Smart Defense functionality

The Switched Firewall 5100 series offers stand-alone deployments for small- or medium-sized sights or branch offices.

Typical Applications

- **Protection for voice and multimedia services** – Companies are deploying voice over IP (VoIP) and Session Initiation Protocol (SIP) services to enhance productivity. The added flexibility and mobility from these services means that VoIP and SIP traffic will need to traverse the firewall. This can present many problems. Traditional firewalls may not support the complexity of signaling used by these services. Many existing firewall implementations add too much delay or jitter into the media path and adversely affect the voice or multimedia quality. High packet throughput to minimize delay, VoIP and SIP application awareness and virtually jitter-free performance are fundamental to the Switched Firewall design and function.
- **Minimize cost of operation** – Network traffic is growing. Organizational dependence on communication and interaction means that security solutions which are cost-effective and can grow to meet future demand must be deployed. The Nortel Switched Firewall 5100 Series can grow to meet future demand. An initial system with one Switched Firewall supports up to 10,000 connection requests per second and 500,000 total concurrent sessions. As the network traffic increases, a Switched Firewall Accelerator can be added. Up to six Switched Firewalls can be supported by a

Switched Firewall Accelerator to provide up to 100,000 connection requests per second and 6,000,000 total concurrent sessions. Adding additional capacity to a Switched Firewall System is easy. A Single System Image controls all configuration data, including physical interfaces, VLANs, IP interfaces, routing protocols and administrative settings. This data is securely and automatically shared within the Switched Firewall cluster. In addition, the cluster is managed through a single IP address, making it easy to perform configuration changes, backup configuration data and update software for all units in the cluster. An existing Check Point customer may re-use an existing license to easily move the firewall onto any Nortel Switched Firewall System.

Features and Benefits

- Protects and supports SIP, VoIP, wireless and other advanced services with no performance impact.
- Combines Check Point security with Nortel networking to create a security solution that eliminates boundaries while protecting resources.
- Improves the performance compared to server-based firewall deployments.

Technical Specifications

Part numbers and description

- **EB1639107** – Switched Firewall 5106: 2 x 10/100/1000Base-TX ports, 2 x 10/100 Mbps ports
- **EB1639127** – Switched Firewall 5111: 2 x 10/100/1000Base-TX ports, 4 x 10/100 Mbps ports
- **EB1639128** – Switched Firewall 5114: 2 x 1000BASE-SX ports, 2 x 10/100/1000 Mbps ports
- **EB1639129** – Switched Firewall/VPN 5124: 2 x 1000BASE-SX ports, 2 x 10/100/1000 Mbps ports and VPN-acceleration card

Interfaces

- 10BASE-T/100BASE-TX Port 10/100 full or half-duplex (auto-negotiation) with RJ-45 UTP port
- 1000BASE-SX Port full-duplex Gigabit Ethernet with SC fiber connector
- RS-232C Console DB-9 serial connection, female DCE interface for out-of-band management

Dimensions

- Height 1.75 inches (4.44 cm)
- Width 16.69 inches (42.39 cm)
- Depth 16.53 inches (42.01 cm)
- Weight 19 lbs (8.6 kg)
- (Standard 19 in. EIA 1U rack mountable)

Network protocol and standards compatibility

- 10BASE-T/100BASE-TX/1000BASE-TX (IEEE 802.3-2000)
- 1000BASE-SX/LX (IEEE 802.3z)
- Logical link control (IEEE 802.2)
- Flow control (IEEE 802.3x)
- Link negotiation (IEEE 802.3z)
- Port Trunking (IEEE 802.3d)
- VLANs (IEEE 802.1Q): Frame tagging on all ports when LANs enabled
- IP (RFC 791)
- ICMP (RFC 792)
- ARP (RFC 826)
- RIP 1 (RFC 1058), RIP 2 (RFC 1723)
- OSPF with md5 authentication (RFC 2328)
- VRRP (RFC 2338)
- CDR (RFC 1519)
- TFTP (RFC 783), FTP (RFC 959)

- Telnet (RFC 854)
- SSH v1/v2
- SSL/TLS (RFC 2246)
- DVMRP (RFC 1075)
- IGMP (RFC 2236)
- Bootp/DHCP Relay (RFC 2131)
- SNMPv2c (RFCs 1901, 1905, 1906, 1907, 2578, 2579, 2580)
- SNMPv3 (RFCs 2570, 2571, 2572, 2573, 2574, 2575)

Power specifications

- Auto-ranging power supply: 00-240 VAC @ 3.5 Amps, 50-60 Hz
- Maximum power consumption: 250 Watts
- MTBF: >50,000 hours

Environmental specifications

- Operating temperature: 10 to 35° C (+45° to +100° F)
- Operating humidity: 8% to 80% (non-condensing)

Certifications

- EMC: (Electromagnetic requirements)
 - USA: FCC Part 15, Subpart B Class A
 - Australia: AS/NZS CISPR 22:2002
 - Canada: ICES-003
 - Japan: VCCI Class A
 - Europe: EN 300 386 v1.3.1 (2001-09)
 - Taiwan: BSMI Registration Certificate
 - Rest of World: CISPR 22 Class A
- Emissions:
 - US— FCC Class B
 - Canada— DOC Class B
 - Europe— CE Mark to EN55022/EN50082-1/ICE 801-2/ICE 801-3/ICE 801-4

Industry:

- EAL-4
- OPSEC
- ICSA
- Safety
 - IEC 60950 (International)
 - National Deviation per CB Member Countries to IEC 60950
 - UL 1950 (USA)
 - CSA 22.2, No. 950 (Canada)
 - EN 60950 (Europe)

Ordering Information

For further information, please contact your local Nortel representative.

Nortel Switched Firewall 6000 series



Overview

The network should be protected by the best security firewall available. This is why Nortel Networks has partnered with Check Point Software Technologies to create the Nortel Networks Switched Firewall 6000 series.

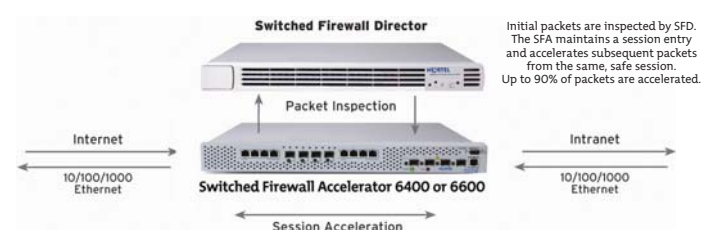
The Nortel Networks Switched Firewall 6000 series is certified under the Check Point Open Platform for Security (OPSEC) criteria and enhances the FireWall-1 deployment with unique services and capabilities.

Typical Applications

- **Layer 2 through Layer 7 Content Filtering** – The Switched Firewall System performs full inspection of any IP application header or payload. This information is used to apply firewall rules to the network data flows. This capability enables the switched firewall to block attacks and unauthorized traffic before there is any chance for performance degradation or network outage. Up to 224 filtering rules can be configured to allow or deny traffic based on application type, protocol type and IP source/destination addresses.
- **Device Load Balancing** – Up to six Switched Firewall Directors can be load balanced with a single Switched Firewall Accelerator. Health checks are performed to ensure availability. In addition, Intrusion Detection Systems (IDS) can be load balanced from the Switched Firewall System. Multiple systems may be run in parallel across multiple security zones or VLANs with the Switched Firewall System ensuring that all sessions and all frames are sent to the same IDS system.

- **VLAN Tagging** – With IEEE 802.1q support, each VLAN is supported as a separate firewall interface. Up to 242 individual VLANs are supported. Unique security policies may be implemented and enforced for each VLAN. This makes the 6414 and 6614 ideal for deployment in multi-tenant or multi-department environments where unique security policies and inter-VLAN policy inspection is required. Examples include: airports, government offices, malls, stadiums, schools, universities and hospitals.
- **Network Address Translation** – The Switched Firewall System performs Network Address Translation (NAT) to preserve and hide organizational IP addresses. With this accelerated-NAT function performed in the switch hardware, the core firewall system devotes its resources to session connections and complex security concerns – there is no performance or throughput degradation. Traditional firewalls often cause degradations in network performance and throughput when invoking NAT functions.

Network Diagram



Key Points

Nortel combines its industry-leading network switching and acceleration with the industry's best security firewall from Check Point. The combined system supports secure access to enterprise resources including SIP, VoIP, and other delay sensitive applications without compromising performance.

- Recognizes and blocks network, application and protocol attacks (DoS, SYN, Nimble, Code Red, Scripts ...)
- Optimized for SIP, VoIP and multimedia services
- Field-proven, network-based solution supports Layer 2 and Layer 3 modes for flexible deployment
- Combined with Nortel's Threat Protection System, it provides an adaptive defense against emerging attacks.

Features and Benefits

- Intelligent security with high performance –
 - Throughput of 7 Gbps
 - Connections per second of 20,000 to 100,000
 - Concurrent accelerated sessions of 1,000,000
- Plug-and-play deployment and expansion with a single-system-image that is easy to manage and maintain.
- Multi-layer packet inspection for extra protection from advanced hackers and attackers.
- Optimized security with switch-based acceleration that off-loads CPU processing and minimizes impact on next-generation multimedia, SIP, and VoIP services.
- Device load-balancing for advanced support of Threat Protection Systems or VPN Gateways.
- Active-active configurations for high availability environments where 99.999% application and service availability is a must.

Technical Specifications

• Part numbers and description

- **EB 1639174** – Switched Firewall System 6616, complete with Accelerator and Director
- **EB 1639113** – Switched Firewall Accelerator 6600, to upgrade an existing Director or to create a High Availability configuration
- **EB 1639173** – Switched Firewall System 6416, complete with Accelerator and Director
- **EB 1639067** – Switched Firewall Accelerator 6400, to upgrade an existing Director or to create a High Availability configuration
- **EB1639130** – Switched Firewall Director 5016

Interfaces

• Accelerator:

- 10/100/1000BASE-TX Port 10/100/1000 full or half-duplex (auto-negotiation) with RJ-45 UTP port
- 1000BASE-SX Port 1-port 1000BASE-SX SFP GBIC (Con. Type: LC)
- 1000BASE-LX Port 1-port 1000BASE-LX SFP GBIC (Con. Type: LC)
- RS-232C Console DB-9 serial connection, female DCE interface for out-of-band management

• Director:

- 10BASE-T/100BASE-TX Port 10/100 full or half-duplex (auto-negotiation) with RJ-45 UTP port
- RS-232C Console DB-9 serial connection, female DCE interface for out-of-band management

• Dimensions

	Accelerator	Director
Height	1.75 inches (4.44 cm)	1.75 inches (4.44 cm)
Width	17.61 inches (44.0 cm)	16.69 inches (42.39 cm)
Depth	20 inches (50.8 cm)	16.53 inches (42.01 cm)
Weight	21 lbs (9.53 kg) (Standard 19 in. EIA 1U rack mountable)	19 lbs (8.6 kg) (Standard 19 in. EIA 1U rack mountable)

• Technical specifications

- IP routing interfaces 256
- VLANs 252
- Default gateways 4
- Trunk groups 12

• Network protocol and standards compatibility

- 10BASE-T/100BASE-TX/1000BASE-TX (IEEE 802.3-2000)
- 1000BASE-SX/LX (IEEE 802.3z)
- Logical link control (IEEE 802.2)
- Flow control (IEEE 802.3x)
- Link negotiation (IEEE 802.3z)
- Port Trunking (IEEE 802.3d)
- VLANs (IEEE 802.1Q): Frame tagging on all ports when LANs enabled
- IP (RFC 791)
- ICMP (RFC 792)
- ARP (RFC 826)
- RIP 1 (RFC 1058), RIP 2 (RFC 1723)
- OSPF with md5 authentication (RFC 2328)
- VRRP (RFC 2338)
- CIDR (RFC 1519)
- TFTP (RFC 783), FTP (RFC 959)
- Telnet (RFC 854)
- SSH v1/v2
- SSL/TLS (RFC 2246)
- DVMP (RFC 1075)
- IGMP (RFC 2236)
- BootP/DHCP Relay (RFC 2131)
- SNMPv2c (RFCs 1901, 1905, 1906, 1907, 2578, 2579, 2580)
- SNMPv3 (RFCs 2570, 2571, 2572, 2573, 2574, 2575)

• Power specifications

- Auto-ranging power supply 00-240 VAC @ 3.5 Amps, 50-60 Hz
- Maximum power consumption 250 Watts
- MTBF >50,000 hours

• Environmental specifications

- Operating temperature 10 to 35° C (+45° to +100° F)
- Operating humidity 8% to 80% (non-condensing)

• Certifications

- EMC: (Electromagnetic requirements)
- USA: FCC Part 15, Subpart B Class A
- Australia: AS/NZS CISPR 22:2002
- Canada: ICES-003
- Japan: VCCI Class A
- Europe: EN 300 386 v1.3.1 (2001-09)
- Taiwan: BSMI Registration Certificate
- Rest of World: CISPR 22 Class A

• Emissions:

- US – FCC Class B
- Canada – DOC Class B
- Europe – CE Mark to EN55022/EN50082-1/ICE 801-2/ICE 801-3/ICE 801-4

• Industry:

- EAL-4
- OPSEC
- ICSA

• Safety

- IEC 60950 (International)
- National Deviation per CB Member Countries to IEC 60950
- UL 1950 (USA)
- CSA 22.2, No. 950 (Canada)
- EN 60950 (Europe)

Ordering Information

For further information, please contact your local Nortel representative.

Nortel Threat Protection System

Overview

Nortel takes a SNORT-based Intrusion Detection System (IDS) and combines it with the industry's best switched firewall for adaptive threat protection. The combined system defends the network against hacks, attacks, worms and viruses. This technology is now extended to a multi-layer in-line Intrusion Prevention System (IPS) model and a Real-time Threat Intelligence system. Together these systems provide:

- High-speed pre-processing and analysis of threat traffic
- Multi-layer inspection and anomaly scanning to detect sophisticated and emerging threats
- A signature database that uses the worldwide knowledge of the SNORT user community
- Information from advanced queries and reports – results in better network protection and enables measurement of organizational security compliance
- Total support from Nortel, including signature updates, makes TPS easy to deploy and support

Ideal For

Medium to large organizations including healthcare, finance, manufacturing, transportation, utilities, service industry, governments, education and high tech that:

- Must comply with corporate and government security regulations
- Are concerned about worms, viruses and attacks that cause disruption and cost real money
- Value secure remote access for employees, partners and customers
- Need advanced threat detection and blocking to ensure critical business systems are not compromised
- Require application-aware security solutions that adapt to changing network requirements and evolving threat profiles

Service organizations offering managed security services to enterprises of all types and sizes. May be a systems integrator, VAR, service provider, landlord, government agency or an in-house service bureau in a large, global company.

Service requirements:

- Must meet service level agreements and help show security policy compliance and effectiveness

- Need good threat information for planning and troubleshooting – affects service profitability
- Need to ensure multi-domain secure remote access
- Need advanced threat detection and blocking to ensure critical systems are not compromised
- Require application-aware solutions that adapt to changing network requirements and evolving threat profiles

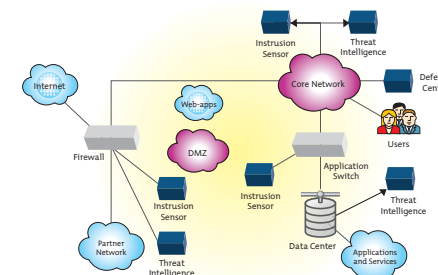
Business Challenges

- Security incidents are on the rise – over 140,000 reported in 2004.
- The sophistication and complexity of attacks are increasing.
- Increased mobility and access create new means for threats to penetrate network defenses.
- New regulatory requirements and corporate security audits increase the need for security knowledge and reporting.

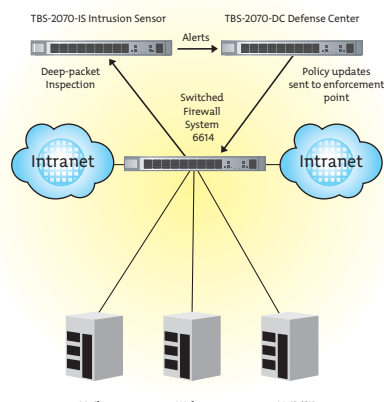
Typical Applications

- **Threat Detection with Intrusion Sensors** –
 - Multi-level Inspection – A rule-based detection method examines protocol fields looking for specific attack profiles. This catches threats hidden deep within the data payload.
 - Anomaly Detection – Switch-based, pre-processing performs complex stateful protocol analysis and normalization. This detects unusual traffic flows like port scans, IP stack fingerprinting, Denial of Service attacks and ARP spoofing.
- **Real-time Threat Intelligence** – Monitor and profile all assets and traffic flows on the network – any IP address that is a potential source or target of an attack. The real-time threat intelligence is analyzed along with the security events flagged by the Intrusion Sensors to create a very accurate threat assessment. Immediate manual or automatic action may be taken to block or isolate the threat.
- **Threat Analysis**
 - Queries and Reports – Provide a detailed analysis of security alerts and events. This enables administrators to quickly determine the response to a new or ongoing threat. Full reporting capabilities enable users to correlate event information for forensic analysis, archiving and compliance.
 - Trap and Trace – Administrators can choose to tag and record sessions that follow a threat event. This capability records subsequent information and is useful in fully analyzing the impact, source, and target of an attack.
- **Event Database** – The high performance database in the Defense Center management console is capable of handling millions of events. Support for in-depth forensic analysis helps with identification of long-term security trends. The database is pre-installed, pre-configured, and self-maintaining. This enables administrators to focus on event consolidation and analysis.
- **Threat Response**
 - In-line Threat Protection – In-line Intrusion Sensors use multi-level inspection, anomaly detection and real-time threat intelligence to find threats. Once detected, traffic flows are dropped or rate-limited to mitigate the attack.
 - Adaptive Defense with Real-time updates – Off-line Intrusion Sensors use multi-level inspection, anomaly detection and real-time threat intelligence to find threats. Once detected, real-time updates are sent to Nortel Switched Firewalls and Application Switches. Dangerous traffic flows are dropped or rate-limited to mitigate the attack.
- **Policy Management and Configuration Control** – The Defense Center manages sensor policies, configures alert responses and sets user administration privileges from one central location. A single Defense Center supports a large hierarchical grouping of Threat Intelligence and Intrusion Sensors. It aggregates and presents event data from across the grid of sensors. Security administrators use the analysis tools in Defense Center to correlate and analyze network or application threats.

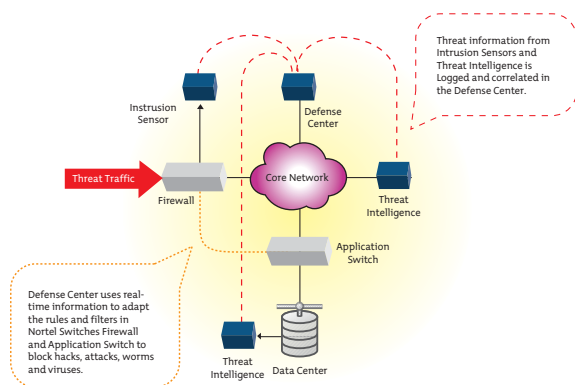
Network Diagrams



Deploying TPS in a Network



Threat Response with Nortel Switched Firewall



Real-time Intelligence and Intrusion Detection Result in Adaptive Defense

Features & Benefits

Feature	Benefit
Detect known threats via deep-packet pre-processing, normalization and inspection	Exposes defense weaknesses and enables administrators to take corrective actions
Detect unknown threats via anomaly scanning	Gives early warning against emerging threats or malicious internal activity
A flexible rule set and administrative structure	Eliminates the expense of false alarms
Keep up-to-date on new threats and vulnerabilities via the SNORT community and a dedicated team of security experts	Helps to maintain the most effective security posture possible

Feature	Benefit
Query and report on threats and event data	Gain a better understanding of ability to protect the network
Trap and trace traffic associated with any attack	Analyze all critical information to formulate response to generic or specialized attacks
Create an adaptive defense that responds immediately to block new and emerging threats	Detect and block threats or attacks by updating Switched Firewall, Router, or Application Switch rules and filters before application availability or performance can be impacted

Market Information

In 2004, attack Incidents reported were more than 150,000. The Internet now connects more than 180 million computers and attack technology has advanced. Organizations continued to see a rise in both the number of security and the sophistication of the attacks. A significant concern is a ZERO DAY attack – attacking vulnerabilities before they are announced, before the vendor issues patch or an

anti-virus vendor issues an update. In a ZERO DAY attack scenario, an otherwise unknown vulnerability will have exploit code readily passing through the Internet before customers are aware of the vulnerability – often there is no time to test and issue a patch. Nortel's Layered Defense Approach to network security including Threat Protection System helps to mitigate the damage of known, emerging and unknown threats.

Technical Specifications

• Part numbers and description

Part #	Model #	Description
EB1639140	TPS 2050-IS	Threat Protection System 2050 Intrusion Sensor with 150 Mbps of intrusion sensing. Includes 4 x 10/100/1000 TX. System has 1 GB RAM and 80 GB HDD.
EB1639141	TPS 2070-IS	Threat Protection System 2070 Intrusion Sensor with 1 Gbps of intrusion sensing. Includes 4 x 10/100/1000 TX. System has 2 GB RAM and 80 GB HDD along with dual CPU.
EB1639142	TPS 2070-DC	Threat Protection System 2070 Defense Center console and management software.
EB1639155	TPS 2150-IS	Threat Protection System 2150 Intrusion Sensor with 100 Mbps of intrusion sensing and a bypass NIC for inline operation. Includes 4 x 10/100/1000 TX. System has 1 GB RAM and 80 GB HDD.
EB1639156	TPS 2170-IS	Threat Protection System 2170 Intrusion Sensor with 1000 Mbps of intrusion sensing and a bypass NIC for inline operation. Includes 4 x 10/100/1000 TX. System has 2 GB RAM and 80 GB HDD along with dual CPU.
EB1639158	TPS 2050-TI	Threat Protection System 2050 Threat Intelligence processes 100 Mbps of traffic and supports real-time threat analysis for 8192 nodes. Includes 4 x 10/100/1000 TX. System has 1 GB RAM and 80 GB HDD.
EB1639159	TPS 2070-TI	Threat Protection System 2070 Threat Intelligence processes 1000 Mbps of traffic and supports real-time threat analysis for 65000 nodes. Includes 4 x 10/100/1000 TX. System has 2 GB RAM and 80 GB HDD along with dual CPU.
EB1639160	TPS-RTI-5	Real-time Threat Intelligence License - up to 511 nodes

Part #	Model #	Description
EB1639161	TPS-RTI-10	Real-time Threat Intelligence License - 512 to 1023 nodes
EB1639162	TPS-RTI-20	Real-time Threat Intelligence License - 1024 to 2047 nodes
EB1639163	TPS-RTI-40	Real-time Threat Intelligence License - 2048 to 4095 nodes
EB1639164	TPS-RTI-80	Real-time Threat Intelligence License - 4096 to 8191 nodes
EB1639165	TPS-RTI-160	Real-time Threat Intelligence License - 8192 to 16383 nodes
EB1639166	TPS-RTI-320	Real-time Threat Intelligence License - 16384 to 32767 nodes
EB1639167	TPS-RTI-Plus	Real-time Threat Intelligence License - 32768 plus nodes

• Interfaces

- Includes 4 x 10/100/1000 TX
- RS-232C Console DB-9 serial connection, female DCE interface for out-of-band management

• Dimensions

- Height 1.75 inches (4.44 cm)
- Width 17.61 inches (44.0 cm)
- Depth 20 inches (50.8 cm)
- Weight 21 lbs (9.53 kg)
(Standard 19 in. EIA 1U rack mountable)

• Network protocol and standards compatibility

- 10BASE-T/100BASE-TX/1000BASE-TX (IEEE 802.3-2000)
- 1000BASE-SX/LX (IEEE 802.3z)
- Logical link control (IEEE 802.2)
- Flow control (IEEE 802.3x)
- Link negotiation (IEEE 802.3z)
- IP (RFC 791)
- ICMP (RFC 792)
- ARP (RFC 826)
- TFTP (RFC 783), FTP (RFC 959)
- Telnet (RFC 854)
- SSH v1/v2
- SSL/TLS (RFC 2246)
- BootP/DHCP Relay (RFC 2131)
- SNMPv2c (RFCs 1901, 1905, 1906, 1907, 2578, 2579, 2580)
- SNMPv3 (RFCs 2570, 2571, 2572, 2573, 2574, 2575)

• Power specifications

- Auto-ranging power supply 00-240 VAC @ 3.5 Amps, 50-60 Hz
- Maximum power consumption 250 Watts
- MTBF >50,000 hours
- Environmental specifications
- Operating temperature 10 to 35° C (+45° to +100° F)
- Operating humidity 8% to 80% (non-condensing)
- Certifications

• EMC: (Electromagnetic requirements)

- USA: FCC Part 15, Subpart B Class A
- Australia: AS/NZS CISPR 22:2002
- Canada: ICES-003
- Japan: VCCI Class A
- Europe: EN 300 386 v1.3.1 (2001-09)
- Taiwan: BSMI Registration Certificate
- Rest of World: CISPR 22 Class A

• Emissions:

- US – FCC Class B
- Canada – DOC Class B
- Europe – CE Mark to EN55022/EN50082-1/ICE 801-2/ICE 801-3/ICE 801-4

• Industry:

- EAL-4
- OPSEC
- ICISA

• Safety

- EC 60950 (International)
- National Deviation per CB Member Countries to IEC 60950
- UL 1950 (USA)
- CSA 22.2, No. 950 (Canada)
- EN 60950 (Europe)

Ordering Information

For further information, please contact your local Nortel representative.

Nortel Application Switch-Security Features



Overview

Nortel has once again raised the bar in the intelligent networking arena with its best-in-breed portfolio of application switches. The Nortel Application Switch allows enterprises to contain and reduce operating costs and to defer or eliminate upgrades to the server and application platforms. A giant leap forward in application-aware networking, this Nortel solution enables multi-application switching that allows enterprises to maximize existing investment in servers and networks through application-intelligent traffic management, load balancing and sophisticated security services. Available in fast Ethernet and gigabit Ethernet models, the Nortel Application Switch improves business productivity and simplifies operations while protecting the organization from denial of service attacks and application abuse. The Nortel Application Switch also allows service providers to efficiently enable differentiated services for enterprise businesses. With integrated SSL acceleration, SSL VPN, security and high-performance content-aware switching, the Nortel Application Switch provides best-in-class application integration and return on investment.

Ideal For

- Enterprises who are interested in designing their networks for business applications and in maximizing the return on their existing investments in servers and networks through application intelligent traffic management, integrated application support and sophisticated security features
- Any organization that uses web-enabled business applications (ERP, CRM, etc.) or next generation applications (wireless LAN, VoIP, Web services, etc.) and wishes to extend the reach of its business
- Enterprises, hosting providers, content providers, ebusinesses and service providers who require high performance switching for their IT data centers, network and hosting infrastructures
- Organizations wishing to protect and enhance their business through increased online service availability and performance
- Service providers who need to efficiently enable differentiated services for their enterprise customers

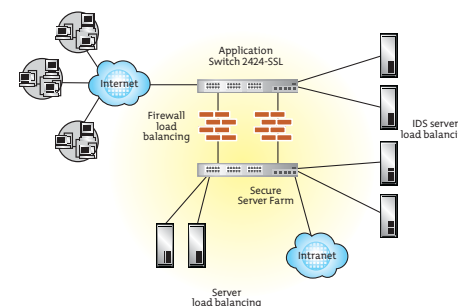
Business Challenges

- Do you want the ability to rapidly deploy new online initiatives to enhance existing customer/partner/employee services or to capture new markets?
- Are content prioritization, increased network and enhanced online security key to your business success?
- Do you want the ability to contain and reduce operating costs and to defer or eliminate upgrades to the server and application platforms while delivering functionality, application performance and maximizing return on investment?

Typical Applications

- Enterprises that are interested in designing their network for business applications and in maximizing the return on their existing investments in servers and networks through application intelligent traffic management, integrated application support, and sophisticated security features.
- Service providers who need to efficiently enable differentiated services for their enterprise customers

Network Diagram



Application-Aware Switching and sophisticated Security Protects and Optimizes the Network and Applications

Key Points

- Improves business productivity and simplifies operations by utilizing intelligent traffic management capabilities to differentiate and route traffic at blazing speeds based on business priorities and network conditions. Nortel switches use sophisticated deep packet inspection and pattern matching capabilities to identify application traffic or a user session within an application and monitor, discard, prioritize, rate limit or rate shape the traffic.
- Enables fail-safe business continuity by eliminating single points of failure and providing device and application failover. Nortel Application Switches accomplish these objectives through sophisticated load balancing and application health checking features as well as a high availability architecture (supports VRRP with active-active or active-standby configurations).
- Provides secure access to business applications and networks through SSL acceleration server offload and SSL VPN which provides a simple remote access security solution that extends the reach of enterprise applications to mobile workers, telecommuters, partners and customers
- Protects applications and networks via multi-layer security. The Nortel Application Switch enables tight security without performance degradation via multiple security acceleration/

load balancing services and integrated security applications such as SSL acceleration. In addition, it protects against denial of service attacks and application abuse.

- Scales business applications efficiently. Enables servers or other network devices to be added to load balanced clusters without service interruption. Nortel Application Switches also enable the plug-n-play addition of integrated application (SSL appliance, etc.) capacity.
- Simplifies application deployment and delivery, enables application optimization, and securely scales delivery of business critical applications such as VoIP, Web Services, ERP, CRM, Wireless, P2P, etc. Example application support: BEA Weblogic, Microsoft .Net Platform, IBM WebSphere, Microsoft Exchange, and Oracle 9iAS
- Maximizes return on IT investment. Nortel Application Switches allow enterprises to use existing infrastructure more efficiently, simplify network design, provide security and scalability and adjust the network quickly to meet rapidly changing business requirements. As a result, enterprises can reduce infrastructure and operating expenses, maximizing return on investment in network and data center assets.
- The Nortel Application Switch is the industry leader in performance, functionality, scalability and reliability when it comes to content switching. Nortel switches have held a leadership position in the Layer 4-7 fixed switch market for six straight years (Dell'Oro).

- Distributed architecture. The Nortel Application Switch uses a distributed architecture to ensure that all processor intensive intelligent decisions are off loaded evenly across all processors.
- The feature-rich Nortel Application Switch enabled by Nortel OS not only performs standard content switching but also allows for advanced applications such as firewall load balancing, application redirection, wireless access and full RTSP streaming support.
- Integrated SSL functionality provides SSL acceleration and support for SSL VPNs. SSL functionality is fully integrated with the existing Nortel SSL Accelerator appliances. This not only provides scalability, resilience and manageability on an unparalleled scale, but also offers other SSL functions such as SSL VPN support allowing secure, remote access to corporate networks from any location.
- Easy to manage. The Nortel switch is an easy-to-manage and robust device that is deployed in some of the most mission-critical and highly accessed sites today. Application Switch Element Manager is the graphical user interface (GUI) tool that is used for managing the Application Switch Portfolio. It makes retrieval of configuration information from a device a simple point and click operation. It also allows the network manager to remotely manage application switches.
- OSPF and BGP routing. The use of OSPF and BGP routing makes integration into existing large-scale networks a simple and painless task.

Features and Benefits

Application Optimization

- Policy-based application redirection and load balancing based on application and content intelligence
- Application health checking and sophisticated application load balancing simplify deployment and enable high availability application architectures.

- User-scriptable health checks enable customized application health checking.
- Intelligent Application Traffic Management enables the inspection of application flows for pre-defined attributes, classifying flows based on these attributes, applying traffic policies (monitor, discard, prioritize, rate limit, or rate shape) and reporting usage of such applications.
- Peer-to-Peer traffic inspection, redirection, bandwidth rate limiting and rate shaping
- Bandwidth Management with rate limiting and rate shaping based on Layer 4-7 attributes
- Web services-aware specialized traffic management features enable secure, fault-tolerant Web services.
- Link load balancing (inbound and outbound) for simplified, optimized multi-homed networking
- Open Application Programming Interface and standards-based XML interface for the Element Management System (EMS) enable applications or appliance communication directly with the switch.
- Geographic redundancy through Global Server Load Balancing (GSLB). GSLB allows application content to be distributed globally by directing requests for application content to the best site based on server health, proximity to the client, and response times. This enables requests for content to be sent to the optimal site in the event of a failure, disaster or network performance degradation at one site.
- Persistent application support in which the client must interact with the same server for the life of a session. Applications requiring persistence include multi-page forms, payment transactions and shopping carts.
- Multi-application support on a single platform. Many applications can be supported concurrently on one platform (e.g., local and global server load balancing, intelligent traffic management, application redirection, application-layer security, security

- acceleration, secure remote access – SSL VPN, filtering, bandwidth management, inbound and outbound link load balancing, etc.
- High availability architecture support through advanced implementation of the Virtual Router Redundancy Protocol (VRRP). Supports active-active, active-standby and hot-standby modes.
- Supports more than 51,000 Layer 7 sessions/second and 110,000 Layer 4 sessions/second with zero session loss (real-world testing, Tolly, Jan. 2003).

Application Security

- Multi-layer security protects applications and networks at multiple points of attack through comprehensive application-layer intrusion prevention and Denial of Service protection, packet filtering, application abuse protection, SSL acceleration, SSL VPN, network address translation (NAT) and secure management.
- Comprehensive Denial of Service protection secures networks and applications against malformed packet, traffic flood, high profile virus, and worm attacks. Examples of these attacks are ping of death, Smurf, Fraggle, etc.
- Security device load balancing enables increased performance and reliability for intrusion detection systems (IDS), virtual private networks (VPN), Firewalls, SSL Accelerators, etc.
- SSL VPN secure remote access - Allows enterprises to offer mobile workers, telecommuters, and partners secure clientless VPN access to business applications and web portals.

Management

- Secure Management. Nortel Application Switches ensure secure switch management through allowable source IP address filtering, authentication and authorization of remote administrators (including RADIUS and TACACS+ support), and encryption of management information (HTTPS, SNMP v3, SSH v2).
- Data center virtualization (Utility Computing) - Service providers or Enterprises can virtualize and offer application switching as a service through the use of features such as

- Management Virtualization and traffic separation via support for VLAN gateways, filtering and multi spanning tree instances.
- Multi-protocol IP switching based on Routing Information Protocol (RIP) v1, Open Shortest Path First (OSPF), Border Gateway Protocol (BGP) 4, Spanning Tree, static routes, and more. Switches learn and cache IP addresses, providing direct IP switching for locally attached networks and the ability to route between VLANs and IP subnets within the switched network without an external router.
- High port density in a simplified, small form factor, Fast Ethernet and Gigabit Ethernet models with port density ranging from 10 to 28, all in a one rack unit platform

Market Information

Nortel's key strength in its applications switches is the single focus on the Nortel OS software that is used across all content switching products. This provides a rich feature set that can be confidently used without the threat of forklift upgrades or cross-product switches to provide functionality. The Nortel Application Switch consistently outperforms all other manufacturers in the content switching space and proves that brains and muscle are important. A 2003 Tolly testing Layer 7 performance test* showed that the Nortel Application Switch outperformed Cisco and F5 switches with 3-4X competitors layer 7 performance capacity. Coupled with this, the simple manageability and robustness of these Nortel switches far outpace any competition and allow customers to deploy the switch with the confidence that comes from using the best of breed.

Technical Specifications

Application Switches	3408	2424	2424-SSL	2216	2208
Total Ports	12	28	28	18	10
10/100 BASE-T	—	24	24	16	8
10/100/1000 BASE-T	8	—	—	—	—
SFP-GBIC (Fiber or Copper GE)	4	4	4	2	2
IP Routing Interfaces	256	256	256	256	256
Virtual Server Support	1,024	1,024	1,024	1,024	1,024
Real Server Support	1,024	1,024	1,024	1,024	1,024
Policy Filters	2,048	2,048	2,048	2,048	2,048
Concurrent Sessions	2M	2M	2M	1M	600K
Layer 7 Performance (sessions/second)	51K*	51K*	51K*	30K*	15K*
Layer 4 Performance (sessions/second)	110K*	110K*	110K*	40K*	20K*
Integrated SSL Acceleration (tps.)**	No	No	Base: 300 Max: 1000	No	No
Integrated SSL VPN	No	No	Yes	No	No
Height (inches/RU)	1.75/1	1.75/1	1.75/1	1.75/1	1.75/1
Network Protocol & Standard Compatibility	10/100/1000 Base-TX (IEEE 802.3) 1000Base-SX/LX (IEEE 802.3) Spanning Tree (IEEE 802.1d) Logical link control (IEEE 802.2) Flow control (IEEE 802.3x) Link negotiation (IEEE 802.3z) VLANs (IEEE 802.1Q) Frame tagging (IEEE 802.1Q) on all ports when VLANs enabled SNMP v3. IP RIPv1 BGP v4 OSPF TFTP (RFC 783) BootP (RFC 1542) BootP (RFC 951) Telnet (RFC 854) EtherChannel-compatible trunking				
Power Specification: Measurement	Auto-ranging power supply: 100-240 VAC @ 3.5 Amps, 50-60 Hz Maximum power consumption: 250 Watts				
Environmental Condition: Operating Specification	Temperature: 0° to 40° C (+32° to +104° F) Relative humidity: 85% maximum, non-condensing				

Certifications	EMC USA: FCC Part 15, Subpart B Class A Australia: AS/NZS CISPR 22:2002 Canada: ICES-003 Japan: VCCI Class A Europe: EN 300 386 v1.3.1 (2001-09) Taiwan: BSMI Registration Certificate Rest of World: CISPR 22 Class A Safety IEC 60950 (International) National Deviation per CB Member Countries to IEC 60950 UL 1950 (USA) CSA 22.2, No. 950 (Canada) EN 60950 (Europe)
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* "Real-world" testing scenarios with zero session loss

** "Real-world" testing scenarios

Ordering Information

For further information, please contact your local Nortel representative.

> Nortel Ethernet Routing Switch Portfolio

The Nortel Ethernet Routing Switch portfolio provides secure, high performing, resilient Ethernet switching products for organizations of all sizes. The products are designed to securely deliver Layer 2 and Layer 3 connectivity combined with Layer 4-7 content-aware intelligence. Integrated network security technologies provide a comprehensive security solution throughout the local area network. Enterprises that want a reliable, secure, cost-effective offering to accommodate converged application requirements will find an ideal product among Nortel's extensive Ethernet Routing Switch portfolio.

- Nortel Ethernet Routing Switch 8600 Series
 - Chassis (8010/8010 CO/8006/8003)
 - Routing Switch Fabric/CPU Modules (8671/8672/8691/8692)
 - Fast Ethernet/Gigabit Ethernet Modules (8624TXE / 8632TXE / 8648GTR/ 8648TXE)
 - Gigabit Ethernet Modules (Nortel Ethernet Routing Switch 8608SXE/ 8608GBE/ 8608GBM/ 8608GTM/ 8616SXE/ 8616GTE/ 8630GBR)
 - 10 Gigabit Ethernet Modules (Nortel Ethernet Routing Switch 8683XLR/ 8681XLW/ 8681XLR/ 8672ATME/ 8683PoSMO)
 - Application Modules (Nortel Routing Switch 8660 SDM/ 8600 WSM /8661 SAM)
- Nortel Ethernet Routing Switch 8300 Series (8300AC/ 8306/ 8310/ 8324GT/ 8348TX/ 8348TX-PWR/ 8393SF)
- Nortel Ethernet Routing Switch 1600 Series (1612G/ 1624G/ 1648T)
- Nortel Ethernet Routing Switch 1424T
- Nortel Ethernet Routing Switch 3510-24T
- Nortel Ethernet Routing Switch 5510 Series (5510-24T/ 5510-48T)
- Nortel Ethernet Routing Switch 5520 Series (5520-24T-PWR/ 5520-48T-PWR)
- Nortel Ethernet Routing Switch 5530-24TFD
- Nortel Ethernet Routing Switch RPS 15

Nortel's Ethernet Routing Switch 8600 delivers a reliable, secure and intelligent network routing solution for converged applications. Hardware-based wire speed performance combined with Quality of Service (QoS) mechanisms enable fast and efficient traffic classification, policy enforcement and filtering. This combination benefits time-sensitive applications such as video and voice with better application response times and fewer dropped calls. The Ethernet Routing Switch 8600 is a hardware-based Layer 2-7 routing and traffic classification switch specifically designed to offer a high level of resiliency, a large number of high-bandwidth connections and wire speed performance. Ethernet connectivity options include 10/100/1000 copper, 100 and 1000 fiber, CWDM, ATM and PoS. The Ethernet Routing Switch 8600 delivers a truly unique solution by combining performance, intelligence and five nines reliability in one solution.

- Enterprises where network uptime is critical
- Enterprises looking for a solution that integrates network traffic intelligence with security
- Organizations such as finance, healthcare, government and education

Enterprises

- Is application reliability critical to your business?
- Are you relying on your network to differentiate your business?
- Are you experiencing increased competition?
- Are you looking to reduce your networking costs?
- Are you trying to increase your employee productivity?
- Are there an increasing number of bandwidth-sensitive applications on your network?
- Do you require sub-second recovery from failures?
- Do you plan to upgrade your existing Ethernet network?
- Do you plan to unify your communications onto one network?

- What are your plans for deploying Web hosting services?
- What are your plans for deploying quality of service?
- What are your plans for deploying VoIP?
- What are your plans for deploying multimedia applications?
- What are your plans for deploying desktop based instruction?
- What are your plans for deploying 10 gigabit Ethernet?

- Enterprise IP routing
- IP multicasting
- Web hosting
- Metropolitan inter-site connectivity
- Multimedia and VoIP ready LAN

The diagram illustrates a complex multi-protocol network architecture. It features several key components and connections:

- Core Routers:** Two central routers are labeled "157". They are connected to each other and serve as the backbone for the network.
- Edge Routers and Switches:**
 - Ethernet Routing Switch 5520:** Located on the left, connected to the core routers and a group of desktop computers.
 - Ethernet Routing Switch 1648T:** Located at the top left, connected to the core routers and a group of desktop computers.
 - Ethernet Routing Switch 5520:** Located at the top right, connected to the core routers and a group of desktop computers.
 - Ethernet Routing Switch 1624G:** Located on the right, connected to the core routers and a group of desktop computers.
 - Ethernet Routing Switch 5520:** Located at the bottom right, connected to the core routers and a group of desktop computers.
- Network Topology:** The routers and switches are interconnected in a mesh-like structure, ensuring redundancy and multiple paths for data flow. The core routers (157) are the central hub, with various edge devices connected to them.
- Client Devices:** Multiple groups of desktop computers are shown, each connected to a specific edge router or switch, representing different user segments or departments within the organization.

Key Points

- **Scalable Resiliency:** By supporting Nortel's unique resiliency technologies (SMLT and RSMLT) over 10 gigabit Ethernet links you can scale applications like VoIP, ERP and CRM network-wide with confidence.
- **Convergence Ready Out of the Box:** With a large array of filtering, queuing and traffic shaping mechanisms, the Ethernet Routing Switch 8600 delivers a network wide Quality of Experience for applications and users alike.
- **Lower Total Cost of Ownership (TCO):** The ability to provide scale sub-second failover across the entire network allows you to utilize all of your network resources to their maximum potential.
- **Secure Switching:** Integrated security services including firewalls, filtering and per-port security supply end-to-end safe transport for all types of application data including CRM, ERP and VoIP.
- **720 Gigabit architecture:** Terabit performance is delivered in resilient clusters for performance available network wide.
- **Unique resiliency technologies:** Enjoy maximum uptime for increased employee productivity and efficiency.
- **Integrated security:** With support for thousands of access control lists and built-in firewalls, "end to end" data integrity and control is provided.
- **15,000 independent hardware queues:** Independent queues per system supply granular traffic control.
- **Line rate forwarding:** All 10 Gigabit Ethernet interfaces means no dropped voice or video calls.
- **Half a million route entries:** Full Internet route support provides scalability in routing applications.
- **240 non-blocking Gigabit Ethernet ports**
- **24 non-blocking 10 Gigabit Ethernet ports**
- **High performance flexible solution allows you to:**
 - Use the network as a competitive advantage for your company.
 - Drive business innovation from within your organization.
 - Improve customer satisfaction with integrated web applications.
 - Ensure data integrity and security for traffic on your network.
- **Security:** Wire-speed security filtering, user authentication, built-in firewall capabilities and 802.1x EAP are supported.

Features and Benefits

Nortel Ethernet Routing Switch 8600 series Routing Switch modules deliver a reliable, secure and intelligent network routing solution. Hardware-based wire speed performance enables fast and efficient traffic classification, policy enforcement and filtering, which benefits convergence and collaboration applications. Nortel Ethernet Routing Switch 8600 series Routing Switch modules provide a robust, secure and intelligent platform that delivers a true competitive edge through secure performance, intelligence and five-nines reliability.

Feature	Benefit
Modular solution	Chassis based solution with a variety of I/O modules for the wiring closet, enterprise network core, metro edge or metro Ethernet core delivers flexibility and simplifies design, sparing, training and operations
10, 6 or 3 slot chassis, 10 slot central office chassis	Flexible solution series can be deployed to meet a variety of different needs and grow with a business' network
Layer 2 through Layer 7 switching, routing and traffic classification	Powerful Ethernet and Web switching capabilities in a single solution simplifies deployment and operations
Wire-speed frame switching, routing and classification	No performance penalty for real-time applications that demand quality of service, even during periods of network congestion
Redundant switch management / switch fabric modules	No single point of failure in the switch control plane
Load-sharing switch fabric modules	No wasted modules idling in standby
Hot swap on all chassis components	Prevents network outages when adding or changing modules
IP addressable and configurable	Simplifies management and operations
Copper and fiber Ethernet, ATM and PoS support	Flexible deployment options for both enterprise and metropolitan connectivity needs

• Ethernet Routing Switch 8600 Chassis

- 8010 10-slot chassis
- 8006 6-slot chassis
- 8003 3-slot chassis
- 8010co 10-slot NEBS chassis

Enterprises

- Medium to large campus networks
 - Layer 3 core
 - Layer 2/3 distribution
- Large enterprise metro networks
 - Metropolitan inter-campus connectivity
- Real-time and streaming application infrastructure
- IP multicasting infrastructure
- Internet telephony infrastructure
- Enterprise wiring closets requiring high-density edge switching capacity

• Routing Switch Fabric/CPU Modules

8692SF Switch Fabric/CPU (enables redundant terabit core configurations) – New for Release 4.0

Highlights:

- High Throughput
- Scalable Control Plane
- Interoperable with Legacy modules
- Multicast Replication in HW

Applications:

- Enterprise Core, Distribution, Server Access Switch
 - BGP Full Internet Router
 - TV Distribution
 - Metro Applications
- Operation Specifics:
- 8692SF interoperable with all existing 3.x I/O modules
 - For CPU/SF redundancy, both SFs must be 8692SF
 - Do not mix 8690SF or 8691SF with 8692SF in a single system (during upgrade allowed)

Fast Ethernet/Gigabit Ethernet Modules

8648GTR Routing Switch Module 48 port autosensing 10BASE-T/100BASE-TX/1000Base-T – New for Release 4.0

Highlights:

- Deep packet inspection capabilities
- SW upgradeable datapath (for IPv6, MPLS, IPFix)
- Support for full Internet Routes

Applications:

- Server Connectivity
- Desktop Connectivity

Operation Specifics:

- Operates with 8690SF/8691SF and 8692SF
- Supported in default, M and R mode
 - **8648TXE Routing Switch Module** 48-port autosensing 10BASE-T/100BASE-TX
 - **8632TXE Routing Switch Module** 32 10/100TX plus 2 GBIC interface modules
 - **8624FXE Routing Switch Module** 24-port 100BASE-FX Ethernet Layer 3 switching interface module

Gigabit Ethernet Modules

8630GBR Routing Switch Module 30-port SFP GBIC baseboard (SFPs sold separately) – New for Release 4.0

Highlights:

- Non-blocking
- Deep packet inspection capabilities
- SW upgradeable datapath (for IPv6, MPLS, IPFix)
- Support for full Internet Routes

Applications:

- Distribution Layer Connectivity (SX, LX)
- Server Connectivity (TX, SX)
- Core Connectivity (LX, SX)
- Metro Applications (CWDM, LX, DWDM)

Operation Specifics:

- Requires 8692SF
- Operates in default, M and R mode
 - **8616SXE Routing Switch Module** 16-port 1000BASE-SX Gigabit Ethernet interface module
 - **8616GTE Routing Switch Module** 16-port 1000BASE-T Gigabit Ethernet interface module
 - **8608SXE Routing Switch Module** 8-port 1000BASE-SX Gigabit Ethernet interface module
 - **8608GBE Routing Switch Module** 8-port 1000 Base GBIC (GBICs sold separately)
 - **8608GTE Routing Switch Module** 8-port 1000BASE-T Gigabit Ethernet interface module

10 Gigabit Ethernet/MAN Modules

8683XLR three-port 10GBase-X XFP Routing Switch Module baseboard (XFPs purchased separately) - New for Release 4.0

Highlights:

- Non-blocking
- Deep packet inspection capabilities
- SW upgradeable datapath (for IPv6, MPLS, IPFix)
- Support for full Internet Routes

Applications:

- Distribution Layer Connectivity (SR, LR)
- Server Connectivity (SR)
- Core Connectivity (SR, LR, ER)
- Metro Applications (LR, ER)

Operation Specifics:

- Requires 8692SF
- Operates in default, M and R mode
 - **8681XLW Single port** 1310 nm WAN serial 10 gig Ethernet interface module
 - **8681XLR Single port** 1310 nm LAN serial 10 gig Ethernet interface module
 - **8672 ATME 2-Slot MDA Baseboard:** Accepts two MDAs, supports up to 8 OC-3 or 2 OC-12 ports
 - **8683 POSM 3-Slot MDA Baseboard:** Accepts three MDAs, supports up to 6 OC-3 or 3 OC-12 ports

8010 Chassis

Parameter Specification

- Height: 22.9 in. (58.2 cm)
- Width: 17.5 in. (44.5 cm)
- Depth: 19.9 in. (50.5 cm)
- Weight (empty): 85 lb (39 kg)
- Weight (fully loaded): 225 lb (102 kg)
- Cooling system:
 - Fan trays: 2 per chassis
 - Fans: 8 per fan tray
- Thermal sensors: 1 per fan tray

8006 Chassis

Parameter Specification

- Height: 15.8 in. (40.1 cm)
- Width: 17.5 in. (44.5 cm)
- Depth: 19.9 in. (50.5 cm)
- Weight (empty): 49 lb (22 kg)
- Weight (fully loaded): 140 lb (63 kg)
- Cooling system:
 - Fan tray: 1 per chassis
 - Fans: 8 per fan tray
- Thermal sensors: 1 per fan tray

8003 Chassis

Parameter Specification

- Height: 10.5 in. (26.7 cm)
- Width: 18.5 in. (47.0 cm)
- Depth: 19.9 in. (50.5 cm)
- Weight (empty): 40 lb (18 kg)
- Weight (fully loaded): 110 lb (50 kg)
- Cooling system:
 - Fan tray: 1 per chassis
 - Fans: 3 per fan tray
- Thermal sensors: 1 per fan tray
- Noise: 61 dBA maximum

8010CO

Parameter Specification

- Height: 35 in. (88.9 cm)
- Rack units (RUs) 20
- Width: 19 in. (48.26 cm)
- Depth: 23.7 in. (60.19 cm)
- Weight:
 - Empty: 127 lbs (57.6kg)
 - Including the following components: cable management brackets, power supply filler panels, power supply bezel, fan trays, module filler panels. 191 lbs (86.63kg)
 - Fully loaded: 315 lbs (142.88 kg)

Technical Specifications

IEEE general

- 802.3 CSMA/CD Ethernet (ISO/IEC 8802-3)
- 802.3i 10BASE-T (ISO/IEC 8802-3)
- 802.3u 100BASE-T (ISO/IEC 8802-3)
- 802.3z (Gigabit Ethernet 1000BASE-SX and LX)
- 802.3ab (Gigabit Ethernet 1000BASE-T 4 pair Cat5 UTP)
- 802.1D (MAC bridges/Spanning Tree Protocol)
- IEEE 802.3ad Link Aggregation
- IEEE 802.1w Rapid Re-convergence Spanning Tree
- 802.3x (Flow Control)
- 802.1X (EAPOL)

Market Information

- Better resiliency than competing solutions
- Allows for greater design simplicity and freedom
- Single integrated operating system
- High line card density resulting in lower cost of ownership per card
- Highest number of queues per port versus the competition
- Resilient Terabit Cluster design offers Terabit performance
- Integrated security services including Firewall and Threat Protections Services

Nortel Ethernet Routing Switch 8660 Service Delivery Module

Overview

The Ethernet Routing Switch 8660 Service Delivery Module or SDM is a module that brings firewall functionality to the Ethernet Routing Switch 8600. The module contains up to 4 Check Point Firewall-1 NGs that inspect network traffic and enforce firewall policies. These firewalls perform policy checking for every new request, manage the connection table and specify rules for handling packets in a session. The card has four slots, which can be used for flexible application modules. The initial offering will include configurations for 1 firewall (FW1), 2 firewalls (FW2) or 4 firewalls (FW4). Up to four fully loaded SDMs are supported in a 10 slot chassis and two fully loaded SDMs are supported in a 6 slot chassis. A single system image simplifies configuration, software management, and fault handling.

Ideal For

- Nortel Ethernet Routing Switch 8600 customers who want to leverage the resiliency of the platform while adding security or other applications to the network core
- Customers seeking integrated core routing solutions that possess capabilities beyond routing and load balancing, and provides an integrated solution whether from a security perspective or from an application perspective

Business Challenges

Do you need to provide security for resources within your network?

Are you looking to leverage your existing Ethernet Routing Switch to provide security services?

Are you looking to implement user-based policies and would like to add a secure component?

Are you looking to decrease the number of security and networking devices you currently maintain?

Typical Applications

Internal Security: Surveys show an increased portion of attacks are launched from within the internal network.

Key Points

- Total Cost of Ownership that leverages existing infrastructures to introduce advanced security services
- Firewall or other security applications that leverage the five 9s resiliency of the Ethernet Routing Switch 8600
- Ability to support multiple services at the same time on one platform eliminating the need for dedicated boxes for different applications
- Fewer network devices to manage and maintain

Features and Benefits

- Check Point FireWall-1 NG with Application Intelligence
- Allows for firewalling of traffic ingressing any port of the Ethernet Routing Switch 8600
- Firewall OS consisting of the Nortel SSI software
- Multiple management options such as Command Line Interface (CLI), Browser-Based Interface (BBI), configuration management using Nortel JDM, Firewall configuration and management using Checkpoint Technologies' SmartCenter
- Network Address Translation (NAT)
- Advanced user filtering using an Access Control list
- High performance security and application services in a modular configuration

- Available with 1, 2 or 4 firewall configuration
- Four general and security application processors
- Up to 1.2 Gbps maximum throughput per slot
- Ability to support multiple security functions on a single platform
- Max number of sessions per slot = 1 Million
- Max number of connections per second per slot = 10,000

Market Information

The Ethernet Routing Switch 8600 is the only modular Ethernet Routing Switch that offers a modular application solution like the Ethernet Routing Switch 8660 module. The ability to add different applications to the same card without additional costs or major configuration changes allows customers to lower their total cost of ownership associated with the Ethernet Routing Switch 8600 as well as integrate applications directly into the Ethernet Routing Switch 8600 platform. Other vendor solutions only offer firewall services with no plans to support additional applications. For most vendors, additional applications will require additional slots in the chassis. No other core routing switch vendor provides this functionality within their solution. The diversity of applications combined with the flexibility of the card provides a superior solution with the Ethernet Routing Switch 8600.

Technical Specifications

Physical Specifications

- Height: 1.5 in. (3.8 cm)
- Width: 15.4 in. (39.1 cm)
- Depth: 18.5 in. (47.0 cm)
- Weight: 7.2 lbs (3.3 kg)

Environmental Specifications

- Operating temperature: 0°C to 40°C (32°F to 104°F)
- Storage temperature: -25°C to 70°C (-13°F to 158°F)
- Operating humidity: 85% maximum relative humidity, non-condensing
- Storage humidity: 95% maximum relative humidity, non-condensing
- Operating altitude: 3000 m (10,000 ft) maximum

Nortel Ethernet Routing Switch 8600 Web Switching Module (WSM)



Overview

The Nortel Ethernet Routing Switch Web Switching Module (WSM) leverages the carrier-grade reliability and high port density of the Nortel Ethernet Routing Switch 8600 and enables the application switching on any port within the system using sophisticated Layer 4 through 7 processing. It contains many of the capabilities of the award-winning stackable Nortel Application Switches in a modular format that is affordable, scalable and easy to customize for every user's unique needs. This combination creates a complete, high capacity, carrier-class switching system of unprecedented scale. New features within the code include enhanced health checking capabilities, intrusion detection system load balancing, an increase in access filters and the ability to perform switching based on a combination of multiple Layer 7 attributes among others. The Nortel WSM has four external gigabit SX Ethernet or 10/100 TX ports. Multiple modules (up to six) can be installed into a single 10-slot chassis. The Nortel Ethernet Routing Switch 8600 that is enabled with a Nortel WSM provides a high-density application switching platform with the ability to support up to 340 10/100 Mbps or 116 10/100/1000 Mbps ports that are Layer 2 through 7 enabled.

Ideal For

The Nortel Ethernet Routing Switch 8600 with a Nortel WSM is ideal for enterprises, hosting and content providers, e-businesses and service providers that require a high-performance switching solution for IT data centers, server farms, network and hosting infrastructures. Further, any business with an existing 8600 can easily turn its current high-density Layer 3 switches into a highly intelligent, content-aware application switch with full carrier-class resilience.

Business Challenges

Any business building highly scalable Web or network infrastructures or requiring the ability to intelligently manage and control the flow of data will benefit from this product. Load balancing services on any TCP or UDP port, content switching as well as bandwidth management, are key services of Nortel L4-7 Switches. In addition, deployment of L4-7 switches is the key enabler for value added services such as caching, SSL offload, high availability and content routing.

Typical Applications

In order to provide the intelligence, scalability, resilience and resource optimization to any network, data center or Web/application server, the Nortel WSM offers many applications that can be run concurrently on a single switch. These applications include:

- Server load balancing
- Global server load balancing
- Cache redirection
- Application redirection (including SSL)
- Bandwidth management
- Content intelligent load balancing
- Firewall load balancing
- High availability
- Streaming media load balancing
- Intrusion detection load balancing
- Wireless load balancing
- VPN load balancing
- Domain name service Layer 7 load balancing
- Layer 7 deny filtering for network and device protection (Web Switches only)
- Denial of service protection
- High speed filtering and NAT
- Application abuse protection

Key Points

- Combines the port capacity and density of the Ethernet Routing Switch 8600 with Nortel content-aware switching technology, to turn any existing Layer 2-3 Ethernet 8600 platform into a highly intelligent, content-aware device for Layer 2-7 Web switching.
- It provides local and global server load balancing and health checks to optimize existing server infrastructure and minimize costs.
- Load balancing and application redirection combined with Layer 3 and 4 resilience (VRRP) facilitate improved application availability and a fully redundant Nortel Ethernet Routing Switch 8600.
- The switch enables firewall and VPN load balancing, which can run simultaneously with server load balancing for economical security deployment without bottlenecks.
- Content intelligent switching and true session-level persistence are delivered to maximize profitability while minimizing infrastructure impact.
- Enhances security without degrading site performance via content filtering, advanced Layer 4-7 Delayed Binding, and industry leading application support for firewall, VPN and Intrusion Detection System (IDS) load balancing.
- Meters, controls and accounts for bandwidth use – by client, server farm, virtual service, application, user class, content type and other traffic classes – and supports guaranteed minimum, metered available and maximum burst bandwidth rates.
- Integration into the Nortel Ethernet Routing Switch 8600 provides network device consolidation and ease of management.
- An array of line cards allows connectivity flexibility to multiple technologies including Ethernet 10/100, gigabit Ethernet, CWDm, ATM and POS, allowing for content intelligence regardless of connectivity type.
- Unique features are supported to enable new, highly profitable services like streaming media, wireless Internet and intrusion detection system load balancing.

- It provides sophisticated security services such as denial of service and application abuse protection, Layer 7 denial filters, high-speed filtering and NAT.

Features and Benefits

- High-performance switching
- Server, firewall, cache, WAN gateway, virtual private network, wireless application protocol, real-time streaming protocol, domain name service and intrusion detection server load balancing
- Full inspection of URLs, cookies and host headers across multiple requests and responses
- TCP, UDP, HTTP, FTP, SSL, SMTP, LDAP, DNS, RADIUS, WAP, RTSP, Telnet and NNTP and IP server load balancing
- Application redirection for any traffic type, including wireless
- Persistent connections using multiple Layer 4 through Layer 7 parameters
- Comprehensive server health checks for content verification and availability
- Gigabit-class, content-intelligent bandwidth management enables SLAs and usage-based services
- Bandwidth, link, hash, least connections, maximum connections and round robin load balancing metrics for unparallelized infrastructure optimization
- Full network address translation enables multi-site load balancing and traffic redirection
- Global server load balancing to distributed servers based on health, user proximity, server weights and response time
- Virtual matrix architecture enables dynamic utilization of all processors and memory
- Complete site redundancy via active-active, active-standby, hot-standby and stateful fail over for high availability
- Up to 256 virtual servers per module
- Up to 1024 application servers per module
- Up to 1024 services per module
- Up to 2K packet filtering rules per port
- Up to concurrent 512,000 Layer 4-7 sessions per module

Market Information

Many award-winning Nortel Application Switch features are delivered and enhanced with the Nortel Ethernet Routing Switch Web Switching Module for the Nortel Ethernet Routing Switch 8600. The Nortel WSM leverages the same OS software platform as Nortel switches, which is used across all Nortel content switching products. In addition, the use of the Nortel Ethernet Routing

Switch 8600 allows the business to benefit from the rich feature set and performance provided by this platform. The ability to connect to an array of different technologies allows for content networking and application switching to be deployed into new areas providing enhanced network optimization and productivity for enterprises and differentiation for high-end service providers.

Technical Specifications

Components and Interfaces:	• Four external Gigabit Ethernet or 10/100 TX ports • Direct interface the Ethernet Routing Switch 8600 backplane • Up to eight Nortel Web Switch Modules per Ethernet Routing Switch 8600 chassis • Up to 336 10/100Base-TX with 4 1000Base-SX front-facing ports, OR • Up to 116 Gigabit Ethernet Ports (112-1000 Base-SX/LX/XDGBICs ports with 4-1000Base-SX front-facing Nortel Web Switching Module ports), OR Up to 32 1000Base-SX Ports
Performance Specifications	• Mean Time Between Failure 80,000 hours • Frame Length 9k (for WSM to WSM traffic) and 1.9K through the 8600
Physical Dimensions:	(H) 1.5 inches x (W) 15.4 inches x (D) 18.5 inches [3.8 cm x 3.8 cm x 47.0 cm]
Weight:	(single module) approximately 10 lbs
Environmental Specifications:	Operating temperature: 5° to 40° C Storage temperature: -25° to 70° C Operating humidity: 85% maximum relative humidity, non-condensing Storage humidity: 95% maximum relative humidity, non-condensing Operating altitude: 10,000 ft (3,000 m) maximum Storage altitude: 10,000 ft (3,000 m) maximum Free Fall/Drop: ISO 4180-s, NATA 1A Vibration: IEC 68-2-6/34 Shock/Bump: IEC 68-2-27-29
Processing Capacity and Performance	10 purpose built WebICs 20 RISC Processors 80 MB of memory Web switching of 128 Gbps Wire speed filtering for more than 48,000 security and policy services Support for more than 4 million concurrent sessions at 2.4 million sessions per second

Nortel Ethernet Routing Switch 8661



Overview

The Nortel Ethernet Routing Switch 8661 is a high-performance secure sockets layer (SSL/TLS) acceleration module that integrates seamlessly into the Nortel Ethernet Routing Switch 8600 Layer 2-7 Routing Switch. The Nortel Ethernet Routing Switch 8661 delivers superior SSL offload performance within a resilient chassis-based architecture. It is designed to front-end server farms and optimize secure network environments by offloading security operations and encryption/decryption processing from application servers.

The Nortel Ethernet Routing Switch 8661 intelligently accelerates secure business transactions and confidential data by offloading secure sockets layer (SSL) processing from local servers without imposing delays on other traffic in the same data path. By optimizing SSL processing the Nortel Ethernet Routing Switch 8661 reduces the number of servers required for a given secure application and mitigates the cost and complexity of installing and managing redundant digital certificates and private keys across servers.

Ideal For

- Any business that needs increased online and application security
- Organizations that want to be able to provide application switching on secure sessions and communication
- Existing businesses with a Nortel Ethernet Routing Switch 8600 looking to leverage their infrastructure investment to secure Web-based application and confidential communication
- Enterprises looking to secure Web-based applications and transactions using a high performance SSL accelerator in a resilient chassis-based form factor
- Medium to large network deployments with high confidentiality or security requirements
- Healthcare operators or finance organizations that have strict privacy standards, such as HIPAA or GLBA that must be met
- Hosting service providers offering the SSL Accelerator as a managed service to complement basic facilities and connectivity

Business Challenges

- Are your applications e-commerce, financial, health care or insurance related?
- Do you have multiple servers processing secure Web sessions? If so, have you noticed performance degradation of your servers?
- Does your company use multiple SSL certificates to authenticate clients accessing secure Web applications?
- Are you experiencing difficulties in scaling applications requiring encrypted security?
- Do you want a way to simplify the delivery of a public key infrastructure for your organization?
- Is high availability a concern for your secure applications?
- Do you need "shopping cart persistence" for your SSL transactions?
- Would you benefit from applying leading content switching techniques to secure sessions and transactions?
- Would you like to improve your server performance and end-user experience while ensuring a high level of security for transactions and corporate communications?

Typical Applications

In many e-commerce, e-business or even intranet applications, SSL is enabled on the server to protect sensitive data and transactions. The Nortel Ethernet Routing Switch 8661 helps offload SSL processing from content and application servers, reduces the costs to implement a secure server architecture and allows them to be optimized for their primary roles – serving user transactions.

This module has been specially designed and enhanced to work in conjunction with the Nortel Ethernet Routing Switch 8600 Layer 2-7 Routing Switch that is equipped with an Nortel Web Switching Module (WSM) and is typically placed in front of the server farm.

Network Diagram

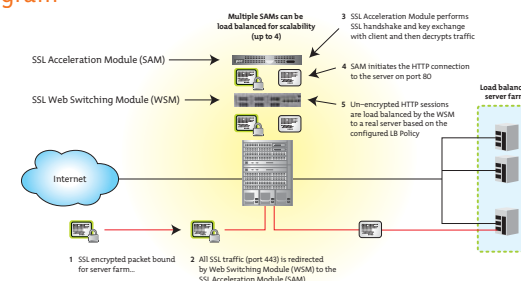


Figure 1: Nortel Ethernet Routing Switch 8661 Session Overview

Key Points

- Industry leading SSL performance per module:
 - 3,000 SSL transactions per second (TPS) – up to 12,000 TPS per chassis
 - 64,000 concurrent sessions – up to 256,000 per chassis
 - 260 Mbps bulk encryption throughput – up to 1.04 Gbps per chassis
- Superior scalability
 - Up to four Nortel Ethernet Routing Switch 8661 blades per 10-slot chassis
 - Single system image (SSI) architecture
- Operational simplicity
 - Centralized certificate and key management
 - Reduced number of certificates per domain
- Reduced total cost of ownership
 - Simplified deployment
 - Device consolidation
 - Centralized management
 - Improved price/performance ratio
- Rock solid reliability
 - Multi-layered resiliency

- Secure content based networking
 - Perform content networking features on secure sessions
 - Maintain persistence connections
 - Facilitates advanced security policies

Features and Benefits

- **Industry leading SSL acceleration performance** - The Nortel Ethernet Routing Switch 8661 leverages the award-winning Nortel SSL appliance technology with purpose built ASICs to deliver 3000 TPS, 260 Mbps and 64,000 concurrent sessions per blade. The Nortel Ethernet Routing Switch 8661 can process SSL transactions 5 to 50 times faster than a server.
- **Ease of manageability** – Nortel's single system image (SSI) simplifies the deployment of additional SSL Acceleration Modules within a chassis cluster. All configurations, including certificates, are automatically replicated.

- **Secure content networking** – The Nortel Ethernet Routing Switch 8661 enables content networking features on secure sessions including content based load balancing, session persistence, health checking and other Layer 7 services. Facilitates advanced security policies like virus scanning and intrusion detection on secure traffic.
- **Operational simplicity** – The Nortel Ethernet Routing Switch 8661 delivers unparalleled operational simplicity because it integrates seamlessly into the Nortel Ethernet Routing Switch 8600 architecture and simplifies security management.
- **Comprehensive key and certificate management** – The Nortel Ethernet Routing Switch 8661 supports server certificates, key generation, certificate signing requests (CSR) and certificate revocation lists (CRL).
- **Lower total cost of ownership** - In addition to the cost savings that result from operational simplicity, the benefit of the Nortel approach is that the Nortel Ethernet Routing Switch 8661 reduces the number of servers and certificates needed, which lowers the cost to manage and maintain a secure communication infrastructure.

- **Rock solid reliability** – Uniting the market-winning and award-winning Nortel SSL technology with the most resilient Layer 2-7 routing switch, the Nortel Ethernet Routing Switch 8600, provides for unparalleled reliability for secure communication and business continuity.

Market Information

- Leverages the capabilities of the Nortel SSL Accelerator, which has been the top selling SSL appliance for the last two years according to Infonetics
- Best in class performance and scaling capabilities with up to 12,000 TPS, 1.04 Gbps bulk encryption rate and 256,000 concurrent sessions per Nortel Ethernet Routing Switch 8600 chassis
- Single point of administration is truly “best in class,” offering unrivalled ease of management of configuration and certificates allowing a public key infrastructure to be installed and operational in less than 30 minutes
- Intelligent traffic management for load balancing on encrypted sessions

Technical Specifications

Physical Specifications	(H) 1.5 inches (3.8 cm) (W) 15.4 inches (39.1 cm) (D) 18.5 inches (47.0 cm)
Weight	14.0 lb (6.4 kg)
Electrical Specifications	MTBF Rating: 288,615 hours @25 degrees Celsius Input Power: 80 W maximum Operating Temperature: 0-40 degrees Celsius Storage Temperature: -40 to 70 degrees Celsius Maintenance port: 8-pin mini-DIN

Nortel Ethernet Routing Switch 8300



Overview

The Nortel Ethernet Routing Switch 8300 is the next generation of cost effective, power over Ethernet (PoE) enabled, modular Ethernet switches. Delivering high density 10/100/1000 connectivity, high-performance Layer 3 switching, industry leading resiliency, security and services, it is the solution for enterprises seeking to extend the intelligence of their network from the network core to the edge.

Ideal for organizations seeking a high-density 10/100/1000 switch with redundant and hot-swappable switch fabrics, I/O modules and power supplies and support for standards-based PoE to power IP phones, Webcams and wireless access points. Nortel Ethernet Routing Switch 8300 provides guaranteed bandwidth with quality of service (QoS), and secures the network edge with 802.1x (EAPoL) user based authentication, SNMPv3 and RADIUS authentication allowing enterprises the ability to extend their network intelligence to the edge, facilitating the adoption of new application models as their business (and users) demand.

Ideal For

- Medium to large campus networks
- Layer 2/3 wiring closets
- Internet telephony infrastructure
- Real-time and streaming application infrastructure
- IP multicasting infrastructure
- Enterprise wiring closets requiring high-density edge switching capacity
- Vertical markets including finance, healthcare, government and education

- What are your plans for deploying streaming audio or video applications?
- What are your plans for deploying desktop-based instruction?
- Will you be deploying wireless LAN access points in your network?

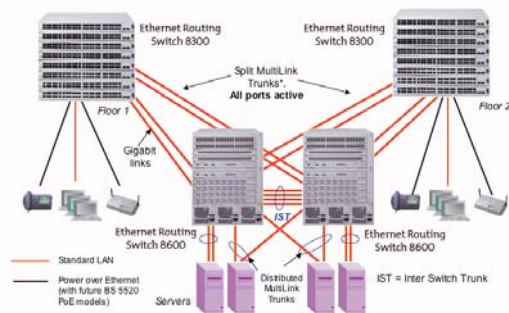
Typical Applications

- Desktop switching
- Wiring closet switching with power over Ethernet
- Server farm connectivity with high density 10/100/1000 Ethernet connectivity
- Medium enterprise or branch office core IP routing
- IP multicasting environments such as surveillance, distance learning and desktop video conferencing

Business Challenges

- Is reliability critical to your business?
- Do you plan to upgrade your existing Ethernet network?
- Do you plan to unify your communications onto one network?
- Do you have mission-critical traffic requiring prioritization?
- What are your plans for deploying quality of service?
- What are your plans for deploying Internet telephony?

Network Diagram



Key Points

- **Performance and capacity**
 - 32X performance increase in switch fabric – 320 Gbps in the Nortel Ethernet Routing Switch 8300
 - High density - 10/100/1000 switch
 - Integrated uplinks on switch fabric modules
 - Pay as you grow software expansion capabilities
- **Resiliency**
 - Redundant and hot swappable switch fabrics, I/O modules and power supplies
 - Integrated time delay reflectometer (TDR) for cable plant trouble shooting
 - Common code base with Nortel Ethernet Routing Switch 8600
 - Designed for split MLT support in future release
- **Security**
 - 802.1x based network authentications
 - SNMPv3 authentication and encryption
 - User based policies
 - RADIUS authentication
- **Services**
 - QoS with 8 queues with traffic policing
 - Standard compliant 802.3af power over Ethernet
 - Comprehensive network management tools

Features and Benefits

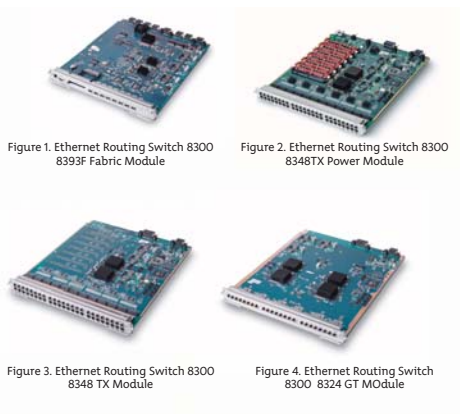
- The 10-slot 8310 chassis is designed for high density campus wiring closet and backbones that need the highest levels of availability and scalability
- The 6-slot chassis is designed for medium-sized, lower-density wiring closets and backbones

Feature	Benefit
Wire-speed frame switching, routing and classification	No performance penalty for real-time applications that demand quality of service, even during periods of network congestion
Redundant switch management/ switch fabric modules	Reduce single point of failure in the switch control plane
Load-sharing switch fabric modules	The addition of a secondary switch fabric, which doubles the switch throughput with no wasted switch fabrics idling in standby
Hot swap on all chassis components	Prevents network outages when adding or changing modules
IP addressable and configurable	Simplifies management and operations
Standards based 802.3af standards based power over Ethernet	Flexible deployment of converged communications for power over Ethernet to IP phones, wireless access points and Web cameras
Integrated small form factor pluggable gigabit connectors on switch fabric module	No need to use I/O slots for uplink ports allowing for a higher port density and maximizing your investment
Split multi-link trunking interoperable	Compatible with split-multi-link trunking with Nortel Ethernet Routing Switch 8600 in the network core to provide a highly reliable end-to-end network infrastructure
802.1x (EAPoL) user based authentication, SNMPv3 and RADIUS authentication	Secure connectivity for enhanced network control
Maximum of 400 ports per chassis	Cost effective, high density gigabit Ethernet to the desktop

- **Switch Management** – The Ethernet Routing Switch 8393SF module is optimized for high-performance switching of Layer 2/3/4 traffic. Two switch fabric modules installed in the chassis provide redundant, load sharing capabilities. The module has eight built-in Small Form Factor Pluggable (SFP) Gigabit Ethernet uplinks that provide simpler space saving connectivity to the network core. When two Ethernet Routing Switch 8393SFs are installed in a chassis, all 16 SFP ports are active. The switch fabric module also has a console port that can be used for out-of-band management.
- **Fast Ethernet with P802.3af Power over Ethernet (PoE)** – The Ethernet Routing Switch 8348TXPWR module (Figure 2) provides inline power to any IEEE P802.3af compliant devices such as IP phones, wireless access points, net cameras, security, lighting devices and access control devices. Standards-based equipment means that customers are not forced to tie themselves to any one vendor, as the switch has the flexibility to power multiple vendors' P802.3af devices. It can supply power up to 15.4 watts per port, which meets the standard and is sufficient to power most devices.
- **Fast Ethernet** – The Ethernet Routing Switch 8348TX module (Figure 3) provides 48 autosensing 10/100 Mbps ports for desktop connectivity.

Feature	Benefit
Modular solution	One chassis with a variety of I/O modules for the wiring closet, medium enterprise or branch office network core for flexibility and simplifies design, sparing, training and operations
10 or 6 slot chassis	Flexible solution series that can be deployed to meet a variety of different needs and that grows with the business' network
Layer 2/3 switching, routing and traffic classification	Powerful Ethernet switching capabilities in a single solution for simplified deployment, operations and provision of a future proof solution for the business

Module and Interface type	Number of Interface Ports	Maximum Number of interfaces per chassis	
		Ethernet Routing Switch 8306 6 Slot Chassis	Ethernet Routing Switch 8310 10 Slot Chassis
8393SF Switch Fabric Module (SFP)	8	16	16
8348TX 10/100 Module (RJ45)	48	192	384
8348TX-PWR 10/100 Module (RJ45)	48	192	384
8324GT10 /100 / 1000 Module (RJ45)	24	96	192



Market Information

- **Backplane** – The Nortel Ethernet Routing Switch 8300 has 500% greater backplane capacity than the Cisco Catalyst 4500.
- **Uplinks** – Nortel Ethernet Routing Switch 8300 switch fabric integrated uplinks can supply 16 gigabit capacity without installing line cards.
- **Port capacity** – The Nortel Ethernet Routing Switch 8300 can provide up to 400 ports in a 10 slot chassis.
- **QoS support** – The Nortel Ethernet Routing Switch 8300 has eight queues for proper QoS prioritization versus only four for the competition.
- **VLAN capability** – Nortel Ethernet Routing Switch 8300 systems support 2K VLANs. Others support much less potentially limiting usability.
- **Power over Ethernet** – Nortel Ethernet Routing Switch 8300 models support standardized 802.3af power over Ethernet. Others offer none or a proprietary power scheme.
- **Installation and configuration** – Nortel provides trouble-free installation and configuration.

Technical Specifications

	Ethernet Routing Switch 8306 Series	Ethernet Routing Switch 8310 Series
Physical Specifications	(H) 15.8 inches x (W) 17.5 inches x (D) 19.9 inches [40.1 cm x 44.5 cm x 50.5 cm] Weight: (Empty) 49 lb (22 kg); (Fully Loaded) 140 lb (63 kg)	(H) 22.9 inches x (W) 17.5 inches x (D) 19.9 inches [58.2 cm x 44.5 cm x 50.5 cm] Weight: (Empty) 85 lb (39 kg); (Fully Loaded) 225 lb (102 kg)
Cooling System	Fan Trays: 1 per chassis Fans: 8 per fan tray Thermal Sensors: 1 per fan tray	Fan trays: 2 per chassis Fans: 8 per fan tray Thermal sensors: 1 per fan tray
Operating Temperature	0° to 50° C (32° to 104° F) Storage temperature: -25° to 70° C (-13° to 158° F) Operating humidity: 85% maximum relative humidity, noncondensing Storage humidity: 95% maximum relative humidity, noncondensing Operating altitude: 3,024 m (10,000 ft) NOM Approved	Operating temperature: 0° C to 50° C (32° F to 104° F) Storage temperature: -25° C to 70° C (-13° F to 158° F) Operating humidity: 85% maximum relative humidity, noncondensing Storage humidity: 95% maximum relative humidity, noncondensing Operating altitude: 3048 m (10,000 ft) maximum Storage altitude: 3048 m (10,000 ft) maximum Free fall/drop: ISO 4180-s, NATA 1A Vibration: IEC 68-2-6/34 Shock/bump: IEC 68-2-27-29
Electromagnetic Emissions Summary	Meets the following standards US, CFR47, Part 15 Subpart B, Class A Canada, ICES-003, Issue 2, Class A Australia/New Zealand, NZS 3548:1995, Class A Japan, V-3/97.04:1997, Class A Taiwan, CNS 13438, Class A EN55022:1995, Class A EN 61000-3-2:1995 EN 61000-3-3:1994 Electromagnetic immunity: Meets the EN 50082-1:1997 standard	
Performance Specifications	Switch fabric bandwidth: 320 Gbps Addressing: 48-bit MAC address Frame length: 64 to 1518 bytes (IEEE 802.1Q Untagged) 64 to 1522 bytes (IEEE 802.1Q Tagged) Jumbo frame support: Up to 9000 bytes (IEEE 802.1Q Tagged) Data rate: 10 Mbps Manchester encoded or 100 Mbps 4MB - 5MB encoded Multi-Link Trunks: Up to 32 trunks with 4 links per group VLANs: Up to 2,000 port- or protocol-based; per VLAN Tagging option Multiple spanning tree groups: Up to 64 (STGs)	
Interfaces	Access 48-ports 10/100BASE-T auto-speed sensing 48-ports 10/100BASE-T auto-speed sensing with P802.3af Power over Ethernet 24-port 10BASE-T/100BASE-TX/1000BASE-T Uplinks 8-port Gig fiber ports (mini-GBIC slots) 1000BASE-SX uses shortwave length 850 nm fiber optic connectors to connect devices over multimode (550 m or 1,805 ft) fiber optic cable 1000BASE-LX uses longwave length 1,300 nm fiber optic connectors to connect devices over single mode (5 km or 3.1 mi) or multimode (550 m or 1,805 ft) fiber optic cable 1000BASE-T uses Category 5 copper cabling with RJ-45 connectors to connect devices (up to 100m)	

	Ethernet Routing Switch 8306 Series	Ethernet Routing Switch 8310 Series
Network protocol and standards compatibility	IEEE 802.3 10BASE-T (ISO/IEC 8802-3, Clause 14) IEEE 802.3u 100BASE-TX (ISO/IEC 8802-3, Clause 25) IEEE 802.3u Autonegotiation on Twisted Pair (ISO/IEC 8802-3, Clause 28) IEEE 802.3x (Flow Control on the Gigabit Uplink port) IEEE 802.3z 1000BASE-SX and 1000BASE-LX IEEE 802.3ab 1000BASE-T IEEE 802.1d MAC Bridges (ISO/IEC 10038) IEEE 802.1p (Prioritizing) IEEE 802.1Q (VLAN Tagging) IEEE 802.1D Spanning Tree Protocol IETF DiffServ	
RFC support	RFC 1213 (MIB-II); RFC 1493 (Bridge MIB); RFC 2863 (Interfaces Group MIB); RFC 2665 (Ethernet MIB); RFC 2737 (Entity MIBv2); RFC 2819 (RMON MIB); RFC 1757 (RMON); RFC 1271 (RMON); RFC 1157 (SNMP); RFC 2570 (SNMPv3); RFC 2571 (SNMP Frameworks); RFC 2573 (SNMPv3 Applications); RFC 2574 (SNMPv3 USM); RFC 2575 (SNMPv3 VACM); RFC 2576; RFC 2572 (SNMP Message Processing); RFC 1332/1661 (Point to Point Protocol); RFC 791/1812 (Internet Protocol); RFC 1388/2453 (RIP1/RIP2); RFC 2328(OSPF)	

Nortel Ethernet Routing Switch 1600 Series (1648T/1624G/1612G)



Overview

The Nortel Ethernet Routing Switch 1600 is a fixed port routing switch solution. Wire speed routing and non-blocking switch fabric provide the performance and reliability critical for converged and collaboration applications. Quality of service (QoS) functionality includes support of DSCP and 802.1p as well as 4 hardware queues per port. Resilience and security are maintained with multi-layer resiliency and packet filtering capabilities. The Nortel Ethernet Routing Switch 1600 is available in three models: the Nortel Ethernet Routing Switch 1648T with 48 ports of 10/100 plus 4 connections for small form factor (SFP) GBICs, the Nortel Ethernet Routing Switch 1612G with connections for 12 SFP GBICs and Nortel Ethernet Routing Switch 1624G with connections for 24 SFP GBICs

Ideal For

- Small to mid-size enterprises that require routing performance in a small form factor
- Large enterprises that require wire speed routing in the wiring closet or smaller network core
- Any enterprise organization that will be implementing converged applications (VOIP, multimedia or collaboration) that will require a high-performance solution that incorporates QoS, wire speed routing and a low cost entry point

Business Challenges

- Do you have fewer dollars to spend on networking infrastructure?
- Are you being asked to implement bandwidth sensitive applications like VoIP and e-learning?
- Is more of the traffic on your network revenue based than ever before?
- Are you being asked to reduce your network operating costs?
- Does your network allow your employees to be more productive?

Typical Applications

The Nortel Ethernet Routing Switch 1600 is a fixed port hardware based routing switch that provides resiliency, performance and security for converged applications. Resiliency delivers maximum network uptime for critical applications. Application-based performance ensures that data traffic won't be dropped or delayed when the traffic load increases on the switch. Security features provide added protection for all data including IP based voice or revenue based traffic. The Nortel Ethernet Routing Switch 1600 combines resiliency, performance and security into a high performance 1U high solution.

Network Diagram

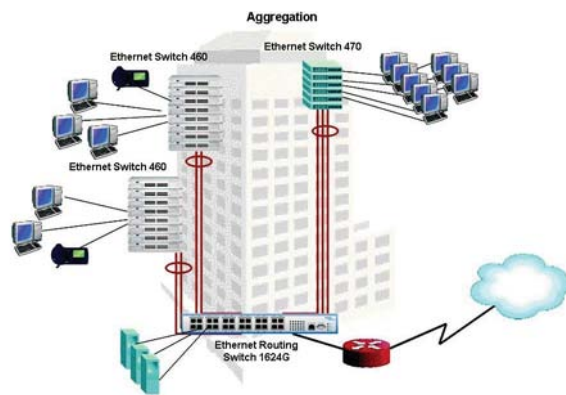


Figure 1: Aggregation

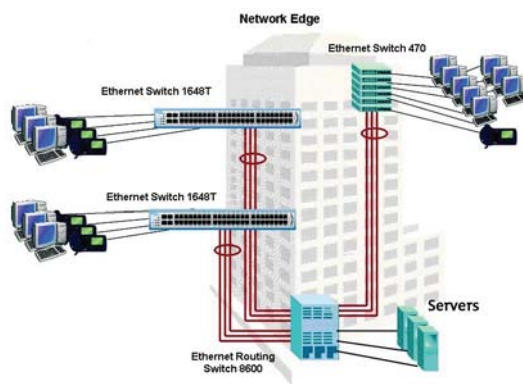


Figure 2: Network Edge

Key Points

- **Performance** – Non-blocking wire-speed capabilities ensure performance for converged applications.
- **Ease of configuration** – A variety of configuration tools are available, including Nortel Ethernet Switching Element Manager, Web and SNMP-based applications, for error free graphical and text based configurations.
- **Interoperability** – Support for standard routing and resilience protocols means decreased complexity and time to implement a network core solution.
- **Resiliency** – Technologies such as split multi-link trunking (SMLT)*, multi-link trunking (MLT), virtual router redundancy protocol (VRRP) and IEEE 802.1ad (static) ensure maximum availability of resources and the lowest downtime.

Features and Benefits

- Reliability for the network core and wiring closet
 - Redundant power supplies
 - Split multi-link trunking (SMLT)* and multi-link trunking (MLT)
 - Multi-layer resiliency ensures network stability for converged applications
- Application based performance
 - QoS support with DSCP and 802.1p
 - Wire speed routing and non-blocking switch fabric
 - Policing and shaping
- Security of data
 - Packet filtering
 - Multi-level access and access policies
 - RADIUS and SSH support
 - SNMPv3
- Resiliency – the Nortel Ethernet Routing Switch 1600 provides increased network reliability for starting with the network core and wiring closet. Multi-layer support and redundant power supplies ensure maximum availability critical for converged and collaborative applications. Support for SMLT and MLT provides redundant load sharing

- connections to one or more desktop switches. Resiliency is addressed at multiple layers across the entire network ensuring maximum availability of resources and the lowest downtime.
- Performance – wire speed routing and QoS mechanisms deliver the performance required for converged and collaborative applications. A non-blocking switch fabric and hardware based routing ensure that data won't be dropped when the traffic load increases on the switch. The policing and shaping *features permit traffic flows to be controlled based on applications needs. With support for 48 10/100 ports or up to 24 GBIC ports application performance can be delivered anywhere in the network.
- Security – packet filters, support for SNMPv3 and SSH* all supply added protection for sensitive data including VoIP conversations. Multi-level access and defined access policies help secure the switch against unauthorized management access. Packet filtering provides an additional means to segment and secure sensitive traffic or network access. Support for RADIUS and SSH* give organizations the freedom to use current security databases.

Market Information

As competition in the marketplace intensifies, there will be more pressure for networks to support additional applications and the ability for a network to adapt and perform will become more critical. Core network routing represents an area where technology will be asked to deliver much in the way of performance and resiliency. The Nortel Ethernet Routing Switch 1600 meets these challenges head-on by combining resiliency, performance, and security into a high performance 1 U high solution. With this addition to the Ethernet Switch Portfolio, Nortel continues its position as a complete "end-to-end" enterprise solution company.

Technical Specifications

Ethernet Routing Switch 1600 Series	
Physical Specification	Weight 1648T = 12 lbs; 1624G = 13.4 lbs; 1612G = 11 lbs Height 1.73 in. (44 mm) Width 17.3 in. (441 mm) Depth 14.4 in. (368mm)
Performance Specifications	• 1648T Non-blocking Switch Fabric of 24 Gbps providing 13 Mpps • 1612G Non-blocking Switch Fabric of 24 Gbps providing 18 Mpps • 1624G Non-blocking Switch Fabric of 48 Gbps providing 36 Mpps
Data Rate	• 10 Mbps Manchester encoded or 100 Mbps 4B/5B encoded
Interface Options	• 10BASE-T/100BASE-TX: RJ-45 (8-pin modular) connectors for MDI-X interface • Autosensing/autonegotiating • SFP (mini) GBICs
Network Protocol and Standards Compatibility	• IEEE 802.3 10BASE-T Ethernet (twisted-pair copper) • IEEE 802.3z Gigabit Ethernet • IEEE 802.3u 100BASE-TX Fast Ethernet (twisted-pair copper) • ANSI/IEEE 802.3 Auto-negotiation • IEEE 802.3x Flow Control • IEEE 802.1p Priority Queues • IEEE 802.1Q VLANs • IEEE 802.1d Spanning Tree • 802.1v protocol/IP subnet-based VLANs
RFC Support	• RFC 768 Unreliable Data gram Protocol (UDP) • RFC 783 Trivial File Transfer Protocol (TFTP) • RFC 791/950 Internet Protocol (IP) • RFC 792 Internet Control Message Protocol (ICMP) • RFC 826 Address Resolution Protocol (ARP) • RFC 854 Telnet • RFC 2236 Internet Group Management Protocol (IGMP) version 2 • RFC 1542 BOOTP • RFC 1058 Routing Information Protocol (RIP) • RFC 1519 Classless Inter-domain Routing (CIDR) • RFC 1723 Routing Information Protocol (RIP) version 2 • RFC 1724 RIPv2 MIB • RFC 1583 OSPFv2 • RFC 1850 OSPFv2 MIB • RFC 2131 BOOTP/DHCP relay • draft-ietf-idmr-dvmrp-v3-10 DVMRPv3 • RFC 2338 Virtual Router Redundancy Protocol
Electrical Specifications	• Power supply AC 100-240V, 50-60Hz, 1.5A max, 1+1 Redundant • Mean Time Between Failure • 1612G: 177,000 hours • 1624G: 158,000 hours • 1648T: 153,000 hours
Environmental	• Operation temperature: 0° to 40°C; 32° to 104°F • Humidity: 5% to 95% • 3 built-in 40x40x10 mm fans
Safety Agency Approvals	• IEC 60950 International CB Certification • EN 60950 European Certification • UL60950 US certification • CSA22.2, #60950 Canadian Certification • NOM Mexican Certification

Ethernet Routing Switch 1600 Series	
Electromagnetic Emissions Summary	• CISPR22, Class A/CISPR24 International Certification • EN55022, Class A/EN55024 European • FCC, Part 15, Class A US Certification • ICES-003, Class A Canadian Certification • AN/NZS 3548 Australian/New Zealand Certification • BSMI - Taiwan - CNS 13438, Class A • MIC - Korea - MIC, No. 2001-116 • VCCI Japanese Certification
Electromagnetic immunity	• EN55024 :1998

*Future release

Nortel Ethernet Routing Switch 1424T



Overview

The Nortel Ethernet Routing Switch 1424T is a performance-based fixed port routing switch solution that delivers enhanced network performance, simplicity and flexibility required by today's converged and collaboration applications and solutions. The Nortel Ethernet Routing Switch 1424T provides increased application performance by enabling better bandwidth utilization and enhancing network performance. Simple to install and maintain, the Nortel Ethernet Routing Switch 1424T combines network core routing features with wiring closet type efficiency. Twenty-four 10/100 ports and 2 GBIC slots combine to provide connectivity for workgroups, servers and switches in a 1U high solution. Support for quality of service (QoS) and IP multicast further enhance network application performance and response times. Network redundancy is maintained with multi-link trunking (MLT) support, which allows the Nortel Ethernet Routing Switch 1424T to function as a member of a resilient converged solution. The Nortel Ethernet Routing Switch 1424T provides the performance, simplicity and flexibility that allow enterprises to plan and implement converged networks.

Ideal For

- Small to medium size enterprises that are looking for a low cost, high performance fixed port routing switch for desktop access or aggregation in the network core
- Large enterprises that require intelligent routed connectivity for server farms, aggregation points from wiring closets or core routing for smaller remote offices
- Any enterprise organization that will be implementing converged applications (VOIP, multimedia or collaboration) that will require a high performance solution that incorporates QoS, wire speed routing and a low cost entry point

- Are you looking for an aggregation or core switch that is easy to install and use?
- Do you have multiple, distant offices (up to 70 km) that need to share resources?
- Are you concerned about cost when considering switching purchases?
- Do you want gigabit performance without the investment in a chassis-based switch?
- Do you expect your business and the associated traffic in your network to grow within the next 3-6 months?

Typical Applications

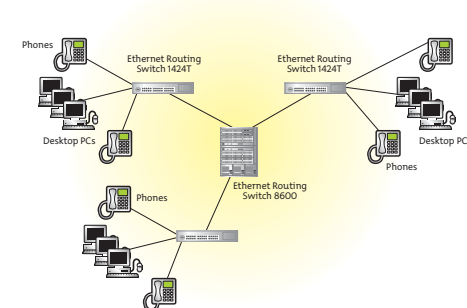
Any enterprise customer looking to:

- Increase application performance for mission critical solutions
- Enhance network bandwidth utilization
- Simplify management and installation with SNMP and Web management

Business Challenges

- Are you implementing converged applications?
- Could your users be more productive?
- Are your users experiencing slow application and response time?
- Are you suffering from slow server or application access?

Network Diagram



Key Points

- Built in support for converged applications
- Wire speed routing
- Non-blocking architecture
- 4 hardware priority queues; 802.1p and diffServ
- SNMP and Web management
- Packet filtering
- VLAN support
- Auto polarity and sensing
- GBIC support
- Multiple gigabit fiber uplink ports
- MLT support

Features and Benefits

The Nortel Ethernet Routing Switch 1424T features 24 ports of 10/100 Ethernet and two GBIC slots (GBICs are ordered separately). Wire-speed routing and a non-blocking architecture provide the performance required by today's converged applications. For applications that have stringent network requirements, four priority queues, with support for 802.1p and diffServ, provide QoS within the network. Reliability is maintained with MLT support, which allows a Nortel Ethernet Routing Switch 1424T to function as an edge member of a resilient core solution. SNMP and Web management increase reliability and simplicity by providing a simple way to configure and monitor the switch.

- **Performance** – The Nortel Ethernet Routing Switch 1424T provides increased application performance by enabling better bandwidth utilization and enhancing network performance. The addition of QoS and performance based routing to a network helps decrease latency and jitter. QoS implemented at the network edge allows traffic to be marked as close to the application as possible, which enables better utilization of the network backbone.
- **Simplicity** – The Nortel Ethernet Routing Switch 1424T is simple to use and maintain. With both Web-based and SNMP management, the Nortel Ethernet Routing Switch 1424T can be configured quickly with fewer errors than competing products. Fewer errors enable faster implementation times and fewer problems to troubleshoot. The Nortel Ethernet Routing Switch 1424T's ability to classify traffic at the network edge allows network administrators to set policies based on traffic type which ensures that applications that have special bandwidth requirements will get the bandwidth they need.
- **Flexibility** – With 24 10/100 ports and 2 GBIC slots, the Nortel Ethernet Routing Switch 1424T provides enhanced connectivity for workgroups and servers. The GBIC ports allow for connectivity of single and multimode fiber for both SX and LX connectivity. Multi-layer redundancy is delivered by multi-link trunking capabilities that provide multiple ports acting as one trunk and the ability to participate in a split multi-link trunk solution.

Market Information

The Ethernet Routing Switch 1424T makes good on its promise of delivering performance to the wiring closet. As a desktop routing switch, the 1424T routing switch provides the performance, simplicity and flexibility required by today's

applications-focused network. As competition in the global marketplace fuels the growth for network applications, Nortel continues to be uniquely positioned to provide customers with the broadest range of solutions for your business' success.

Technical Specifications

Ethernet Routing Switch 1424T	
Physical Specification	Weight: 2.8kg (6.2 lb.) Height: 43 mm (1.7in.) Width: 441 mm (17.3 in.) Depth: 210 mm (53.3 in.)
Performance Specifications	Frame forwarding rate (64 byte packets): 8.8 Gbps switching fabric capacity • 6.6 Mpps packet forwarding rate Port forwarding performance (64 byte packets): • 8.8 Gbps switching fabric capacity • 6.6 Mpps packet forwarding rate Port filtering performance (64 byte packets): • Address database size: 8K • Addressing Frame length: Up to 1536 bytes
Data Rate	10 Mbps Manchester encoded or 100 Mbps 4MB/5MB encoded
Interface Options	10BASE-T/100BASE-TX: RJ-45 (8-pin modular) connectors for MDI-X interface GBICs: 2-port GBIC-based Gigabit Ethernet Module The 1424T GBIC MDA supports the following GBICs: • 1000BASE-SX uses shortwave 850 nm fiber optic connectors to connect devices over multi-mode (550 m or 1,805 ft) fiber optic cable. • 1000BASE-LX uses longwave 1,300 nm fiber optic connectors to connect devices over single mode (5 km or 3.1 mi) or multi-mode (550 m or 1,805 ft) fiber optic cable. • 1000BASE-XD uses longwave 1550 nm fiber optic connectors to connect devices over single-mode (up to 50 km or 31 mi) fiber optic cable • 1000BASE-ZX uses longwave 1550 nm fiber optic connectors to connect devices over single-mode (up to 70 km or 43 mi) fiber optic cable • 1000BASE-T uses RJ-45 connectors to connect devices over category 5 copper cabling (up to 100 m or 328 ft)
Network Protocol and Standards Compatibility	• IEEE802.3 10BASE-T Ethernet (twisted-pair copper) • IEEE802.3u 100BASE-TX Fast Ethernet (twisted-pair copper) • ANSI/IEEE802.3 Auto-negotiation • IEEE802.3x Flow Control • IEEE802.1p Priority Queues • IEEE802.1q VLANs • IEEE802.1D Spanning Tree

Ethernet Routing Switch 1424T	
RFC Support	• RFC 768 User Datagram Protocol (UDP) • RFC 783 Trivial File Transfer Protocol (TFTP) • RFC 791 / 950 Internet Protocol (IP) • RFC 792 Internet Control Message Protocol (ICMP) • RFC 826 Address Resolution Protocol (ARP) • RFC 854 Telnet • RFC 2236 Internet Group Management Protocol (IGMP) version 2 • RFC 1542 BOOTP • RFC 1058 Routing Information Protocol (RIP) • RFC 1519 Classless Inter-domain Routing (CIDR) • RFC 1723 Routing Information Protocol (RIP) version 2 • RFC 1724 RIPv2 MIB • RFC 1583 OSPFv2 • RFC 1850 OSPFv2 MIB • RFC 2131 BOOTP/DHCP relay • draft-ietf-idmr-dvmrp-v3-10 DVMRPv3
Electrical Specifications	Power supply: 100 - 240 VAC, 50-60 Hz internal universal
Environmental	Operating Temperature 0 - 50 °C Storage temperature: -25 - 55 °C Humidity: 5% - 95% non-condensing
Safety Agency Approvals	CUS,TUV, CB, NOM
Electromagnetic Emissions Summary	FCC Class A, CE Mark, VCCI Class I, BSM
Electromagnetic immunity	EN55024 :1998

Nortel Ethernet Routing Switch RPS 15



Overview

The Nortel Ethernet Routing Switch RPS (Redundant Power Supply) 15 is a low cost yet scalable redundant power supply device that provides redundancy and power protection in a single chassis for stackable Nortel Ethernet Routing Switches and Ethernet Switches. The RPS 15 maintains network operation in case of device power failure. Power is provided to switches simultaneously without requiring a device reboot. During normal operation, the RPS load shares with the power supply in the network device thereby increasing the life expectancy of the power supply. The power redundancy modules are Hot-Swappable so additional protection can be added within normal office hours and without downtime of the network. The modular chassis allows you to acquire additional RPS modules as your network grows.

The RPS 15 can be used to provide power sharing or protection for Nortel Ethernet Routing Switch 5520, as well as power protection for non-PoE switches. Up to 12 switches can be power protected with one RPS 15 providing maximum efficiency. For additional resiliency, customers may choose an Uninterruptible Power Supply (UPS) solution from their approved vendor.

The RPS 15 is a 2 Rack Unit high design and can accommodate up to three Redundant Power Supply (RPS) Modules. Each RPS module can deliver up to 600W of power. The RPS module features two front facing LED indicators to display status of AC and DC power. The basic configuration consists of an RPS chassis that is shipped with two blank panels pre-installed. The RPS 15 requires at least one RPS Module which must be ordered as a separate item. Additionally, a DC power cable needs to be ordered to connect to the DC power socket of the switch. Depending on the switch type a separate DC-to-DC converter may be required.

Power Protection Mode

The RPS 15 provides power protection for Ethernet Routing Switches 5510, 5520 and 5530, Ethernet Switches 470, 380 and Business Policy Switch, as well as Ethernet Services Unit 1400, 1450 and 1800. Each 600 W RPS module can supply power to one 5520 Switch, one 5530 Switch, or four 5510, 470, 380 or Ethernet Services Unit models. In case of a power outage the RPS 15 will immediately take over providing power to the switch. In power protection mode, RPS 15 is capable of providing 320W to PoE devices such as 5520 Switches in the network to a maximum of 15.4W per port (13.3W average to 24 ports and 6.6W average to 48 ports).

Power Sharing Mode

To increase per port PoE power, power sharing is available when the RPS 15 is used together with the 5520 Switch's internal power supply. These switches can be configured to use internal or external power source only to provide power redundancy as described above. In this case 320W of power can be provided to connected devices with a maximum of 15.4W per port as per the standard requirement. When configured to use both internal and external power (power sharing) the switch total PoE power output is increased to 740W. In power sharing mode up to 740W (conform 802.3af, 15.4W per port on a -48T) can be provided.

Ideal For

- New and existing mid-tier and enterprise customers that need RPS functionality
- Enterprise customers requiring more power for PoE devices than a single switch can deliver
- Enterprise customers that already have a UPS and only need power redundancy
- Enterprise customers that need power redundancy but have limited space in the wiring closet

Business Challenges

- Is network uptime and uninterrupted activity critical to your business?
- Do you have multiple wiring closet switches?
- Is space limited in your wiring closets?
- Do you have multiple high demanding PoE devices connecting into your wiring closet?

Typical Applications

- **5520 Switches** – Using a single chassis, connect up to three 5520 Switches and provide each switch with 320W for Power over Ethernet Redundancy or 720W in power sharing mode. Order a DC cable (AA0005018) to connect each 5520 Switch.
- **5530 Switch** – Using a single chassis, connect up to three 5530 Switches. Order a DC cable (AA0005018) to connect each 5520 Switch.
- **Other Switches** – Using a single chassis, connect up to twelve Ethernet Routing Switch 5510, Ethernet Switch 470, 380 or Business Policy Switch as well as Ethernet Services Unit 1400, 1450 and 1800 to provide power protection. A chassis accepts up to three 600W RPS modules. Each RPS module can protect up to 4 switches. Each RPS module uses a DC cable (10ft/3m) to connect up to four switches. For maximum deployment flexibility a longer DC cable (25ft/7.6m) is also available. Models 5510, 470, 380 and BPS also need a DC-to-DC connector to be purchased separately.

Features and Benefits

- Provides power redundancy to power supplies of Ethernet Routing Switches 5510, 5520 and 5530, Business Policy Switch, Ethernet Switch 380, 470, as well as Ethernet Services Unit 1400, 1450 and 1800.
- Single chassis, 2U high for standard 19" rack, provides scalable, redundant power supply for multiple devices.
- Redundant Power Supply (RPS) modules available in 600 watt rating provide redundant DC power to up to twelve devices per chassis.
- Redundant power modules may be purchased separately and installed into the chassis as needed, while unit remains fully operational.
- Provides Load Sharing to PoE switches such as the Ethernet Routing Switch 5520. All ports will be able to deliver full 15.4W power each.
- Protects mission-critical enterprise applications from interruption due to problems with either the power source or power units within network devices.
- Single chassis, 2U high for standard 19" rack, provides scalable, redundant power supply system for up to 12 devices.
- Hot-swappable RPS modules can be replaced or added while the whole unit remains operational.
- With the help of a third-party UPS solution, it ensures continuity of AC power to switches and other network devices even during AC mains failure, power sag, surges or blackouts.

Technical Specifications

Interfaces	Standard AC wall plug- NEMA 5-15 P (AC in) DC connector
Electromagnetic Compatibility	EN55022/CISPR 22, Class A EN55024/CISPR 22, Class A VCCI, Class A (Japan) BSMI Class A (Taiwan) ACA, AS/NZ 3548, Class A (Australia) FCC Part 15 Class A (US)
MTBF	>2,000,000 hours
Noise level	<60 dBA
Shock/Vibration	NEBS GR-63 Std, MIL-STD-810E, METHOD 516.4, procedure IV when packaged for shipping. NEBS GR-63-CORE Sect. 5.3.1, Category A container. NEBS GR-63-CORE, Sect. 5.1.1, NEBS GR-63-CORE, Sect. 5.4.3
Physical Dimensions	13.75 x 5.375 x 3.125 inches (34.925 x 13.653 x 7.938 cm) Weight: Chassis 15lbs/6.8kg, RPS module 7.5lbs/3.4kg
Power Requirements	Input requirements: Input voltage: 90-264VAC Input frequency range: 47 to 440 Hz, Nominal: 50 / 60 Hz • Inrush current: max. 40A • Leakage current: 0.5 mA to 3.0 mA maximum for any input voltage Output requirements: Output voltage and current 600W power supply module DC output: 47.5V output, 600W, Minimum Load: 0A, Full Load: 12.5A
Environmental	Operating temperature: 0 ° to 40 ° C Storage temperature: -25° C to 70° C Operating relative humidity: 5% to 85% relative humidity, non-condensing Storage temperature humidity: 95% maximum relative humidity, non-condensing Operating altitude: Up to 10,000 feet above sea level Storage altitude: Up to 30,000 feet above sea level Cooling, forced air: 2X30 CFM, 80 mm fans
Standards and Certifications	UL 1778, UL/C-UL 1950, IEC 950/EN 60950, EN50091-1, CB certificate and report with all national deviations, TCA AS/NZS 3260, CCIB/GB4943, GB9254, KNITQ, JET, PSB, NOM-019-SCFI, GOST, IRAM

Ordering Information

For further information, please contact your local Nortel representative.

Nortel Ethernet Routing Switch 3510

Overview

Nortel Ethernet Routing Switch 3510-24T is a standalone 24-port 10/100/1000 Mbps Layer 3 Ethernet switch designed for small and medium businesses and branch offices looking for a cost-effective, high-performance desktop switching solution. It offers 24 10/100/1000 Mbps auto-sensing ports with four SFP (Small Form factor Pluggable) uplink ports for fiber connection. The 3510-24T delivers a highly affordable LAN solution that offers high performance, is easy to use and delivers investment protection.

Ideal For

Small and medium businesses (SMBs) and branch offices of enterprises as well as server farms

Business Challenges

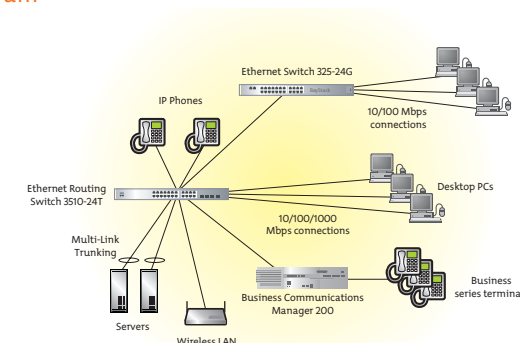
- Are price and performance predominant decision factors?

Typical Applications

Any customer looking to:

- Improve employee productivity using Gigabit to the desktop
- Implement cost-effective Gigabit desktop connectivity
- Higher performance for graphics and multimedia applications
- Simplify management and installation using Web management
- Aggregate servers
- Protect investments

Network Diagram



Key Points

- Cost-effective Gigabit desktop connectivity helps improve employee productivity.
- Easy-to-use management features save time.
- Gigabit performance future-proofs and provides investment protection.

- Layer 3 routing helps improve network performance.
- Has QoS support for time-sensitive, mission-critical applications including Voice over IP and multimedia applications.
- Uses existing Category 5 copper cabling.
- Is worry-free with lifetime warranty.

Features and Benefits

- **Gigabit desktop connectivity** – 24 10/100/1000 auto-sensing ports. Gigabit performance improves employee productivity by accelerating data transfer of larger file sizes such as graphics and multimedia. Gigabit performance is designed to future-proof investment by accommodating the ever-growing bandwidth and low delay requirements to end users running critical business applications.
- **Lower 10/100/1000 per-port price** – Saves costs while deploying high-speed data network.
- **Layer 3 routing** – Helps improve network performance as packets do not need to go to the network core and routing can take place within the switch.
- **Wire-speed operation** – Helps assure there are no dropped packets.
- **Java™ Device Manager and Web-based management** – Graphical user interface minimizes time needed to configure and manage the switches.
- **Command Line Interface (CLI) and ASCII Configuration** — Helps automate general management and configuration, which makes it ideal for the enterprise branch office application.

- **Eight hardware queues for QoS** – Helps provide higher granularity of traffic control for mission critical applications.
- **Secure access** – Helps prevent unauthorized user access.

Market Information

Nortel's Ethernet Routing Switch 3510-24T is a cost-effective high-performance 10/100/1000 Mbps Layer 3 routing switch featuring high-speed uplinks, easy configuration and Web-based management from your web browser. It is designed for the requirements of small to medium-sized businesses and branch offices that consider price and performance to be predominant decision factors. The switch can accommodate the ever-growing bandwidth and low delay requirements to end users running critical business applications and they can now take full performance advantage of PCs, laptops and servers that are Gigabit-enabled.

Technical Specifications

Ethernet Routing Switch 3510-24T	
Physical Specification	(H) 1.75 inches (W) 17.25 inches (D) 8.19 inches [4.45 cm x 43.82 cm x 20.80 cm] Weight: 4.5 kg (9.9 lb)
Performance Specification	Switch fabric bandwidth: 80 Gbps for the switch Frame forwarding rate: 35.7 Mpps (million packets per second)
Port Forwarding / Filtering Performance	For 10 Mbps: 14,880 pps maximum (64-byte packets) For 100 Mbps: 148,810 pps maximum For 1000 Mbps: 1,488,100 pps maximum Address database size: 8,000 entries at line rate (8,000 entries without flooding) Addressing: 48-bit MAC address Frame length: 64 to 1518 bytes (IEEE 802.1Q Untagged) 64 to 1,522 bytes (IEEE 802.1Q Tagged) Jumbo frame support: Up to 9,216 bytes Multi-Link Trunks: Six trunks, four members per trunk VLANs: 256 port-based or protocol-based VLANs Tagging option Multiple Spanning Tree Groups: Up to eight STGs

Ethernet Routing Switch 3510-24T	
Interface Options	10BASE-T/100BASE-TX/ RJ-45 (8-pin modular) connectors for Auto MDI/MDI-X interface 1000BASE-T with auto-polarity
SFP GBIC Support	1000BASE-SX: Uses short wavelength 850 nm MTRJ or LC type fiber optic connectors to connect devices over multimode (275m, 62.5um core or 350m, 50.0um core) fiber optic cable 1000BASE-LX: Uses long wavelength 1300nm duplex LC type fiber optic connector to connect devices over single mode (10km, 9um core) fiber optic cable 1000BASE-CWDM: Uses long wavelength 1470, 1490, 1510, 1530, 1350, 1570, 1590, 1610nm LC type fiber optic connector to connect devices over single mode (40km, 9um core or 70km, 9um core) fiber optic cable
Network Protocol and Standards Compatibility	IEEE 802.3 10BASE-T (ISO/IEC 8802 3, Clause 14) IEEE 802.3u 100BASE-TX (ISO/IEC 8802-3, Clause 25) IEEE 802.3u Autonegotiation on Twisted Pair (ISO/IEC 8802-3, Clause 28) IEEE 802.3x (Flow Control on the Gigabit Uplink port) IEEE 802.3z 1000BASE-SX and 1000BASE-LX IEEE 802.1d MAC Bridges (ISO/IEC 10038) IEEE 802.1p (Prioritizing) IEEE 802.1Q (VLAN Tagging) IEEE 802.1D Spanning Tree Protocol IEEE 802.3ad (manual/static) IEEE 802.3ad (LACP)† IEEE 802.1s† IEEE 802.1w† IETF DiffServ
RFC Support	RFC 1213 (MIB-II); RFC 1493 (Bridge MIB); RFC 1573 (IF-MIB); RFC 2863 (Interfaces Group MIB); RFC 2665 (Ethernet MIB); RFC 2737 (Entity MIBv2); RFC 2819 (RMON MIB); RFC 1757 (RMON); RFC 1271 (RMON); RFC 1157 (SNMP); RFC 2570 (SNMPv3); RFC 2571 (SNMP Frameworks); RFC 2573 (SNMPv3 Applications); RFC 2574 (SNMPv3 USM); RFC 2575 (SNMPv3 VACM); RFC 2576 (SNMPv3); RFC 2572 (SNMP Message Processing) RFC 791 (IP); RFC 792 (ICMP); RFC 793 (TCP); RFC 783 (TFTP); RFC 826 (ARP); RFC 768 (UDP); RFC 854 (TELNET); RFC951 (Bootp); RFC 2236 (IGMPv2); RFC 1112 (IGMPv1); RFC 1945 (HTTP v1.0); RFC 2138 (RADIUS); RFC 894 (IP over Ethernet); RFC2674 (Q MIB); RFC 1058/RFC 1723 (RIPv1/v2) †; RFC 2030 (SNTP [Simple NTP]) † Future software release
Electrical Specifications	Input voltage (AC version): 100-240 VAC (+/- 10%) @ 47 to 63 Hz Input power consumption (AC version): 90 W max Input current (AC version): 0.8 A maximum Input voltage (rms): 100 to 240 VAC at 50 to 60 Hz Maximum thermal output: 310 BTU/hr
Environmental Specifications	Operating temperature: 0° to 45°C (32° to 113°F) Storage temperature: -25° to +70°C (-13° to 158°F) Operating humidity: 85% maximum relative humidity, non-condensing Storage humidity: 95% maximum relative humidity, non-condensing Operating altitude: Up to 3,024 m (10,000 ft.) above sea level Storage altitude: Up to 3,024 m (10,000 ft.) above sea level
Mean Time Between Failures	335,000 hours
Safety Agency Approvals	UL60950 CSA 22.2 No. 60950 (cUL) IEC 60950/EN 60950, CB report and certificate with all national deviations UL-94-V1 flammability requirements for PC board NOM-019 (NOM)

Ethernet Routing Switch 3510-24T	
Electromagnetic Emissions Summary	Meets the following standards: US: CFR47, Part 15, Subpart B, Class A Canada: ICES-003, Issue 3, Class A Australia/New Zealand: AS/NZS 3548:1995, A1:1997/A2:1997 class A Japan: VCCI-V-3/02.04 class A Taiwan: CNS 13438, Class A EN55022:1998/A1:2000 EN61000-3-2:2000 EN61000-3-3:1995/A1:2001
Electromagnetic Immunity	The module meets the EN55024:1998/A1:2000 standard
Declaration of Conformity	As stated in the Declaration of Conformity, the Ethernet Routing Switch 3510 complies with the provisions of Council Directives 89/336/EEC and 73/23/EEC

Nortel Ethernet Routing Switch 5510 Series

Overview

Part of the Nortel Ethernet Routing Switch 5000 series, the Nortel Ethernet Routing Switch 5510 is 1-rack unit high stackable 10/100/1000 Mbps Ethernet Layer 3 switch designed to provide affordable high-density gigabit desktop connectivity for medium and large enterprise wiring closets. The Nortel Ethernet Routing Switch 5510 offers a scalable and resilient solution, providing exceptional security features and support for enhanced convergence, while minimizing capital and operational expenses. The Nortel Ethernet Routing Switch 5000 family represents the next-generation in innovation and performance in a stackable solution, while future-proofing an enterprises' wiring closet investment.

Ideal For

- Enterprises that are looking for affordable long-term investment in the wiring closet
- Enterprises that work with large files and want faster file access
- Medium to large single-site and multi-site enterprises with demanding network needs including high bandwidth, high density and reduced size
- Enterprises that require quality of service (QoS) in the local area network
- Enterprises that want to implement and support voice, video and data on the same network

Business Challenges

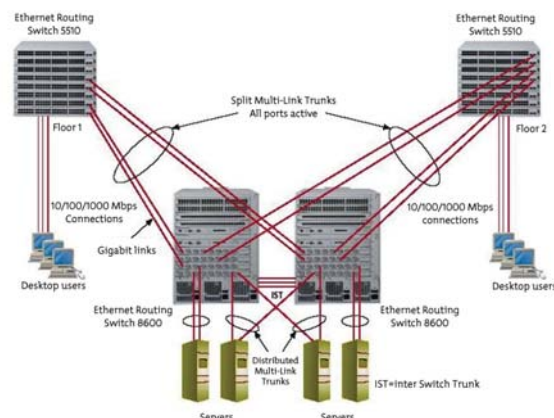
- Are you looking to future-proof your LAN solution in the wiring closet to support you for the next five years?
- Are you looking for affordable enterprise-class gigabit desktop connectivity?
- Do you have limited space available in your wiring closets?
- Do you work with large file sizes?
- Are you tired of long file transfer times?
- Are you planning to use collaborative applications in the future?
- Do you want to minimize network down time?
- Do you require a high level of security at the edge of your network?

- Would you like to set levels of priority for key departments, users or applications?
- Are you considering implementing voice over IP (VoIP), video conferencing, on-line training and/or video streaming on your network?

Typical Applications

- High bandwidth requirements such as multimedia (video and application streaming), eCommerce and Web applications
- Collaborative peer-to-peer applications such as office automation, grid computing or instant messaging
- Large file transfer applications such as storage, multimedia production and editing, desktop publishing, video training, CAD/CAM, imaging, MRI, X-ray and telemedicine
- Delay intolerant applications such as IP telephony
- Key department or personnel prioritization requirements such as help desk, service teams and/or key management

Network Diagram



Key Points

- **High-density Gigabit desktop connectivity** - Up to eight switches can be stacked to achieve up to 384 10/100/1000 ports in a stack. Pay as you grow while saving premium closet space.
- **Innovative FAST stack design** - FAST (Flexible Advanced Stacking Technology) stack design allows for simultaneous bi-directional traffic flow on each stacking port resulting in up to 640 Gbps stacking bandwidth for the stack – the highest stacking bandwidth in the industry today. Faster traffic flow across the stack for bandwidth-intensive applications.
- **High-performance switch fabric of 160 Gbps** – Wire-speed performance with no dropped packets.
- **Ethernet Switch Software** – Flexible stacking across 5510, 5520 and 5530 switches.
- **Compact form factor** – 1-rack unit high design allows a stack to support up to 384 ports and saves premium space in the wiring closet.

Features and Benefits

The Nortel Ethernet Routing Switch 5510 is available in two models: the Nortel Ethernet Routing Switch 5510-48T and the Nortel Ethernet Routing Switch 5510-24T. Power over Ethernet versions of the switches are planned for release in the future.

The Nortel Ethernet Routing Switch 5510-48T features 48 10/100/1000base-T RJ-45 ports for desktop switching and two built-in small form factor pluggable (SFP) GBIC ports for uplink. Port 47 and port 48 offer configuration flexibility by allowing the network administrator to configure each port as either 10/100/1000 or make use of the built-in SFP GBIC. As many as eight Nortel Ethernet Routing Switch 5510-48Ts can be stacked to achieve up to 384 10/100/1000 ports for highest-density desktop switching.

The Nortel Ethernet Routing Switch 5510-24T offers 24 10/100/1000base-T RJ-45 ports for desktop switching and two built-in GBIC ports for uplink. Port 23 and port 24 offer configuration flexibility as either a 10/100/1000 or a built-in SFP GBIC port. Both Nortel Ethernet Routing Switches 5510-24T and 5510-48T may be combined in a single stack for maximum flexibility.

- **High-density Gigabit desktop connectivity** - Up to eight switches can be stacked to achieve up to 384 10/100/1000 ports in a stack. Pay as you grow while saving premium closet space.
- **Innovative FAST stack design** - FAST (Flexible Advanced Stacking Technology) stack design allows for simultaneous bi-directional traffic flow on each stacking port resulting in up to 640 Gbps stacking bandwidth for the stack – the highest stacking bandwidth in the industry today. Faster traffic flow across the stack for bandwidth-intensive applications.
- **High-performance switch fabric of 160 Gbps** – Wire-speed performance with no dropped packets.
- **Compact form factor** – 1-rack unit high design allows a stack to support up to 384 10/100/1000 ports and saves premium space in the wiring closet.
- **Layer 3 routing** – Supports static IP routing, which improves the network performance as the packets do not have to go to the core for routing.
- **Single software image** – Allows Ethernet Routing Switch 5510, 5520 and 5530 models to stack together, simplifying software upgrades.
- **Auto Unit replacement feature** - Allows for retrieval of the failed switch's configuration from a server on to the replacement switch, saving time and making configuration easier.
- **Higher uplink capacity** – Up to 16 GBIC ports are available for uplink connectivity in a full stack for faster data traffic between the stack and the core switches.
- **Fail-safe stacking** – Assures continuous uptime for a stack – even if a switch fails – and eliminates a single point of failure.
- **Secure access and data traffic protection** – Features include secure shell (SSH), secure socket layer (SSL), IEEE 802.1x based security, (also known as extensible authentication protocol [EAP]), assignment of proper VLAN and priority, user-based policies and RADIUS authentication. Protection also includes extensive security in the wiring closet. New IEEE 802.1x enhancements include Multiple Host Multiple Authentication (MHMA) adding support for allowing more than one authenticated host per port. Guest VLANs are also included.

Market Information

The edge of the network is becoming more demanding. IP Telephony and other collaborative applications are driving more traffic to the edge of the network. As file sizes continue to grow, users need more bandwidth. Quite simply, the convergence of voice, video, data and storage enables users to do more from the desktop. Enterprises need to be able to address today's increased demands and still prepare for the unknown demands of tomorrow. By re-assessing how they're using the wiring closet, they can achieve both goals and be assured that their investments will be protected for a long time to come. Ethernet Routing Switch 5510 is designed to provide high-density Gigabit desktop connectivity for mid-size and large enterprise customers' wiring closets. It offers a scalable and resilient solution, providing exceptional security features and support for enhanced convergence while minimizing capital and operational expenses.

Technical Specifications

	Ethernet Routing Switch 5510 Series
Physical Specification	Weight: 5.8 kg (12.78 lb) for -24T, 6.0 kg (13.2 lb) for -48T Height: 4.45 cm (1.75 in) Width: 43.82 cm (17.25 in) Depth: 38.74 cm (15.25 in)
Performance Specifications	Switch fabric bandwidth: 160 Gbps for the switch; Up to 1,280 Gbps for the full stack Stacking bandwidth: 80 Gbps for the switch; Up to 640 Gbps for the full stack Maximum data throughput: 768 Gbps for a full stack of 5510-48T Frame forwarding rate: 71.4 Mpps (million packets per second) for the Ethernet 5510-48T and 35.7 Mpps for the 5510-24T; 571.4 Mpps for a full stack of 8 5510-48T units
Port forwarding/filtering performance	For 10 Mbps: 14,880 pps maximum (64-byte packets) For 100 Mbps: 148,810 pps maximum For 1000 Mbps: 1,488,100 pps maximum Address database size: 16,000 entries at line rate (16,000 entries without flooding) Addressing: 48-bit MAC address Frame length: 64 to 1518 bytes (IEEE 802.1Q Untagged) 64 to 1,522 bytes (IEEE 802.1Q Tagged) Jumbo frame support: Up to 9,216 bytes Multi-Link Trunks: Six trunks, four members per trunk VLANs: 256 port-based or protocol-based VLANs Tagging option Multiple Spanning Tree Groups: Up to eight STGs
Interface Options	10BASE-T/100BASE-TX/ RJ-45 (8-pin modular) connectors for Auto MDI/MDI-X interface 1000BASE-T with auto-polarity The 5510 Switches support the following SFP GBICs: 1000BASE-SX Uses short wavelength 850 nm MTRJ or LC type fiber optic connectors to connect devices over multimode (275m, 62.5um core or 550m, 50.0um core) fiber optic cable 1000BASE-LX Uses long wavelength 1300nm duplex LC type fiber optic connector to connect devices over single mode (10km, 9um core) fiber optic cable 1000BASE-CWDM Uses long wavelength 1470, 1490, 1510, 1530, 1550, 1570, 1590, 1610nm LC type fiber optic connector to connect devices over single mode (40km, 9um core or 70km, 9um core) fiber optic cable
Network Protocol and Standards Compatibility	IEEE 802.3 10BASE-T (ISO/IEC 8802-3, Clause 14) IEEE 802.3u 100BASE-TX (ISO/IEC 8802-3, Clause 25) IEEE 802.3u Autonegotiation on Twisted Pair (ISO/IEC 8802-3, Clause 28) IEEE 802.3x (Flow Control on the Gigabit Uplink port) IEEE 802.3z 1000BASE-SX and 1000BASE-LX IEEE 802.1d MAC Bridges (ISO/IEC 10038) IEEE 802.1p (Prioritizing) IEEE 802.1Q (VLAN Tagging) IEEE 802.1D Spanning Tree Protocol IEEE 802.3ad (manual/static) IEEE 802.3ad (LACP) IEEE 802.1s† IEEE 802.1w‡ IETF DiffServ

	Ethernet Routing Switch 5510 Series
RFC Support	RFC 1213 (MIB-II); RFC 1493 (Bridge MIB); RFC 1573 (IF-MIB); RFC 2863 (Interfaces Group MIB); RFC 2665 (Ethernet MIB); RFC 2737 (Entity MIBv2); RFC 2819 (RMON MIB); RFC 1757 (RMON); RFC 1271 (RMON); RFC 1157 (SNMP); RFC 2570 (SNMPv3); RFC 2571 (SNMP Frameworks); RFC 2573 (SNMPv3 Applications); RFC 2574 (SNMPv3 USM); RFC 2575 (SNMPv3 VACM); RFC 2576 (SNMPv3); RFC 2572 (SNMP Message Processing) RFC 791 (IP); RFC 792 (ICMP); RFC 793 (TCP); RFC 783 (TFTP); RFC 826 (ARP); RFC 768 (UDP); RFC 854 (TELNET); RFC951 (Bootp); RFC 2236 (IGMPv2); RFC 1112 (IGMPv1); RFC 1945 (HTTP v1.0); RFC 2138 (RADIUS); RFC 894 (IP over Ethernet); RFC 2674 (Q MIB); RFC 1058/RFC 1723 (RIPv1/v2); RFC 2030 (SNTP [Simple NTP])
Electrical Specifications	Input voltage (AC version): 100-240 VAC (+/- 10%) @ 47 to 63 Hz Input power consumption (AC version): 135 W max Input current (AC version): 1.3 A @ 115 VAC, 0.65 A @ 230VAC Maximum thermal output: 460 BTU/hr
Environmental Specifications	Operating temperature: 0° to 45°C (32° to 113°F) Storage temperature: -25° to +70°C (-13° to 158°F) Operating humidity: 85% maximum relative humidity, non-condensing Storage humidity: 95% maximum relative humidity, non-condensing Operating altitude: Up to 3,024 m (10,000 ft.) above sea level Storage altitude: Up to 3,024 m (10,000 ft.) above sea level
Safety Agency Approvals	UL EN60950 (UL Listed or CSA 22.2 No. 60950 (CUL)) IEC 60950/EN 60950, CB report and certificate with all national deviations C22.2 No. 950 (CUL) with all national deviations UL-94-VI flammability requirements for PC board NOM-019 (NOM)
Electromagnetic Emissions Summary	Meets the following standards: US: CFR47, Part 15, Subpart B, Class A Canada: ICES-003, Issue 3, Class A Australia/New Zealand: AS/NZS 3548:1995, A1:1997/A2:1997 class A Japan: VCCI-V-3/02.04 class A Taiwan: CNS 13438, Class A EN55022:1998/A1:2000 EN61000-3-2:2000 EN61000-3-3:1995/A1:2001
Electromagnetic Immunity	The module meets the EN55024:1998/A1:2001 standard
Declaration of Conformity	As stated in the Declaration of Conformity, the Ethernet Routing Switch 5510 Switch complies with the provisions of Council Directives 89/336/EEC and 73/23/EEC

* SMLT is a 8600 feature

Nortel Ethernet Routing Switch 5520 Series



Overview

The Nortel Ethernet Routing Switch 5520 Power over Ethernet Switches are designed for mid-to-large enterprise customers who are looking to deploy Power over Ethernet in the wiring closet while maintaining connectivity to 10/100/1000 Mbps Ethernet devices such as PCs. Built on the advanced features of the 5510 Switches, they provide a stacking solution that offers greater performance, security, resiliency and more IP services to the network edge. Any enterprise customer who will be deploying applications such as IP telephony, WLAN, network cameras and access control devices (badge readers) will benefit from the convenience of having a single cable provide power and data traffic. With the 802.3af standard now ratified, there will be a proliferation in the amount of devices that can be powered in the next few years.

Ideal For

- Enterprises looking for affordable long-term investment in the wiring closet
- Enterprises looking to deploy Power over Ethernet in the wiring closet now or in the future
- Enterprises working with large files and want faster file access
- Medium to large single-site and multi-site enterprises with demanding network needs including high bandwidth, high density and reduced size
- Enterprises requiring QoS in the local area network
- Enterprises wanting to implement and support voice, video and data on the same network

Business Challenges

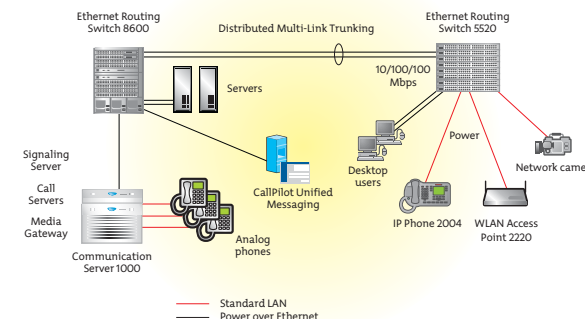
- Are you looking to future-proof your LAN solution in the wiring closet to support you for the next five years?
- Are you looking for affordable enterprise-class gigabit desktop connectivity?
- Do you have limited space available in your wiring closets?
- Do you work with large file sizes?
- Are you tired of long file transfer times?
- Are you planning to use collaborative applications in future?
- Do you want to minimize network down time?

- Do you require a high level of security at the edge of your network?
- Would you like to set levels of priority for key departments, users or applications?
- Are you considering implementing voice over IP (VoIP), video conferencing, on-line training and/or video streaming on your network?

Typical Applications

- The Ethernet Routing Switch 5520 can be used to provide power to devices such as Internet telephones, wireless LAN access points and network cameras as well as providing connectivity to standard 10/100/1000 Mbps Ethernet devices such as PCs and servers.
- The Ethernet Routing Switch 5520 addresses the needs for all vertical markets as they bring Gigabit connectivity and Power over Ethernet to the desktop. In particular, but not limited to, the following industries will find these switches appealing:
 - Healthcare and medical for increased use of digitized scans (MRI, X-Ray, etc.) that are typically very large
 - Education, Universities, K-12
 - Digital Media Production, i.e. video editing, multimedia production and editing
 - Desktop Publishing
 - Corporate Communications, i.e. video training
 - Any industry that wants to deploy Power over Ethernet
 - Any industry that needs bulk data transfer

Network Diagram



Key Points

- High-density Gigabit desktop connectivity – As many as eight switches can be stacked to achieve up to 384 10/100/1000 ports in a stack for pay as you grow capability while saving premium closet space.
- Power over Ethernet support for current and future devices – IP phones, wireless access points, network cameras, lighting, security and access control devices (badge readers).
- Innovative FAST stack design - FAST (Flexible Advanced Stacking Technology) stack design allows for simultaneous bi-directional traffic flow on each stacking port resulting in up to 640 Gbps stacking bandwidth for the stack – the highest stacking bandwidth in the industry today. Faster traffic flow across the stack for bandwidth-intensive applications.
- High-performance switch fabric of 160 Gbps – Wire-speed performance with no dropped packets.
- Compact form factor – 1-rack unit high design allows a stack to support up to 384 ports, saving premium space in the wiring closet.

Features and Benefits

- High-density Gigabit desktop connectivity – Stacking of up to eight switches to achieve up to 384 10/100/1000 ports in a stack for pay as you grow while saving premium closet space
- Power over Ethernet support to IP phones, network cameras, wireless access points, security, lighting and access control devices (badge readers)
- Innovative FAST stack design - FAST (Flexible Advanced Stacking Technology) stack design for simultaneous bi-directional traffic flow on each stacking port resulting in up to 640 Gbps stacking bandwidth for the stack – the highest stacking bandwidth in the industry today; faster traffic flow across the stack for bandwidth-intensive applications
- High-performance switch fabric of 160 Gbps – Wire-speed performance with no dropped packets
- Compact form factor – 1-rack unit high design allowing a stack to support up to 384 10/100/1000 ports, which saves premium space in the wiring closet
- Layer 3 routing – Supports static IP routing and improves the network performance as the packets do not have to go to the core for routing
- Plug-n-play settings – Simplified web-based configurations for data and power settings

- Auto Discovery Feature – Automatic recognition of a connection's device with immediate power sent to it
- Convenience of single cable – Data and power transmitted over one cable without using a power outlet
- Dynamic power management – Each port configured to limit the power delivered to a device and for power priority level – low, high and critical
- Single software image – Allows Ethernet Routing Switch 5520-48T-PWR, 5520-24T-PWR, 5510-48T, 5510-24T and 5530-24TFD models to stack together, simplifying software upgrades
- Auto Unit replacement feature - Allows retrieval of the failed switch's configuration from a server on to the replacement switch, saving time and making configuration easier

Market Information

The way in which businesses use LANs is changing and the performance requirement at the edge of the network is becoming more demanding. IP Telephony and other collaborative applications are driving more traffic to the edge of the network. As file sizes continue to grow, users need more bandwidth. Quite simply, the convergence of voice, video, data and storage enables users to do more from their desktop. Enterprises need to be able to address today's increased demands and still prepare for the unknown demands of tomorrow. By re-assessing how they're using the wiring closet, they can achieve both goals and be assured that their investments will be protected for a long time to come. According to IDC's Worldwide Power over Ethernet 2004-2008 Forecast and Analysis report, the Power over Ethernet market revenue is expected to grow at an 8.9% compound annual growth rate over the next five years.

Technical Specifications

Ethernet Routing Switch 5520 Series	
Physical Specification	Weight: 8.4 kg (18.5 lb) for -24T-PWR, 8.8 kg (19.5 lb) for -48T-PWR Height 4.45 cm (1.75 in) Width 43.82 cm (17.25 in) Depth 38.74 cm (15.25 in)
Performance Specifications	Switch fabric bandwidth: 160 Gbps for the switch; Up to 1,280 Gbps for the full stack Stacking bandwidth: 80 Gbps for the switch; Up to 640 Gbps for the full stack Maximum data throughput: 768 Gbps for a full stack of 5520-48T-PWR Frame forwarding rate: 71.4 Mpps (million packets per second) for the 5520-48T-PWR and 35.7 Mpps for the 5520-24T-PWR; 571.4 Mpps for a full stack of 8 5520-48T-PWR units
Port forwarding/filtering performance	For 10 Mbps: 14,880 pps maximum (64-byte packets) For 100 Mbps: 148,810 pps maximum For 1000 Mbps: 1,488,100 pps maximum Address database size: 16,000 entries at line rate (16,000 entries without flooding) Addressing: 48-bit MAC address Frame length: 64 to 1518 bytes (IEEE 802.1Q Untagged) 64 to 1,522 bytes (IEEE 802.1Q Tagged) Jumbo frame support: Up to 9,216 bytes Multi-Link Trunks: Up to six trunks, four members per trunk VLANs: Up to 256 port- or protocol-based per VLAN Tagging option Multiple Spanning Tree Groups: Up to eight STGs

Ethernet Routing Switch 5520 Series	
Interface Options	10BASE-T/100BASE-TX/ RJ-45 (8-pin modular) connectors for Auto MDI/MDI-X 1000BASE-T interface 1000BASE-T with auto-polarity The 5510 Switches support the following SFP GBICs: 1000BASE-SX Uses short wavelength 850 nm MTRJ or LC type fiber optic connectors to connect devices over multimode (275m, 62.5um core or 550m, 50.0um core) fiber optic cable 1000BASE-LX Uses long wavelength 1300nm duplex LC type fiber optic connector to connect devices over single mode (10km, 9um core) fiber optic cable 1000BASE-CWDM Uses long wavelength 1470, 1490, 1510, 1530, 1550, 1570, 1590, 1610nm LC type fiber optic connector to connect devices over single mode (40km, 9um core or 70km, 9um core) fiber optic cable
Network Protocol and Standards Compatibility	IEEE 802.3af compliant (Power over Ethernet) IEEE 802.3 10BASE-T (ISO/IEC 8802 3, Clause 14) IEEE 802.3u 100BASE-TX (ISO/IEC 8802-3, Clause 25) IEEE 802.3u Autonegotiation on Twisted Pair (ISO/IEC 8802-3, Clause 28) IEEE 802.3x (Flow Control on the Gigabit Uplink port) IEEE 802.3z 1000BASE-SX and 1000BASE-LX IEEE 802.1d MAC Bridges (ISO/IEC 10038) IEEE 802.1p (Prioritizing) IEEE 802.1Q (VLAN Tagging) IEEE 802.1D Spanning Tree Protocol IEEE 802.3ad (manual/static) IEEE 802.3ad (LACP) IEEE 802.1s * IEEE 802.1w * IETF DiffServ
RFC Support	RFC 1213 (MIB-II); RFC 1493 (Bridge MIB); RFC 1573 (IF-MIB); RFC 2863 (Interfaces Group MIB); RFC 2665 (Ethernet MIB); RFC 2737 (Entity MIBv2); RFC 2819 (RMON MIB); RFC 1757 (RMON); RFC 1271 (RMON); RFC 1157 (SNMP); RFC 2570 (SNMPv3); RFC 2571 (SNMP Frameworks); RFC 2573 (SNMPv3 Applications); RFC 2574 (SNMPv3 USM); RFC 2575 (SNMPv3 VACM); RFC 2576 (SNMPv3); RFC 2572 (SNMP Message Processing) RFC 791 (IP); RFC 792 (ICMP); RFC 793 (TCP); RFC 783 (TFTP); RFC 826 (ARP); RFC 768 (UDP); RFC 854 (TELNET); RFC951 (Bootp); RFC 2236 (IGMPv2); RFC 1112 (IGMPv1); RFC 1945 (HTTP v1.0); RFC 2138 (RADIUS); RFC 894 (IP over Ethernet); RFC 2674 (Q MIB); RFC 1058/RFC 1723 (RIPv1/v2)†; RFC 2030 (SNTP [Simple NTP])
Electrical Specifications	Max input current: 6.5A at 115VAC or 3.25A at 230VAC Input voltage (rms): 100 to 240 VAC 50/60 Hz Power consumption: 600W max. Thermal rating: 850 BTU/Hr Inrush current 20A 120VAC at max. load, 40A 240VAC at max. load Turn on condition 1 second max after application of AC power. Note: 12V output rise time, from 10% to 90%, shall be a maximum of 50 ms and monotonic under all defined input and output conditions. Efficiency: 70% min.
Environmental Specifications	Operating temperature: 0° to 40°C (32° to 104°F) for continuous operation and 0° to 55°C (32° to 131°F) for short time operation Storage temperature: -40° to +85°C (-40° to 185°F) Operating humidity: 10% to 90% relative humidity, non-condensing Storage humidity: 10% to 95% relative humidity, non-condensing Operating altitude: Up to 3,048 m (10,000 ft.) above sea level Storage altitude: -304.8 to 3,048 m (-1,000 to 10,000 ft.) above sea level

Ethernet Routing Switch 5520 Series	
Safety Agency Approvals	UL EN60950 (UL Listed or CSA 22.2 No. 60950 (CUL)) IEC 60950/EN 60950, CB report and certificate with all national deviations C22.2 No. 950 (CUL) with all national deviations UL-94-V1 flammability requirements for PC board NOM-019 (NOM)
Electromagnetic Emissions Summary	Meets the following standards: US: CFR47, Part 15, Subpart B, Class A Canada: ICES-003, Issue 3, Class A Australia/New Zealand: AS/NZS 3548:1995, A1:1997/A2:1997 class A Japan: VCCI-V-3/02.04 class A Taiwan: CNS 13438, Class A EN55022:1998/A1:2000 EN61000-3-2:2000 EN61000-3-3:1995/A1:2001
Electromagnetic Immunity	The module meets the EN55024:1998/A1:2001 standard.
Declaration of Conformity	As stated in the Declaration of Conformity, the Ethernet Routing Switch 5520 complies with the provisions of Council Directives 89/336/EEC and 73/23/EEC. † Future software release

Nortel Ethernet Routing Switch 5530-24TFD



Overview

A new addition to the Nortel Ethernet Routing Switch 5000 Series, the Nortel Ethernet Routing Switch 5530-24TFD is a next-generation stackable 10/100/1000 Mbps Ethernet Layer 3 routing switch designed to provide high-density Gigabit desktop connectivity, Gigabit fiber connectivity and dual 10 Gigabit Ethernet uplink connections for mid-size and large enterprise customers' wiring closets. The 5530 Switch combines higher flexibility of deployment using Gigabit copper or fiber connections with exceptional performance utilizing dual 10 Gigabit uplinks. The 5530 Switch is a scalable and resilient solution that provides exceptional security features and support for enhanced convergence while minimizing capital and operational expenses.

The Ethernet Routing Switch 5530-24TFD provides with 24 10/100/1000BASE-T RJ-45 ports, 12 shared Small Form Pluggable (SFP) slots and 2 slots for 10 Gigabit Ethernet Small Form Pluggable (XFP) modules. The switch includes two built-in stacking ports in a compact 1 rack-unit high design. The Ethernet Routing Switch 5530-24TFD may be utilized in standalone mode, or stacked in a mixed stack of 8 units with existing Ethernet Routing Switch 5510-24T/48T or 5520-24T/48T-PWR devices.

Ideal For

- Enterprises looking for affordable long-term investment in the wiring closet
- Enterprises working with large files and want faster file access
- Medium to large single-site and multi-site enterprises with demanding network needs including high bandwidth, high density and reduced size
- Enterprises requiring quality of service (QoS) in the local area network
- Enterprises wanting to implement and support voice, video and data on the same network

- Are you planning to use collaborative applications in future?
- Do you want to minimize network down time?
- Do you require a high level of security at the edge of your network?
- Would you like to set levels of priority for key departments, users or applications?
- Are you considering implementing voice over IP (VoIP), video conferencing, on-line training and/or video streaming on your network?

Business Challenges

- Are you looking to future-proof your LAN solution in the wiring closet to support you for the next five years?
- Are you looking for affordable enterprise-class gigabit desktop connectivity?
- Are you tired of long file transfer times?
- Do you work with large file sizes?
- Do you have limited space available in your wiring closets?

Typical Applications

- Gigabit desktop connectivity
- Aggregating Gigabit traffic from wiring closet switches
- High-speed uplinks to the core
- Gigabit server aggregation

Key Points

- Higher flexibility of deployment using high-density Gigabit copper or fiber connection – up to 192 10/100/1000 ports or 96 SFP ports in a stack
- Exceptional uplink performance utilizing dual 10 Gigabit ports – up to sixteen 10 Gigabit ports in a stack
- Flexible stacking across 5510, 5520 and 5530 switches
- Innovative FAST stack design - FAST (Flexible Advanced Stacking Technology) stack design for faster traffic flow across the stack for bandwidth-intensive applications
- Wire-speed operation with no packet loss with 160 Gbps switch fabric
- Minimal network downtime using resilient connectivity, fail-safe stacking and power redundancy
- Secure access and data traffic protection

Features and Benefits

- Higher flexibility of deployment using high-density Gigabit copper or fiber connection – up to 192 10/100/1000 ports or 96 SFP ports. Pay as you grow while saving premium closet space.
- Exceptional uplink performance utilizing dual 10 Gigabit ports – up to sixteen 10 Gigabit ports in a stack for faster network performance
- Flexible stacking across 5510, 5520 and 5530 switches to simplify software upgrades and network operations

Technical Specifications

Ethernet Routing Switch 5530 Series	
Physical Specification	Weight 6.5 kg (14 1/2 lbs) Height: 4.45 cm (1.75 in) Width: 43.82 cm (17.25 in) Depth 38.74 cm (15.25 in)

- Innovative FAST stack design - FAST (Flexible Advanced Stacking Technology) stack design for faster traffic flow across the stack for bandwidth-intensive applications
- High-performance switch fabric of 160 Gbps – wire-speed performance with no dropped packets
- Layer 3 routing – Supports static IP routing to improve the network performance as the packets do not have to go to the core for routing

Market Information

The edge of the network is becoming more demanding. IP Telephony and other collaborative applications are driving more traffic to the edge of the network. As file sizes continue to grow, users need more bandwidth. Quite simply, the convergence of voice, video, data and storage enables users to do more from their desktop. Enterprises need to be able to address today's increased demands and still prepare for the unknown demands of tomorrow. By re-assessing how they're using the wiring closet, they can achieve both goals and be assured that their investments will be protected for a long time to come. Ethernet Routing Switch 5530 is designed to provide high-density Gigabit desktop connectivity as well as Gigabit fiber connectivity for mid-size and large enterprise customers' wiring closets. It offers a scalable and resilient solution, providing exceptional performance, security features and support for enhanced convergence while minimizing capital and operational expenses.

Ethernet Routing Switch 5530 Series	
Performance Specifications	Maximum Switch fabric bandwidth: 192 Gbps for the switch; Up to 1,563 Gbps for the full stack Typical Switch fabric bandwidth: 168 Gbps for the switch; Up to 1,344 Gbps for the full stack Maximum Stacking bandwidth: 96 Gbps for the switch; Up to 768 Gbps for the full stack Typical Stacking bandwidth: 80 Gbps for the switch; Up to 640 Gbps for the full stack Maximum data throughput: 704 Gbps for a full stack of 5530s Frame forwarding rate: 65.5 Mpps (million packets per second); 523.8 Mpps for a full stack of 8 5530s
Port forwarding/filtering performance	For 10 Mbps: 14,880 pps maximum (64-byte packets) For 100 Mbps: 148,810 pps maximum For 1000 Mbps: 1,488,100 pps maximum For 10000 Mbps: 14, 881,000 pps maximum Address database size: 16,000 entries at line rate (16,000 entries without flooding) Addressing: 48-bit MAC address Frame length: 64 to 1518 bytes (IEEE 802.1Q Untagged) 64 to 1,522 bytes (IEEE 802.1Q Tagged) Jumbo frame support: Up to 9,216 bytes Multi-Link Trunks: Six trunks, four members per trunk VLANs: 256 port-based or protocol-based VLANs Tagging option Multiple Spanning Tree Groups: Up to eight STGs
Interface Options	10BASE-T/100BASE-TX/ RJ-45 (8-pin modular) connectors for Auto MDI/MDI-X interface 1000BASE-T with auto-polarity The 5530 Switch supports the following SFP GBICs: 1000BASE-SX Uses short wavelength 850 nm MTRJ or LC type fiber optic connectors to connect devices over multimode (275m, 62.5um core or 550m, 50.0um core) fiber optic cable 1000BASE-LX Uses long wavelength 1300nm duplex LC type fiber optic connector to connect devices over single mode (10km, 9um core) fiber optic cable 1000BASE-CWDM Uses long wavelength 1470, 1490, 1510, 1530, 1550, 1570, 1590, 1610nm LC type fiber optic connector to connect devices over single mode (40km, 9um core or 70km, 9um core) fiber optic cable The 5530 Switch supports the following 10 Gigabit XFPs: 10GBASE-LR Uses wavelength 1310nm, Single mode fiber, up to 10Km, LC connector 10GBASE-ER Uses wavelength 1550nm, Single mode fiber, up to 40Km, LC connector 10GBASE-SR Uses wavelength 850nm, Multi mode fiber (22m @ 62.5um/160MHz/km MMF, or 33m @ 62.5um/200MHz/km MMF, or 66m @ 62.5um/500 MHz/km MMF, or 82m @ 50um/500MHz/km MMF, or 300m @ 50um/2000MHz/km MMF), LC connector
Network Protocol and Standards Compatibility	IEEE 802.3 10BASE-T (ISO/IEC 8802 3, Clause 14) IEEE 802.3u 100BASE-TX (ISO/IEC 8802-3, Clause 25) IEEE 802.3u Autonegotiation on Twisted Pair (ISO/IEC 8802-3, Clause 28) IEEE 802.3x (10/100 Flow Control) IEEE 802.3z 1000BASE-SX and 1000BASE-LX IEEE 802.3ae 10 Gigabit XFP IEEE 802.1d MAC Bridges (ISO/IEC 10038) IEEE 802.1p (Prioritizing) IEEE 802.1Q (VLAN Tagging) IEEE 802.1D Spanning Tree Protocol IEEE 802.3ad (manual/static) IEEE 802.3ad (LACP) IEEE 802.1s† IEEE 802.1w† IETF DiffServ

Ethernet Routing Switch 5530 Series	
RFC Support	RFC 1213 (MIB-II); RFC 1493 (Bridge MIB); RFC 1573 (IF-MIB); RFC 2863 (Interfaces Group MIB); RFC 2665 (Ethernet MIB); RFC 2737 (Entity MIBv2); RFC 2819 (RMON MIB); RFC 1757 (RMON); RFC 1271 (RMON); RFC 1157 (SNMP); RFC 2570 (SNMPv3); RFC 2571 (SNMP Frameworks); RFC 2573 (SNMPv3 Applications); RFC 2574 (SNMPv3 USM); RFC 2575 (SNMPv3 VACM); RFC 2576 (SNMPv3); RFC 2572 (SNMP Message Processing); RFC 791 (IP); RFC 792 (ICMP); RFC 793 (TCP); RFC 783 (TFTP); RFC 826 (ARP); RFC 768 (UDP); RFC 854 (TELNET); RFC951 (Bootp); RFC 2236 (IGMPv2); RFC 1112 (IGMPv1); RFC 1945 (HTTP v1.0); RFC 2138 (RADIUS); RFC 894 (IP over Ethernet); RFC 2674 (Q MIB); RFC 1058/RFC 1723 (RIPv1/v2) ‡; RFC 2030 (SNTP [Simple NTP])
Electrical Specifications	Input voltage (AC version): 100-240 VAC (+/- 10%) @ 47 to 63 Hz Input power consumption (AC version): 135 W max Input current (AC version): 1.3 A @ 115 VAC, 0.65 A @ 230VAC Maximum thermal output: 512 BTU/hr
Environmental Specifications	Operating temperature: 0° to 50°C (32° to 122°F) Storage temperature: -40° to +85°C (-40° to 185°F) Operating humidity: From 10% to 85% maximum relative humidity, non-condensing Storage humidity: From 10% to 95% maximum relative humidity, non-condensing Operating altitude: Up to 4572m (15,000 ft.) maximum above sea level Storage altitude: Between -340.8m (-1000 ft.) and 12,192m (40,000 ft.) above sea level
Safety Agency Approvals	IEC 60950/EN 60950, CB report and certificate with all national deviations EN60950 GS Licensed UL EN60950 NRTL Licensed C22.2 No. 60950 SCC Licensed (can be combined with UL 60950 NRTL License UL-94-V1 flammability requirements or better for PC board and all plastics NOM-019 (NOM) Additional country licensing as required (currently some products for Argentina, Brazil, Chili, Peru and Venezuela.
Electromagnetic Emissions Summary	Meets the following standards: CISPR22 International Emissions Specification, Class A minimum with 6dB margin US: CFR47, FCC Part 15, Subpart B, Class A Canada: ICES-003, Issue 3, Class A Australia/New Zealand: AS/NZS 3548 Class A Japan: VCCI-V-3/02.04 class A Taiwan: CNS 13438, Class A Korea: MIC Licensed Europe: EN55022:1998/A1:2000 EN61000-3-2:2000 EN61000-3-3:1995/A1:2001
Electromagnetic Immunity	CISPR24 International EMC Immunity EN55024:1998/A1:2001 standard including EN61000-4-2, -4-3, -4-4, -4-5, -4-6, -4-8 as applicable
Declaration of Conformity	As stated in the Declaration of Conformity, the Ethernet Routing Switch 5530-24TFD complies with the provisions of Council Directives 89/336/EEC and 73/23/EEC.

Ordering Information

For further information, please contact your local Nortel representative. Nortel Ethernet Switch

> Nortel Ethernet Switch Portfolio

Nortel's Ethernet Switching portfolio includes a wide range of products that securely deliver Layer 2 connectivity and Layer 3 routing and Quality of Service, combined with Layer 4-7 content-aware intelligence. Each product delivers the speed, performance and flexibility that today's enterprise networks require. The portfolio also offers a simplified architecture that can accommodate exponential bandwidth growth – a true competitive advantage for businesses of various sizes.

- Nortel Ethernet Switch 325
- Nortel Ethernet Switch 425
- Nortel Ethernet Switch 460-24T-PWR
- Nortel Ethernet Switch 470
- Nortel Ethernet Switch 380-24F
- Nortel Ethernet Switch Power Supply Unit 10

Nortel Ethernet Switch 325



Overview

Nortel Ethernet Switch 325 is a standalone 10/100 Mbps layer 2 Ethernet switch featuring easy configuration, high-speed uplinks and Web-based management from a Web browser. Nortel Ethernet Switch 325 is available in two standalone, compact one rack-unit (1U) size models: the Nortel Ethernet Switch 325-24T and the Nortel Ethernet Switch 325-24G. The Nortel Ethernet Switch 325-24T has 24 10BASE-T/100BASE-TX auto-sensing ports. The Nortel Ethernet Switch 325-24G has 24 10BASE-T/100BASE-TX auto-sensing ports plus two 10/100/1000BASE-T ports for uplink connectivity to servers or backbone switches. The Nortel Ethernet Switch 325 has been architected to be Layer 3 and DiffServ capable via a software upgrade in the future.

Ideal For

- Desktop switching solution for small-to-medium size businesses and branch offices

- Do you currently use Nortel Ethernet Switches or another competitor's hubs?
- Are you concerned about paying for feature upgrades?

Business Challenges

- Are you concerned about cost when considering switching purchases?
- Are you looking for a switch that is easy to install and configure?
- Are you looking for easy Web-based network management?
- Do you want to connect devices at 10 Mbps and 100 Mbps without purchasing new equipment?

Typical Applications

- Typical business applications such as email, Internet traffic and file transfers
- Gigabit uplinks to connect servers or backbone switches

Network Diagram

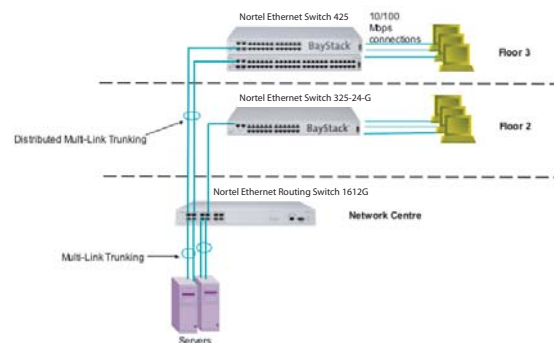


Figure 1: Network Diagram of Typical Deployment - Small/Medium Business Solution

Key Points

- Cost-effective desktop switching for small and medium enterprises and branch offices
- Easy to use
- Uplink connectivity for server or backbone connections
- Easy Web-based management
- 1U high compact design with low power consumption

Features and Benefits

- **Full auto-sensing on every port** – each switch has auto-sensing ports to accommodate 10 Mbps or 100 Mbps devices.
- **Ethernet Switch Software** – allows Nortel Ethernet Switch 325 models to use a single software image that provides new features.
- **Robust feature set** – provides enterprise class quality features such as 802.1x, SSHv2, multi-link trunking, 802.1Q/p at a cost-effective price.
- **Wire-speed throughput** – the 16 Gigabit per second (Gbps) switch fabric for each switch supports full frame forwarding and filtering across all ports at wire-speed performance.
- **High-speed uplink ports** – the Nortel Ethernet Switch 325-24G Switch provides two 10/100/1000BASE-T ports in the front of the unit that provide high-speed connections to backbone switches or servers.
- **Multi-link trunking (MLT)** – enables grouping of links between a Nortel Ethernet Switch 325 and another switch or a server to provide greater bandwidth with active redundant links. The Nortel Ethernet Switch 325 supports up to 6 MLTs per switch with up to 4 ports per MLT.
- **Up to 32 port-based VLANs** – can be established for each switch to extend the broadcast domain and segment network traffic for higher network efficiency.
- **Support for up to 8,000 MAC addresses** – provides scalability for growing networks with many attached devices and workgroups connected to each switch.

- **IEEE 802.1p priority queuing** – is standards-based and enables priority to the order in which the switch forwards packets, on a per-port basis. Up to four queues can be set on a Nortel Ethernet Switch 325 with IEEE 802.1p.
- **DSCP Recognition and Prioritization** – enables the prioritization of traffic based on not only 802.1p, but now Diffserv Code Point (DSCP) marking through the switch.
- **Web-based management** – summary, configuration, fault, statistics, application, administration and support pages can be provided via a Web browser. Real-time sampling provides up-to-date LED statistical information. The Web interface also allows for static configuration of numerous parameters of the device.

Market Information

Nortel Ethernet Switch 325 is designed to address the needs of small and medium organizations. The switch helps save money by allowing devices to be connected at either 10 Mbps or 100 Mbps without needing newer switches to accommodate different speeds. In addition, the switch provides small and medium businesses with the comfort of knowing that their investment is protected with free new feature upgrades for the life of the switches. Easy Web-based management features will save organizations significant time in setting up the switches. Also, the switch's ease of use features require minimal technical expertise to configure it.

Technical Specifications

Performance	- Switch fabric bandwidth: 16 Gbps - Frame forwarding rate - Ethernet Switch 325-24T: 3.6 million packets per second (Mpps) - Ethernet Switch 325-24G: 6.6 million Mpps - Switched 10 Mbps forwarding rate: 14,880 pps maximum - Switched 100 Mbps forwarding rate: 148,810 pps maximum - Switched 1000 Mbps forwarding rate: 1,488,810 pps maximum - Memory: 16MB memory architecture shared by all ports 4MB Flash Memory 16MB SDRAM - Address database size: 8,000 entries at line rate - Addressing: 48-bit MAC address - Frame Length: 64 to 1518 bytes (IEEE 802.1Q Untagged) 68 to 1522 bytes (IEEE 802.1Q Tagged)
Interface Options	10BASE-T/100BASE-TX: RJ-45 (8-pin modular) connectors for Auto MDI/MDI-X interface with auto-polarity 10BASE-T/100BASE-TX/1000BASE-T: RJ-45 (8-pin modular) connectors for MDI-X
RFC Support	- RFC 1213 (MIB-II); RFC 1493 (Bridge MIB); RFC 2863 (Interfaces Group MIB); - RFC 2665 (Ethernet MIB); RFC 2737 (Entity MIBv2); RFC 2819 (RMON MIB); - RFC 1757 (RMON); RFC 1271 (RMON); RFC 1157 (SNMP); RFC 2570 (SNMPv3); - RFC 2571 (SNMP Frameworks); RFC 2573 (SNMPv3 Applications); - RFC 2574 (SNMPv3 USM); RFC 2575 (SNMPv3 VACM); RFC 2576 (SNMPv3); - RFC 2572 (SNMP Message Processing); RFC 791 (IP); RFC 792 (ICMP); RFC 793 (TCP); RFC 783 (TFTP); RFC 826 (ARP); RFC 768 (UDP); RFC 854 (TELNET); RFC951 (Bootp); RFC 2236 (IGMPv2); RFC 1112 (IGMPv1); RFC 1945 (HTTP v1.0); RFC 2138 (RADIUS); RFC 894 (IP over Ethernet); RFC 2674 (Q MIB)
Electromagnetic Emissions	Meets the following standards: - US: CFR47, Part 15, Subpart B, Class A - Canada: ICES-003, Issue 3, Class A - Australia/New Zealand: AS/NZS 3548:1995, Class A, A1:1997/A2:1997 class A - Japan: VCCI-V-3/02.04 class A - Taiwan: CNS 13438, Class A - Europe: - EN55022:1998/A1:2000 - EN61000-3-2:2000 - EN61000-3-3:1995/A1:2001 - CISPR 22:1997/A1:2000 Class A
Electromagnet Immunity:	Ethernet Switch 325 meets the EN55024:1998/A1:2001 standard
Physical Dimensions	Weight: 3 kg (6.61 lb) Height: 4.37 cm (1.72 in) Width: 43.82 cm (17.25 in) Depth: 22.91 cm (9.02 in)
Power Requirements	Input voltage (AC version): 100 to 240 VAC @ 47 to 63 Hz Input power consumption (AC version): 46 W maximum Input current (AC version): 2 A @ 120 VAC, 1 A @ 240 VAC Maximum thermal output: 75 BTU/hour

Environmental	Operating temperature: 0° to 40°C (32° to 104°F) Storage temperature: -25° to 70°C (-13° to 158°F) Operating humidity: 10 to 85% maximum relative humidity, non-condensing Storage humidity: 10 to 95% maximum relative humidity, non-condensing Operating altitude: Up to 3,024 m (10,000 ft.) above sea level Storage altitude: Up to 3,024 m (10,000 ft.) above sea level
Standards and Certifications	IEEE 802.3 10BASE-T (ISO/IEC 8802-3, Clause 14) IEEE 802.3u 100BASE-TX (ISO/IEC 8802-3, Clause 25) IEEE 802.3u Autonegotiation on Twisted Pair (ISO/IEC 8802-3, Clause 28) IEEE 802.3x (Flow Control on the Gigabit Uplink ports) IEEE 802.3z (Gigabit) IEEE 802.1d MAC Bridges (ISO/IEC 10038) IEEE 802.1p (Prioritizing) IEEE 802.1Q (VLAN Tagging) IEEE 802.1D (Spanning Tree Protocol) IEEE 802.3ad (manual/static) IEEE 802.3ad (LACP) IEEE 802.1s IEEE 802.1w UL EN60950 (UL 1950 and CSA 22.2 No. 60950) IEC 60950/EN60950, CB report and certificate with all national deviations C22.2 No. 950 (CUL) with all national deviations UL-94-VI flammability requirements for PC board NOM-019

Nortel Ethernet Switch 425

Overview

Nortel Ethernet Switch 425 is a stackable 10/100 Mbps layer 2 Ethernet switch featuring easy configuration, flexible choices for high-speed uplinks and Web-based management from your Web browser. Nortel Ethernet Switch 425 is available in two models: the Nortel Ethernet Switch 425-24T Switch and the Nortel Ethernet Switch 425-48T Switch.

The Nortel Ethernet Switch 425-24T has 24 10BASE-T/100BASE-TX auto-sensing ports, 2 flexible combo uplink ports and built-in stacking ports. It can be used standalone or in a stack of up to 8 switches to get up to 192 10/100 Mbps ports, that can be easily managed as a single unit. The Nortel Ethernet Switch 425-48T can also be used standalone or in a stack of up to 8 switches for up to 384 10/100 Mbps ports*. The Nortel Ethernet Switch 425 has been architected to be Layer 3 and DiffServ capable via a software upgrade in the future.

Ideal For

- Ideal stackable switching solution for small to medium sized businesses

Business Challenges

- Are you concerned about cost when considering switching purchases?
- Are you looking for a switch that is easy to install and configure?
- Are you looking for easy Web-based network management?
- Do you want to connect devices at 10 Mbps and 100 Mbps without purchasing new equipment?

- Do you currently use Nortel or another competitor's hubs?
- Are you concerned about paying for feature upgrades?
- Do you expect your business to grow within the next 6-18 months?

Typical Applications

- High-density desktop switching and network segmentation
- High-speed LAN connectivity and data access
- Flexible uplink options to connect to servers or backbone switches

Key Points

- Cost-effective stackable switching for small and medium enterprises
- Up to 384 10/100 Mbps ports for desktop switching in an 8-rack unit high design*
- Plug-and-play stacking with built-in stacking ports
- Easy to use
- Flexible combo uplink ports for wiring closet or backbone connections
- Resilient uplink connectivity for minimal network downtime
- Easy Web-based management
- 1U high compact design with low power consumption
- Flexible stacking across Nortel Ethernet Switch 425 and the Nortel Ethernet Switch 420 – a stack is managed as a single entity with a single IP address

Features and Benefits

- A scalable, stackable architecture enables up to 8 switches to be connected to support up to 384 ports*.
- Two flexible combo uplink ports provide high-speed connectivity to wiring closet or backbone devices.
- Wire-speed performance is delivered by a 16 Gigabit per second (Gbps) switch fabric that supports full frame forwarding and filtering across all ports at wire-speed performance.
- Ethernet Switch Software is a single software image that is used for Nortel Ethernet Switch 425-24T, Nortel Ethernet Switch 420-24T and Nortel Ethernet Switch 425-48T. Future versions provide new features.
- Cost-effective 10/100 Layer 2 Ethernet switch provides 24 or 48 10BASE-T/100BASE-TX auto-sensing ports, two flexible combo uplink ports and built-in stacking ports that reduce cost by eliminating the need to purchase cascade modules.

- Distributed multi-link trunking (DMLT) allows trunked ports to span multiple units of the stack for redundant connectivity to mission-critical servers and the network center.
- Up to 255 port-based VLANs can be established for each switch to extend the broadcast domain and segment network traffic for higher network efficiency. The switch is architected to support up to 256 VLANs in the future.
- Support for up to 8,000 MAC addresses provides scalability for growing networks with many attached devices and workgroups connected to each switch.
- User interface push-button on the front panel is provided for the purpose of base unit selection and for resetting the unit or the stack.
- Auto MDI/MDI-X feature on each port allows the use of either a crossover or straight through cable to connect to a hub or switch.
- IEEE 802.1p queuing prioritizes the order in which the switch forwards packets. The switch supports up to four queues.

Market Information

Nortel Ethernet Switch 425 has been designed to address the needs of small and medium organizations. The switches help save money by allowing devices to be connected at either 10 Mbps or 100 Mbps without needing newer switches to accommodate different speeds. In addition, the switches are scalable and provide small and medium businesses (SMBs) with the comfort of knowing that their investment is protected as their company grows. Easy Web-based management features and plug-and-play stacking ports will save organizations significant time in setting up the switches. Also, the switches' ease of use features require minimal technical expertise to configure them.

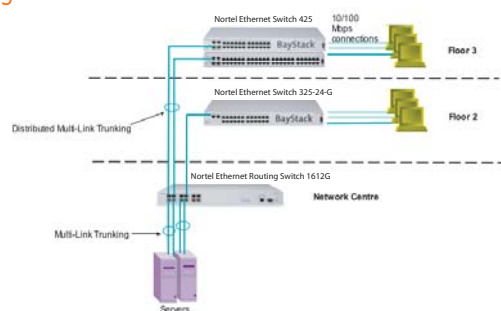


Figure 1: Diagram of Typical Deployment - Small/Medium Business Solution

Technical Specifications

Performance Specifications (64-byte packets)	- Switch fabric bandwidth: 16 Gbps - Frame forwarding rate: 6.6 Mpps (Ethernet Switch 425-24T) - Frame forwarding rate: 10.1 Mpps (Ethernet Switch 425-48T) - Switched 10 Mbps forwarding rate: 14,880 pps - Switched 100 Mbps forwarding rate: 148,810 pps - Switched 1000 Mbps forwarding rate: 1,488,100 pps - Memory: 32MB memory architecture shared by all ports, 4MB Flash Memory, 16MB SDRAM - Address database size: 8,000 entries at line rate - Addressing: 48-bit MAC address - Frame length: 64 to 1518 bytes (IEEE 802.1Q Untagged) 68 to 1522 bytes (IEEE 802.1Q Tagged)
Data Rate and Encoding	10 Mbps: Manchester encoding 100 Mbps: 4B/5B encoding 1000 Mbps: 8B/10B
Electromagnetic Emissions US	Meets the following standards: - US: CFR47, Part 15, Subpart B, Class A - Canada: ICES-003, Issue 3, Class A - Australia/New Zealand: AS/NZS 3548:1995, Class A, A1:1997/A2:1997 class A - Japan: VCCI-V-3/02.04 class A - Taiwan: CNS 13438, Class A - Europe: EN55022:1998/A1:2000 - EN61000-3-2:2000 - EN61000-3-3:1995/A1:2001 - CISPR 22:1997/A1:2000 Class A
Electromagnetic Immunity	The Ethernet Switch 425-24T and Ethernet Switch 425-48T Switches meet the EN55024:1998/A1:2001 standard.
Interface Options	10BASE-T/100BASE-TX: - RJ-45 (8-pin modular) connectors for Auto MDI/MDI-X interface with auto-polarity The Ethernet Switch 425 Switches support the following SFP GBICs: 1000BASE-SX: Uses short wavelength 850 nm MTRJ or LC type fiber optic connectors to connect devices over multimode (275m, 62.5um core or 550m, 50.0um core) fiber optic cable. 1000BASE-LX: Uses long wavelength 1300nm duplex LC type fiber optic connector to connect devices over single mode (10km, 9um core) fiber optic cable.
Physical Dimensions	Ethernet Switch 425-24T: Weight: 3 kg (6.61 lb) Height: 4.37 cm (1.72 in) Width: 43.82 cm (17.25 in) Depth: 22.91 cm (9.02 in) Ethernet Switch 425-48T Weight: 3.1 kg (6.83 lb) Height: 4.37 cm (1.72 in) Width: 43.82 cm (17.25 in) Depth: 22.91 cm (9.02 in)
Power Requirements	Input voltage (AC version): 100 to 240 VAC @ 47 to 63 Hz Input power consumption (AC version): 46 W maximum Input current (AC version): 2 A @ 120 VAC, 1 A @ 240 VAC Maximum thermal output: 75 BTU/hour

Environmental	Operating temperature: 0° to 40°C (32° to 104°F) Storage temperature: -25° to 70°C (-13° to 158°F) Operating humidity: 10 to 85% maximum relative humidity, non-condensing Storage humidity: 10 to 95% maximum relative humidity, non-condensing Operating altitude: Up to 3,024 m (10,000 ft.) above sea level Storage altitude: Up to 3,024 m (10,000 ft.) above sea level
Standards and Certifications	IEEE 802.3 10BASE-T (ISO/IEC 8802-3, Clause 14) IEEE 802.3u 100BASE-TX (ISO/IEC 8802-3, Clause 25) IEEE 802.3u Autonegotiation on Twisted Pair (ISO/IEC 8802-3, Clause 28) IEEE 802.3x (Flow Control on the Gigabit Uplink ports) IEEE 802.3z Gigabit IEEE 802.1d MAC Bridges (ISO/IEC 10038) IEEE 802.1p (Prioritizing) IEEE 802.1Q (VLAN Tagging) IEEE 802.1D (Spanning Tree Protocol) IEEE 802.3ad (manual/static) IEEE 802.3ad (LACP) IEEE 802.1s IEEE 802.1w UL EN60950 (UL 1950 and CSA 22.2 No. 60950) IEC 60950/EN60950, CB report and certificate with all national deviations C22.2 No. 950 (CUL) with all national deviations UL-94-VI flammability requirements for PC board NOM-019

Nortel Ethernet Switch 460-24T-PWR



Overview

The Nortel Ethernet Switch 460-24T-PWR Power over Ethernet is a resilient, secure stackable switch with IEEE 802.3af Power over Ethernet (PoE) capabilities to power devices such as IP phones, wireless access points, network cameras, security and lighting devices, and access control devices (badge readers). It has 24 10/100 Mbps ports, 1 media dependent adapter (MDA) slot for uplink connectivity and 1 cascade module slot for stacking. The switch has advanced features such as advanced quality of service (QoS) and high resiliency, with the addition of Power over Ethernet capability. It enables enterprise customers to power devices while maintaining connectivity to standard 10/100 Mbps Ethernet devices such as PCs and servers. All 24 ports of the Nortel Ethernet Switch 460 can be powered. The Ethernet Switch Software allows the Nortel Ethernet Switch 460 to stack with other Nortel Ethernet Switches and protects users' existing investment in Nortel Ethernet Switch 450, 470 and Nortel Business Policy Switches.

Ideal For

- Medium to large enterprises with an identified need to provide power to a wide range of devices and to deliver QoS for mission-critical devices, applications, groups and users
- Enterprise businesses that are looking to deploy IP phones, wireless LAN access points, network cameras and other products that can take advantage of Power over Ethernet

Business Challenges

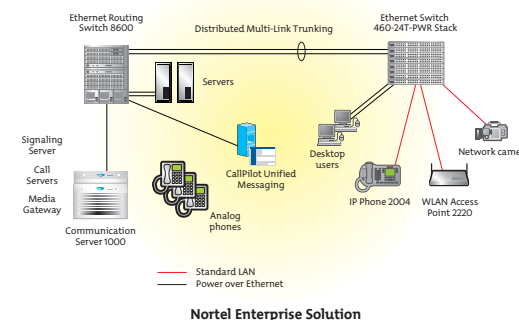
- Are your users experiencing slow application and response time?
- Are you looking for a reliable infrastructure to deploy IP telephony to minimize downtime?
- Are you looking for solutions that are based on industry standards to ensure vendor interoperability?
- Are you looking to future proof your network to support multimedia applications like IP telephony?
- Are you looking to deploy PoE enabled WLAN APs in your network?

- Are you looking to deploy network cameras for security surveillance over your data network infrastructure?
- Do you have multiple, distant offices (up to 70 km) that need to share resources?
- Are you concerned about cost when considering a switching purchase?
- Do you expect your business and the associated traffic in your network to grow within the next 6-18 months?

Typical Applications

- Multi-site campus environments that require high bandwidth and secure connections to each desktop
- Used to provide power to IP phones over Ethernet link
- Used to provide power to wireless access points for increased mobility
- Used to provide power to surveillance cameras and card readers providing higher security

Network Diagram



Key Points

- Power to IP phones, wireless LAN access points, network cameras, security and lighting devices, and access control devices
- Provides power to all 24 ports
- Common software (Ethernet Switch Software) across all Nortel platforms for lower training and installation costs
- IEEE 802.3af compliant to power multiple vendors' equipment - does not force enterprises to be tied to any one vendor
- Automatically provides power to a detected device
- Network availability with QoS features
- Fail-safe stacking design assures continuous uptime
- Resilient connectivity for minimal network downtime
- Secure access and data traffic protection
- Simplifies the process of making adds, moves and changes
- Dual functionality supports both Power over Ethernet (PoE) devices and standard LAN devices
- Significant cost and space savings by integrating standard LAN switch functionality with power over UTP cable of a mid-span patch panel into one unit
- Convenient use of single cable allowing data and power to be transmitted over one cable without using a power outlet
- Plug-n-play IP telephony switching provides simplified Web-based configurations on data and power properties

- Seamless user migration, stackable with Nortel Ethernet Switch 450, Nortel Business Policy Switches, Nortel Ethernet Switch 470-24T and Nortel Ethernet Switch 470-48T

Features and Benefits

The Nortel Ethernet Switch 460-24T-PWR Power over Ethernet (PoE) provides a resilient, secure, stackable wiring closet switch with PoE capabilities for support of IEEE 802.3af compliant devices such as IP phones, wireless LAN access points and network cameras. It delivers advanced quality of service (QoS) capabilities to enable connectivity and network availability to mission-critical users and for delay-intolerant applications such as IP telephony. The Nortel Ethernet Switch 460-24T-PWR Power over Ethernet (PoE) eliminates the need to plug devices into separate power outlets, making adds, moves and changes easier. The Nortel Ethernet Switch 460-24T-PWR can directly power the Nortel IP Telephony Clients including the Nortel IP Phones 2002 and 2004.

- **IEEE 802.3af compliant** – The Nortel Ethernet Switch 460-24T-PWR is IEEE 802.3af compliant. It can provide Power over Ethernet to any IEEE 802.3af compliant device such as IP phones, wireless access points, network cameras, security and lighting devices, and access control devices. The benefit of being interoperable with standards-based equipment means that organizations are not forced to tie themselves to

any one vendor, as the switch has the flexibility to power multiple vendors' devices. It can supply power up to 15.4 Watts per port, which meets the IEEE 802.3af standard. This is more than sufficient to power most devices.

- **Convenience of a single cable** – With the Nortel Ethernet Switch 460, data and power can be transmitted over one cable without using a power outlet. There is no need for a separate cable connecting the device to a power outlet.
- **High availability with QoS features** – Network availability for mission critical applications, devices and users is provided, enabling LAN traffic to be classified, prioritized and marked.
- **Auto discovery feature** – The Nortel Ethernet Switch 460-24T-PWR automatically recognizes the connection of a device and immediately sends power to it. This automatic capability ensures fast connectivity without manual intervention.
- **Plug-n-play IP telephony switching** – The Nortel Ethernet Switch 460 provides simplified Web-based configurations on data and power properties. The graphical user interfaces make it simple to set up data and power configurations.
- **Fail-safe stacking and resiliency** – A key differentiation for the Nortel Ethernet Switch 460 is its resilient stacking feature. The Nortel Ethernet Switch 460 can stack up to eight units with a cascade stacking design, assuring continuous uptime even if a switch in the stack should fail. A loop-back, or redundant cascade cable, is used to seamlessly connect the entire stack to eliminate any single point of failure.
- **Multi-link trunking (MLT)** – The grouping of links between the Nortel Ethernet Switch 460 and another switch or a server provides greater bandwidth with active redundant links. With Nortel's unique distributed multi-link trunking (DMLT) feature, trunked ports can span multiple units of the stack for fail-safe connectivity to mission-critical servers and the network center. This can provide bandwidth of up to 800 Mbps (when used

with 10/100 ports) or up to 8 Gbps (when used with Gigabit uplink ports) with active redundant links in one trunk. Up to six trunks per switch or stack are supported. The split multi-link trunking (SMLT) feature of the Nortel Ethernet Routing Switch 8000 eliminates single points of failure and allows wiring closet switches, such as the Nortel Ethernet Switch 460, to have multiple active connections to the network core. The Nortel Ethernet Switch 460's ability to have multiple connections to a Nortel Ethernet Routing Switch 8600 network core allows enterprises to double network bandwidth with no extra investment. The Nortel Ethernet Routing Switch 8600 provides a self-healing network that delivers the reliability and availability required by today's mission-critical applications.

- **Common software lowers training and installation costs** – Nortel Ethernet switches, including the Nortel Ethernet Switch 460, have a common "look and feel," which reduces training costs. These tools include the Web, command line interface (CLI), menus, Nortel Enterprise Network Management System (NMS), Nortel Ethernet Switching Element Manager and Nortel Enterprise Policy Manager.
- **Significant space and cost savings** – Traditionally, a mid-span patch panel device connects via a UTP cat 5 cable to a standard Ethernet switch and then the mid-span device sends power over another standard UTP cat 5 cable to the device (such as an IP phone). In essence, two units are needed for power over Ethernet capability. In contrast, the Nortel Ethernet Switch 460 integrates standard LAN switch functionality with the power over UTP cable capability of a mid-span patch panel into one unit. This results in significant cost and space savings.
- **Dynamic power management** – Each port can be configured to limit the power delivered to a device. Each port can also be configured for power priority level – low, high and critical. On the switch, total available power is monitored. In the case where all available

power is fully utilized, the switch may turn off lower priority ports and turn on higher priority ports.

- **Active circuit protection** – The Nortel Ethernet Switch 460 can automatically disable a port if there is a short. All the other ports on the switch will remain active and will not be affected by the disabled port.
- **Extensive security features** – A number of security features are delivered with the Nortel Ethernet Switch 460 including EAP over LAN (IEEE 802.1x), SNMPv3, SSH (secure shell) version 2, BaySecure MAC-address based security and RADIUS authentication. User-based policy feature enables network services such as QoS to follow the user regardless of which port is accessed.
- **Custom auto negotiation advertisements (CANA)** – The network manager can tune the capabilities that a particular Ethernet port can advertise via auto negotiation.
- **Unit replacement feature** – A failed switch's configuration from a server to the replacement switch can be retrieved, a feature that simplifies the addition and deletion of a switch to the stack – without service interruption. It also reduces switch downtime and improves productivity.

- **Power sharing options** – The Nortel Ethernet Switch 460 can be used in conjunction with the Nortel 10 PSU or NES (network energy source) DC Power System from Powerware. (www.powerware.com/DC_Power/Network_Energy_Source.asp and www.nortel.com/prd/select/powerware.html) to create a load sharing, RPSU or UPS solution. For information on how to purchase NES systems, please visit this location: www.nortel.com/prd/select/powerware.html or email Powerware at nes.quotes@powerware.com.

Market Information

The Nortel Ethernet Switch 460-24T-PWR Power over Ethernet is one of the first IEEE 802.3af compliant switches in the market. With the Nortel Ethernet Switch 460-24T-PWR, any standards-compliant device can be powered. It also provides investment protection by being backwards compatible with Nortel Ethernet Switch 450's and the Nortel Business Policy Switch, as well as Nortel Ethernet Switch 470-24T and Nortel Ethernet Switch 470-48T.

Technical Specifications

Performance Specifications	• Frame Forward Rate (64-byte packets): Up to 3.2 million packets per second (pps) maximum, learned unicast traffic • Port Forwarding/Filtering Performance - For 10 Mb/s: 14,880 pps (64-byte packets) maximum - For 100 Mb/s: 148,810 pps maximum • Address Database Size: 16,000 entries at line rate (32,000 entries without flooding) • Addressing: 48-bit MAC address • Frame Length: 64 to 1518 bytes (IEEE 802.1Q Untagged), 64 to 1522 bytes (IEEE 802.1Q Tagged) • Data Rate: 10Mbps Manchester encoded or 100 Mbps 4B/5B encoded
Interface Options	• 10BASE-T/100BASE-TX: RJ-45 (8-pin modular) connectors for MDI-X interface • 100BASE-FX: SC and MT-RJ connectors for switched 100 Mbps (100BASE-FX) connections over 50/125 and 62.5/125 micron multimode fiber optic cable (2 km/6562 ft. maximum distance) • 1000BASE-SX (Shortwave Gigabit Fiber) MDA: SC connectors for shortwave 850 nm fiber optic connections over multimode 550 m/1805 ft.) fiber optic cable • 1000BASE-LX (Longwave Gigabit Fiber) MDA: SC connectors for longwave 1300 nm fiber optic connections over single-mode (3km/9843 ft.) or multimode (550m/1805 ft.) fiber optic cable

GBICs Supported	• 1000BASE-SX: Uses shortwave 850 nm fiber optic connectors to connect devices over multimode (550 m or 1,805 ft) fiber optic cable. • 1000BASE-LX: Uses longwave 1,300 nm fiber optic connectors to connect devices over single mode (5 km or 3.1 mi) or multimode (550 m or 1,805 ft) fiber optic cable. • 1000BASE-XD: Uses single mode fiber to connect devices over distances up to 40 km (or 31 mi), depending on the quality of the cable. • 1000BASE-ZX: Uses single mode fiber to connect devices over distances up to 70 km (or 43 mi), depending on the quality of the cable. The ports on this GBIC operate only in full-duplex mode.
RFC Supported	RFC 1213 (MIB-II); RFC 1493 (Bridge MIB); RFC 2863 (Interfaces Group MIB); RFC 2665 (Ethernet MIB); RFC 2737 (Entity MIBv2); RFC 2819 (RMON MIB); RFC 1757 (RMON); RFC 1271 (RMON); RFC 1157 (SNMP); RFC 2748 (COPS); RFC 2940 (COPS Clients); RFC 3084 (COPS Provisioning); RFC 2570 (SNMPv3); RFC 2571 (SNMP Frameworks); RFC 2572 (SNMP Message Processing); RFC 2573 (SNMPv3 Applications); RFC 2574 (SNMPv3 USM); RFC 2575 (SNMPv3 VACM); RFC 2576 (SNMPv3); RFC 791 (IP); RFC 792 (ICMP); RFC 793 (TCP); RFC 783 (TFTP); RFC 826 (ARP); RFC 768 (UDP); RFC 854 (TELNET); RFC951 (Bootp); RFC 2236 (IGMPv2); RFC 1112 (IGMPv1); RFC 1945 (HTTP v1.0); RFC 2138 (RADIUS)
Electromagnetic Immunity	Global: CISPR 24:1997/A1:2001 Europe: EN55024:1998/A1:2001
Physical Dimensions	Weight: 5.8 kg (12.76 lb) Height: 7.04 cm (2.77 in.) Width: 43.82 cm (17.25 in.) Depth: 38.35 cm (15.1 in.)
Power Requirements	Input voltage: 100-240VAC @ 47 to 63 Hz Input Power Consumption: 400 W maximum Input Volt Amperes Rating : 440 VA maximum Input Current: 4.5 A @ 100 VAC, 2.25 A @ 240 VAC Maximum Thermal Rating: 575 BTU/hr
Environmental	Operating temperature: 0 ° to 40 °C (32 ° to 104 °F) Storage temperature: -25 ° to +70 °C (-13 ° to 158 °F) Operating humidity: 85% maximum relative humidity, non-condensing Storage humidity: 95% maximum relative humidity, non-condensing Operating altitude: Up to 3024 m (10,000 ft.) Storage altitude: Up to 3024 m (10,000 ft.)
Standards and Certifications	IEEE 802.3af compliant IEEE 802.3 10BASE-T (ISO/IEC 8802 3, Clause 14) IEEE 802.3u 100BASE-TX (ISO/IEC 8802-3, Clause 25) IEEE 802.3u 100BASE-FX (ISO/IEC 8802-3, Clause 26) IEEE 802.1p (Prioritizing) IEEE 802.1Q (VLAN Tagging) IEEE 802.1z (Gigabit) IEEE 802.1x IEEE 802.3x IEEE 802.3ad (manual/static) IEEE 802.3ad (LACP)* IEEE 802.1s IEEE 802.1w IETF DiffServ UL Listed (UL60950) CUL (CAN/CSA-22.2 No. 60950) CB certificate and report with all national deviations (IEC 60950/ EN60950) US: CFR47, Part 15, Subpart B, Class A Canada: ICES-003, Issue 3, Class A Australia/New Zealand: AS/NZ 3548: 1995/A1:1997/A2; 1997, Class A Japan: VCCI-V-3/02.04/ Class A Taiwan: CNS 13438, Class A Europe: EN 55022-1998/A1:2000 Class A EMC Directive: 89/336/EEC: Directly published in the EMC Directive of 89/ 336/EEC with Modification 92/31/EED, 93/13/, EC, EN 61000-3-2: 2000, EN 61000-3-3: 1995/A1:2001 Global: CISPR 22-1997/A1:2000, Class A

Nortel Ethernet Switch 470



Overview

Nortel Ethernet Switch 470 is a stackable 10/100 Mbps Ethernet Layer 2 switch available in two models – the Nortel Ethernet Switch 470-48T and the Nortel Ethernet Switch 470-24T. They include two built-in gigabit interface converter (GBIC) uplink ports and built-in stacking ports in a compact 1-rack unit high design. The Nortel Ethernet Switch 470 can be stacked in any combination to provide up to 384 10/100 ports and 16 GBIC ports in 8U of rack space, designed to provide high-density desktop connectivity for enterprise wiring closets. Their comprehensive quality of service (QoS) features ensure connectivity and network availability by managing and prioritizing data traffic and users for maximum performance. Nortel Ethernet Switch 470 offers a scalable, resilient solution that minimizes capital and operational expenses. Its robust security features offers protection against unauthorized access to data traffic. The Ethernet Switch Software allows the Nortel Ethernet Switch 470 to stack with other Nortel Ethernet Switches and protects users' existing investment in Nortel Ethernet Switch 450 and Nortel Business Policy Switches.

Ideal For

- Medium to large single-site and multi-site enterprises with demanding network needs including high bandwidth, high density and reduced size
- Enterprises that require QoS guarantees in their local area network and need resilient fail-safe stackability
- Enterprises that want to implement and support voice and video on the same network
- Organizations concerned with performance, business value and price effectiveness

- Is high port count in a compact space at a very attractive price important to you?
- Do you want to minimize the network down time?
- Do you currently have Nortel Ethernet Switch 450 and Nortel Business Policy Switches installed in your network?

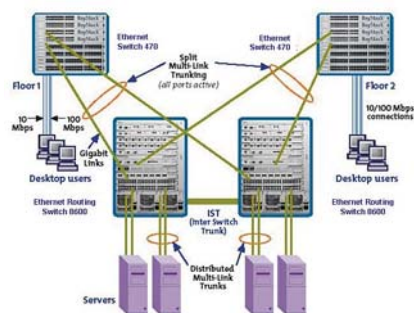
Typical Applications

- Key department or personnel prioritization requirements such as help desk, service teams and/or key management
- High bandwidth requirements such as multimedia (video and application streaming), eCommerce and Web applications
- Delay intolerant applications such as IP telephony

Business Challenges

- Are you looking for a reliable solution that will support your business needs now, as well as your future requirements?
- Would you like to set levels of priority for key departments, users or applications?
- Are you considering implementing voice over IP (VoIP), video conferencing, online training and/or video streaming on your network?
- Do you have limited space available in your wiring closets?
- Do most of your wiring closet switches have gigabit uplinks?

Network Diagram



Split Multi-link Trunking (SMLT)

Key Points

- Industry leading QoS capabilities and features
- Web-based management
- Only 1U high
- Innovative built-in stacking ports
- Two built-in GBIC ports for highest uplink capacity per switch in stack
- Fail-safe stacking and resiliency
- Authenticated switch port access and authenticated and encrypted management
- Built-in stacking ports mean no cascade modules to order
- Stackable with Ethernet Switch 450, 460 and Business Policy Switches
- Ethernet Switch Software lowers training and installation costs

Features and Benefits

- **High-density desktop connectivity** – Up to eight switches can be stacked to achieve up to 384 10/100 ports for high-density desktop switching.
- **Cost-effective, simpler stacking** – Two built-in stacking ports provide simpler, quicker and more cost-effective stacking because expensive stacking modules are not required.

- **Higher uplink capacity** – Two built-in GBIC ports are provided for dedicated uplink connectivity to network core switches such as the Ethernet Routing Switch 8600. This doubles the uplink bandwidth as GBIC ports are not required for stacking purposes. Up to 16 GBIC ports are available for pure uplink connectivity in a full stack.
- **Fail-safe stacking** – Continuous uptime is assured even if a switch fails and a single point of failure is eliminated.
- **Resilient connectivity for minimal network downtime** – With Nortel distributed multi-link trunking (DMLT) feature, trunked ports can span multiple units of the stack for fail-safe connectivity to mission-critical servers and the network core. Nortel Ethernet Routing Switch 8600's split multi-link trunking (SMLT) eliminates single points of failure in the network and allows Nortel Ethernet Switch 470s to have multiple active connections to the network core.
- **Secure access and data traffic protection** – Features include Secure Shell (SSH), BaySecure, RADIUS, IP manager list, access list, SNMP v3, password protection and extensible authentication protocol (EAP) over LAN. The user-based policy feature enables network services, such as QoS, to follow the user regardless of the user's port connection.

- **High availability with QoS features** – Mission-critical applications, devices and users are available by classifying, prioritizing and marking LAN traffic.
- **Custom auto negotiation advertisements (CANAs)** – Auto negotiation enables the network manager to tune the capabilities of a particular Ethernet port.
- **Common software lowers training and installation costs** – Nortel Ethernet Switches have a common "look and feel," which reduces training costs. These tools include the Web, command line interface (CLI), menus, Nortel Enterprise Network Management System (NMS), Nortel Ethernet Switching Element Manager and Nortel Enterprise Policy Manager.
- **Unit replacement feature** – A failed switch's configuration can be retrieved from a server on to the replacement switch, a feature that simplifies the addition and deletion of a switch to the stack without service interruption. Switch downtime is reduced while productivity is improved.

- **Save money and time with auto MDI/MDIX feature** – Auto MDI/MDIX eliminates the need for expensive cross-over cables while connecting to a hub or switch. The switch port can automatically detect the signal on the cable and configures itself appropriately.

Market Information

Ethernet Switch 470's are stackable 10/100 Mbps Ethernet Layer 2 switches. Ethernet Switch 470 includes two built-in GBIC (Gigabit Interface Converter) uplink ports and built-in stacking ports in a compact, one rack-unit high design. They are designed to provide high-density desktop connectivity for mid-size and large enterprise customers' wiring closets. Ethernet Switch 470's comprehensive Quality of Service (QoS) features are designed to ensure connectivity and network availability by managing and prioritizing data traffic for maximum performance. These switches offer a scalable, resilient solution that minimizes capital and operational expenses.

Technical Specifications

Performance Specifications	Port Forwarding/Filtering Performance: For 10 Mbps: 14,880 pps maximum (64-byte packets) For 100 Mbps: 148,810 pps maximum For 1000 Mbps: 1,488,100 pps maximum • Address Database Size 16,000 entries at line rate (32,000 entries without flooding) • Addressing 48-bit MAC address • Frame Length: 64 to 1518 bytes (IEEE 802.1Q Untagged) 64 to 1552 bytes (IEEE 802.1Q Tagged)
Data Rate	10 Mbps Manchester encoded or 100 Mbps 4MB - 5MB encoded
Interface Options	10BASE-T/100BASE-TX RJ-45 (8-pin modular) with Auto MDI/MDIX The Ethernet Switch 470 supports the following GBICs: • 1000BASE-SX uses short wavelength 850 nm fiber optic connectors to connect devices over multimode (550 m or 1,805 ft) fiber optic cable. • 1000BASE-LX uses long wavelength 1,300 nm fiber optic connectors to connect devices over single mode (5 km or 3.1 mi) or multimode (550 m or 1,805 ft) fiber optic cable. • 1000BASE-XD uses single mode fiber to connect devices over distances up to 40 km (31 mi), depending on the quality of the cable. • 1000BASE-ZX uses single mode fiber to connect devices over distances up to 70 km (43 mi), depending on the quality of the cable. The ports on this GBIC operate only in full-duplex mode. • 1000Base-T uses 8-pin modular RJ-45 connector to connect devices up to 100 m over Category 5 cable • 1000Base-CWDM Eight GBIC types with 1470-1610nm (in 20nm intervals) with LC connector to connect devices over distances up to 70km

RFC Support	RFC 791 (IP); RFC 792 (ICMP); RFC 793 (TCP); RFC 783 (TFTP); RFC 826 (ARP); RFC 768 (UDP); RFC 854 (TELNET); RFC 951 (Bootp); RFC 2236 (IGMPv2); RFC 1112 (IGMPv1); RFC 1945 (HTTP v1.0); RFC 2138 (RADIUS); RFC 1573 (IF-MIB); RFC 894 (IP over Ethernet); RFC 2674 (Q MIB); RFC 2030 (Simple NTP); RFC 1213 (MIB-II); RFC 1493 (Bridge MIB); RFC 2863 (Interfaces Group MIB); RFC 2665 (Ethernet MIB); RFC 2737 (Entity MIBv2); RFC 2819 (RMON MIB); RFC 1757 (RMON); RFC 1271 (RMON); RFC 1157 (SNMP); RFC 2748 (COPS); RFC 2940 (COPS Clients); RFC 3084 (COPS Provisioning); RFC 2570 (SNMPv3); RFC 2571 (SNMP Frameworks); RFC 2572 (SNMP Message Processing); RFC 2573 (SNMPv3 Applications); RFC 2574 (SNMPv3 USM); RFC 2575 (SNMPv3 VACM); RFC 2576 (SNMPv3)
Safety Agency Approvals	USA: UL60950 Canada: CAN/CSA-22.2 No.60950 Europe: EN60950 / IEC 60950, CB report with all national deviation Australia/New Zealand: AS/NZS 60950 Mexico: NOM-019
Electromagnetic Immunity	Europe, EN55024, CISPR 24
Physical Dimensions	Weight 4.8 kg (10.56 lb) for -24T, 5.0 kg (11.0 lb) for -48T Height 4.37 cm (1.72 in.) Width 43.82 cm (17.25 in.) Depth 35.29 cm (13.89 in.)
Power Requirements	Input voltage (AC Version) 100-240 VAC @ 47 to 63 Hz Input Power consumption (AC Version) 90 W max Input current (AC Version) 1.0 A @ 100 VAC, 0.5 A @ 240VAC
Environmental	Operating temperature 0° to 40°C (32° to 104°F) Storage temperature -25° to +70°C (-13° to 158°F) Operating humidity 85% maximum relative humidity, non-condensing Storage humidity 95% maximum relative humidity, non-condensing Operating altitude up to 3,024 m (10,000 ft.) above sea level Storage altitude up to 12,096 m (40,000 ft.) above sea level
Standards and Certifications	IEEE 802.3 10BASE-T (ISO/IEC 8802-3, Clause 14) IEEE 802.3u 100BASE-TX (ISO/IEC 8802-3, Clause 25) IEEE 802.3u Autonegotiation on Twisted Pair (ISO/IEC 8802-3, Clause 28) IEEE 802.3x (Flow Control on the Gigabit Uplink port) IEEE 802.3z 1000BASE-SX and 1000BASE-LX IEEE 802.1d MAC Bridges (ISO/IEC 10038) IEEE 802.1p (Prioritizing) IEEE 802.1Q (VLAN Tagging) IEEE 802.3ad (Static/dynamic- LACP) EEE 802.1s EEE 802.1w IETF DiffServ USA: FCC CFR47 Part 15, subpart B, Class A Canada: ICES-003, Class A Europe: EN55022, CISPR 22, Class A Australia/New Zealand: AS/NZS 3548, Class A Japan: VCCI-V-3/02.04, Class A Taiwan: CNS 13438, Class A CE

* Future software upgrade

Nortel Ethernet Switch 380-24F



Overview

The Nortel Ethernet Switch 380-24F is designed to provide high-density high-bandwidth connectivity to other switches, servers and network devices. The Nortel Ethernet Switch 380-24F has 20 SFP (small form factor) GBICs (gigabit interface converter) and 4 full size GBICs.

The Nortel Ethernet Switch 380-24F is ideal for high density wiring closet Layer 2 aggregation. It is also a resilient solution that minimizes capital and operational expenses while its robust security features offer protection against unauthorized access to data traffic.

Ideal For

- Small to large single-site or multi-site enterprises looking for gigabit connectivity
- Organizations that demand quick installation, high performance and a cost-effective solution
- Organizations looking to simplify the management of their network with a simple Layer 2 gigabit core

- Are you looking for an aggregation or core switch that is easy to install and use?
- Do you have multiple, distant offices (up to 70 km) that need to share resources?
- Are you concerned about cost when considering switching purchases?
- Do you want gigabit performance without the investment in a chassis-based switch?

Business Challenges

- Are you experiencing slow application and response times?
- Are you suffering from slow server or application access?

Typical Applications

- Server farms
- High-bandwidth aggregation of wiring closet switches

Network Diagram

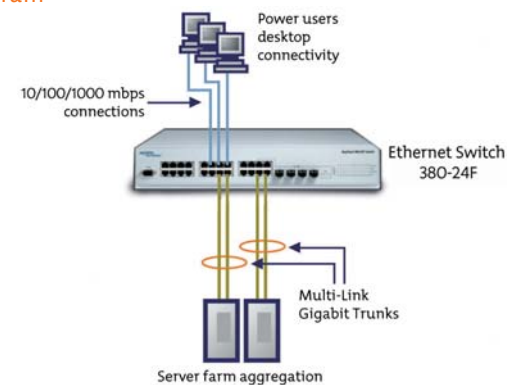


Figure 1: High-density gigabit connectivity and server farm aggregation for mid-size and large businesses

Key Points

- Cost effective Layer 2 switch for server farms, aggregation or small to medium core
- Dual 24 Gbps switch fabric
- Multi-link trunking for high-bandwidth load-balanced connections
- Secure access and data traffic protection

Features and Benefits

- **Cost-effective layer 2 switch for server farms** – The Nortel Ethernet Switch 380-24F allows users to aggregate servers without the need to purchase an expensive modular Layer 3 switch.
- **High-density cost-effective wiring closet switch aggregation** – 20 SFP GBIC ports and 4 full sized GBIC ports deliver the highest density and outstanding price-performance in a Layer 2 gigabit switch. Layer 2 switches are more cost effective and easier to configure and manage than Layer 3 switches.
- **Resilient connectivity for minimal network downtime** – Multi-link trunking (MLT) enables grouping of links between the switch and another switch or server to provide greater bandwidth of up to 8 Gbps with active redundant links. This feature provides load-balancing and automatic fail-over protection. Ethernet Routing Switch 8600 split multi-link trunking (SMLT) eliminates single points of failure in the network and allows Nortel Ethernet Switch 380s to have multiple active connections to the network core.

- **Secure access and data traffic protection** – Features include BaySecure, RADIUS, IP manager list, access list, SNMP v3 and password protection. Nortel is the only major vendor to support SNMPv3 protocol for user authentication and data encryption.
- **Common software lowers training and installation costs** – Nortel Ethernet switches have a common “look and feel,” which reduces training costs. Tools include the Web, menus, Nortel Enterprise Network Management System and Nortel Ethernet Switching Element Manager.
- **Save money and time with auto MDI/MDIX feature** – This feature (Nortel Ethernet Switch 380-24T only) eliminates the need for expensive cross-over cables while connecting to a hub or switch. The switch port can automatically detect the signal on the cable and configures itself appropriately.

Market Information

Nortel's Ethernet Switch 380-24F is designed to provide high-density high-bandwidth connectivity to desktops, other switches, servers, and other network devices. The Ethernet Switch 380-24F offers a resilient solution that minimizes capital and operational expenses. Its robust security features offer protection against unauthorized access to data traffic. The switch is Web-manageable and supports Redundant Power Supply (RPS) and Uninterruptible Power Supply (UPS) options.

Technical Specifications

Performance	• Switch Fabric: 20 Gbps • Frame Forward Rate (64-byte packets): Up to 30 million packets per second (pps) maximum • Port Forwarding/Filtering Performance (64-byte packets) • For 1000 Mb/s: 1,488,100 pps maximum • Address Database Size: 32,000 entries at line rate • Addressing: 48-bit MAC address • Frame Length: 64 to 9,216 bytes (IEEE 802.1Q Tagged) • 802.1p Priority classification: Four (4) queues • SDRAM size: 16 Mbyte • Flash memory size: 32 Mbyte
Data Rate	1000 Mbps 8B/10B encoded

Full-size GBICs	• 1000BASE-SX: Uses short wavelength 850 nm duplex SC fiber optic connectors to connect devices over multimode (550 m or 1,805 ft) fiber optic cable. • 1000BASE-LX: Uses long wavelength 1,300 nm duplex SC fiber optic connectors to connect devices over single mode (5 km or 3.1 mi) or multimode (550 m or 1,805 ft) fiber optic cable. • 1000BASE-XD: Uses single mode duplex SC fiber to connect devices over distances up to 40 km (or 31 mi), depending on the quality of the cable. • 1000BASE-ZX: Uses single mode duplex SC fiber to connect devices over distances up to 70 km (or 43 mi), depending on the quality of the cable. The ports on this GBIC operate only in full-duplex mode.
SFP GBICs	• 1000BASE-SX: Uses short wavelength 850 nm MTRJ type fiber optic connectors to connect devices over multimode (275m, 62.5um core or 550m, 50.0um core) fiber optic cable. • 1000BASE-SX: Uses short wavelength 850 nm duplex LC type fiber optic connectors to connect devices over multimode (275m, 62.5um core or 550m, 50.0um core) fiber optic cable. • 1000BASE-LX: Uses long wavelength 1300nm duplex LC type fiber optic connector to connect devices over single mode (10km, 9um core) fiber optic cable. • 1000BASE-CWDM: Uses long wavelength 1470, 1490, 1510, 1530, 1550, 1570, 1590, 1610nm LC type fiber optic connector to connect devices over single mode (40km, 9um core or 70km, 9um) fiber optic cable.
RFC Support	• RFC 1213 (MIB-II); RFC 1493 (Bridge MIB); RFC 2863 (Interfaces Group MIB) • RFC 2665 (Ethernet MIB); RFC 2737 (Entity MIBv2); RFC 2819 (RMON MIB) • RFC 1757 (RMON); RFC 1271 (RMON); RFC 1157 (SNMP); RFC 2570 (SNMPv3) • RFC 2571 (SNMP Frameworks); RFC 2573 (SNMPv3 Applications) • RFC 2574 (SNMPv3 USM); RFC 2575 (SNMPv3 VACM); RFC 2576 (SNMPv3) • RFC 2572 (SNMP Message Processing)
Safety Agency Approvals	- USA: UL60950 - Canada: CAN/CSA-22.2 No.60950 - Europe: EN60950 / IEC 60950, CB report with all national deviation. - Australia/New Zealand: AS/NZS 60950 - Mexico: NOM-019
Electromagnet Immunity	Europe: EN55024, CISPR24
Physical Dimensions	- Weight: 5 kg (11 lb) for -24F - Height: 7.04 cm (2.77 in.) - Width: 43.82 cm (17.25 in.) - Depth: 32.34 cm (12.75 in.)
Power Requirements	• Input voltage: 100-240VAC @ 47 to 63 Hz, -48 Volts DC with redundant power support • Input Power consumption: 150 W max • Input current (AC Version): 1.5 A @100 VAC, 0.6 A @ 240VAC, -48 Volts DC @ 3.0 Amps
Environmental	- Operating temperature: 0° to 40° C (32° to 104° F) - Storage temperature: -25° to +70° C (-13° to 158° F) - Operating humidity: 85% maximum relative humidity, non-condensing - Storage humidity: 95% maximum relative humidity, non-condensing - Operating altitude: Up to 3,024 m (10,000 ft.) above sea level - Storage altitude: Up to 12,096 m (40,000 ft.) above sea level
Standards and Certifications	- IEEE 802.1p (Prioritizing) - IEEE 802.1Q (VLAN Tagging) - IEEE 802.1D Spanning Tree Protocol - IEEE 802.3z 1000BASE-X specifications - IEEE 802.3x Flow Control (with 802.1D compliant device) - USA: FCC CFR47 Part 15, subpart B, Class A - Canada: ICES-003, Class A - Europe: EN55022, CISPR 22, Class A - Australia/New Zealand: AS/NZS 3548, Class A - Japan: VCCI-V-3/02.04, Class A - Taiwan: CNS 13438, Class A

Nortel Ethernet Switch Power Supply Unit 10



Overview

The Nortel Ethernet Switch Power Supply Unit 10 is a scalable redundant power supply (RPS) and uninterruptible power supply (UPS) device that provides redundancy and power protection in a single chassis for Nortel Ethernet Switches and other network devices.

Ideal For

- New and existing mid-tier and enterprise customers that need RPS/UPS functionality in a single chassis

Business Challenges

- Is network uptime and uninterrupted activity critical to your business?
- Do you have multiple wiring closet switches?
- Are you in an area that experiences power sags, surges and blackouts?

Typical Applications

- Any enterprise using Nortel Ethernet switches that requires a scalable redundant power supply and UPS system

Key Points

- Compact, all-in-one packaging. Single chassis, 3U high for standard 19" rack provides scalable, redundant power supply and UPS system for multiple devices.
- Redundant Power Supply (RPS). Modules - available in 136-watt or 200-watt ratings - provide redundant DC power to up to four devices per chassis.
- Optional UPS module. Available in 110-volt and 230-volt ratings, the optional UPS module provides battery backup AC power to up to four devices per module/chassis.

- Flexible deployment. RPS and UPS may be purchased separately and installed into the chassis as needed, while unit remains fully operational.
- Integrated management. The SNMP Controller module (or integrated UPS/SNMP module) supports remote configuration, management, or reset.

Features and Benefits

- Provides redundancy for the power supplies of Ethernet Switches, Business Policy Switch, and other Ethernet devices to ensure continuous network operation.
- Protects mission-critical enterprise applications from interruption due to problems with either the power source or power units within network devices.
- Enables on-demand deployment of UPS and RPS capabilities as enterprise needs grow, extending the value of original system investment.
- Supports continuous operation even as RPS modules are added or replaced.
- Single chassis, 3U high for standard 19" rack, provides scalable, redundant power supply and UPS system for multiple devices.
- Redundant Power Supply (RPS) modules provide redundant DC power to one device per module, four per chassis; UPS module provides battery backup AC power to up to four devices per module/chassis.
- Rear slots accept up to four RPS modules per chassis, available in two ratings.

- 136 watt modules (+12V, -12V, and +5V output) support Ethernet Switch 450 and other Ethernet devices such as hubs and routers that support the redundant power supply connector.
- 200-watt modules (-48V output) support Business Policy Switch.
- Hot-swappable RPS modules can be replaced or added while the whole unit remains operational.
- Front slots in the chassis accept optional UPS and associated battery pack module, to provide uninterrupted AC power supply for up to four devices.
- North American UPS module supports 110 Volt current; International version supports 230 Volt current.
- RPS and UPS may be purchased separately and installed into the chassis as needed, while the unit remains fully operational.
- SNMP controller module or integrated UPS/SNMP module manages and provides performance information.
- Power cables included with RPS modules connect to the Ethernet Switch 450 or other devices-or to the separately purchased DC-to-DC module required for supporting a Business Policy Switch.
- The Ethernet Switch 10 PSU may be remotely configured, managed or reset using an SNMP MIB browser.
- Front-panel LEDs on management modules indicate system power, RPS power, fan operation, and error codes obtained by SNMP.
- Ensures continuity of AC power to switches, hubs, and other network devices even during AC mains failure, power sag, surges, or blackouts.

Market Information

Nortel's Ethernet Switch Power Supply Unit 10 is a scalable redundant power supply (RPS) and uninterruptible power supply (UPS) solution that provides redundancy and power protection to existing and future network devices including Ethernet Switches 380, 450, 460, 470, Business Policy Switch and router products. Ethernet Switch Power Supply Unit 10 is ideal for new and existing mid-tier and enterprise customers that need RPS/UPS functionality in a single chassis.

Technical Specifications

Interfaces	Standard AC wall plug- NEMA 5-15 P (AC in) DC connector Console (RS-232) connector Ethernet (RJ-45) port
Electromagnetic Compatibility	EN55022/CISPR 22, Class A EN55024/CISPR 24 ICES-003, Class A verified (Canada) BSMI-Class A (Taiwan) ACA, AS/NZ 3548, Class A (Australia) FCC Part 15 Class A (US)
Shock/Vibration	IEC 721-3-3, 3M3; IEC 721-3-1, 1M3
Physical Dimensions	17.25 x 18.5 x 5.25 inches

Power Requirements

Input requirements:

Input voltage: North America: 100 V to 120 V; Europe: 230 V
 Input frequency range: North America: 57 to 63 Hz; Europe: 47 to 53 Hz
 Input current: 12.0 Amps, rms, max
 • Inrush current: 150 Amps peak maximum at cold start for a 1/2 cycle at any rated input voltage decaying to the nominal value within 100 milliseconds
 • Leakage current: 0.5 mA to 3.0 mA maximum for any input voltage

Output requirements:

Output voltage and current
 136W power supply module
 Output: -12, +12, +5 V DC
 Current (max.): 0.5, 2.5, 20 Amp
 200W power supply module
 Output: -48V DC
 Current (max.): 4.2 Amp

Set point adjustment

• 120 V AC, +/- 3 V AC (or 208 V AC or 220 V AC or 240 V AC +/- 6 V AC)
 under half load with batteries fully charged

Output over voltage

• AC outputs over voltage protected (OVP). The output OVP trip level preset to 135 V AC +/- 5 V AC, or 238 V AC, 250 V AC or 270 V AC +/- 10 V AC

Hold-up time

The output shall remain within its error band for 3 minutes minimum for fully loaded UPS, from a complete line loss. See RPS specifications for RPS Hold-up time

Transfer time

Less than 5 ms, phase locked to the utility waveform

UPS voltage and current for North American version

Input: 100/120 V AC, 12 A, 60 Hz
 Output: 120 V AC, 12 A, 60 Hz, 1400 VA, 1000 W, pf: 0.7

UPS voltage and current for International version

Input: 230 V AC, 7 A, 50 Hz
 Output: 230 V AC, 7 A, 50 Hz, 1400 VA, 1000 W.

Environmental

Operating temperature: 0 ° to 40 ° C
 Storage temperature: -25° C to 70° C
 Operating relative humidity: 5% to 85% relative humidity, non-condensing
 Storage temperature humidity: 95% maximum relative humidity, non-condensing
 Operating altitude: Up to 10,000 feet above sea level
 Storage altitude: Up to 30,000 feet above sea level
 Cooling, forced air: 2X30 CFM, 80 mm fans

Standards and Certifications

UL 1778, UL/C-UL 1950, IEC 950/EN 60950, EN50091-1, CB certificate and report with all national deviations, TCA AS/NZS 3260, CCIB/GB4943, GB9254, KNITQ, JET, PSB, NOM-019-SCFI, GOST, IRAM

> Nortel Network Management

Nortel's Enterprise Network and Service Management develops strategies, solutions and tools to enable a system-wide life cycle management approach dedicated to delivering convergence solutions that reduce total cost of ownership and enhance the end user experience by managing real-time system and application performance at the end user level.

Proactive Voice Quality Management (PVQM) provides a life-cycle approach that delivers the necessary management tools to support each phase of an IP Telephony project: assessment, pre-deployment, ongoing monitoring, reporting and diagnostics to ensure a successful implementation and on-going management. The PVQM approach ensures a proper, cost efficient and rapid roll-out resulting in a high-quality VOIP and multimedia solution. PVQM's unique ability to monitor, measure and maintain end-user voice quality in real time allows for better SLA management ensuring a reduced total cost of ownership.

ESM applies true subscriber-based services that change the way service providers do business. ESM moves the traditional model of provisioning by asset type to one that is subscriber based and greatly reduces operational cost and the total cost of ownership. This new model, focused on end user needs, revolutionizes MAC management, delivery time and throughput, allowing the service provider to focus on the business at hand to further enable the mobile work force.

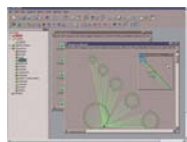
Enterprise Policy Manager (EPM) is a policy management software solution that allows network managers to control and secure the access to network resources based on users, groups of users and applications. Policies function as business rules that manage resource security, bandwidth and prioritize traffic so that an enterprise's network resources can be aligned with its actual business priorities. Through policy management, resources can be logically distributed where and to whom it makes the most business sense. Enterprise Policy Manager supports and simplifies the implementation of Core Security Policies, Differentiated Services (DiffServ) and Quality of Service architecture. EPM filters, polices and prioritizes traffic flows by automatically applying policies across the network at the network element level. This allows network managers to work with policies at the network level without having to worry about the complexities at the device level.

Enterprise Network Management System (NMS) is the end-to-end domain manager for the Nortel portfolio of converged solutions. It provides a fast and efficient way to manage and troubleshoot converged networks. With a comprehensive set of network visualization, discovery, fault and diagnostic capabilities it helps managers identify problems before they impact network services. Maintaining optimum user quality of experience in Web services, IP Telephony and other business-critical applications is important. Enterprise NMS provides a consolidated network infrastructure tool for Nortel solutions.

Enterprise IP Address Domain Manager (ADM) offers a powerful, standards-based solution for managing Internet Protocol (IP) addressing, Domain Name Service (DNS) and Dynamic Host Configuration Protocol (DHCP) in enterprise networks. From a single administrative interface, ADM provides a complete platform for integrated and automated IP address, DNS and DHCP management in both Windows and UNIX environments.

- Nortel Enterprise Network Management System
- Nortel Enterprise Policy Manager
- Proactive Voice Quality Management
- Enterprise Subscriber Manager
- Nortel IP Address Domain Manager

Nortel Enterprise Network Management System (ENMS)



Overview

Nortel Enterprise Network Management System (ENMS) is the end-to-end domain manager for the Nortel portfolio of converged solutions. With a comprehensive set of network visualization, discovery, fault and diagnostic capabilities, it enables network administrators to identify and resolve problems and performance bottlenecks before they impact network services. ENMS is designed to support the complete performance, scalability and security requirements of networks as large as 10,000 managed interfaces, and it is essential for maintaining user quality of experience in multi-cast video, IP telephony and other business-critical applications.

Ideal For

Enterprises that rely on their network infrastructure to deliver communication services and business applications

Business Challenges

- As your enterprise network transitions to IP telephony and other converged applications, how are you addressing service management issues?
- Are you experiencing lost productivity and missed opportunities due to network downtime?
- Is your current management solution able to efficiently handle the new business-critical applications and the complex network services and protocols they depend on?
- Is network performance and availability being impacted by the time it takes to troubleshoot and correct a network problem?

Typical Applications

Nortel Enterprise Network Management System provides a fast and efficient way for enterprises to manage and troubleshoot networks built with Nortel products. With comprehensive discovery features, it provides a detailed view of the physical network and logical connections, including specific protocol visualization for multicast, unicast and frame relay. It has fault correlation and diagnostic tools, such as RMON analysis and real-time performance monitoring, to help pinpoint the location and cause of network problems, ensuring higher network uptime.

Proactive voice quality management (PVQM) is a solution Nortel has co-developed with NetIQ. It gives the network manager the capability to ensure the overall quality of IP telephony deployments. PVQM continuously and passively measures the user quality of experience (QoE) for all IP telephony communications, conducts system health checks for IP telephony servers and provides troubleshooting and resolution for any performance degradation or fault conditions. PVQM provides real-time, proactive notification and problem resolution of emerging voice quality problems while a call is ongoing, without end-user involvement or awareness.

Network Diagram

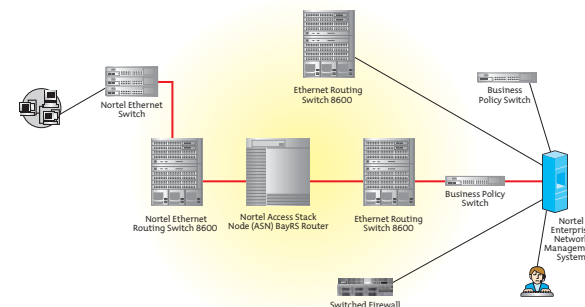


Figure 1: Network diagram of typical deployment

Key Points

- Nortel ENMS offers functionality for managing complex multicast networks and support for the Nortel Switched Firewall cluster view provides visualization of the Nortel Switched Firewall cluster and enables drill-down capabilities to identify members of the Nortel Switched Firewall cluster. Context-specific launch points facilitate the launch of third-party applications such as the CheckPoint SmartCenter Management Console.
- The device inventory manager helps network managers keep a complete inventory of their network devices. Critical information such as support contract details and precise physical location can be very useful when troubleshooting.
- Nortel ENMS provides powerful navigation tools that enable network managers to move seamlessly between logical and physical topology views with a single mouse click.
- Nortel ENMS can support the performance, scalability and security requirements for any size network. It also has the capability to consolidate and correlate network faults from all supported devices, including the Nortel Communication Server enterprise products managed by the Nortel Communication Server Manager.

Features and Benefits

- **Network discovery** – Nortel ENMS provides automated discovery and a detailed view of the physical network and logical connections between all Nortel devices, interfaces and network services. This includes physical discovery of hubs, switches, routers, IP telephony call servers and gateways, Nortel Multimedia Communications Servers, Nortel Communication Servers, Wireless Security Switches and Wireless Access Points, and Wireless Mesh network components. Users have the flexibility to control the span of their discovery and to discover elements on a per-device basis.
- **Fault management** – the intelligent fault engine in Nortel ENMS links the topology of the network to alarm conditions for consolidation and correlation of network faults, which helps the network manager quickly resolve fault or performance issues. Once a fault area has been identified, users can drill-down to view event details and track root cause.
- **Statistics and performance management** – Nortel ENMS includes performance analysis capabilities that extend from a segment down to individual nodes, giving network managers the flexibility to track metrics on a subnet basis, VLAN basis, protocol basis, or a per-device basis. It displays real-time utilization statistics and performance metrics in a graphical or tabular format, and allows users to customize polling and generate graphs for the utilization metrics.

- **Security management** – Nortel ENMS provides a user-centric security model that leverages community strings as well as SNMPv3 features. Access control is used to enforce user access in Nortel ENMS. Administrators have control over which users may use what applications. Additionally, access control can be enforced on a per basis. Nortel ENMS leverages SNMPv3 to secure element manager-device interaction. A community string editor is used to set SNMP community string information and SNMPv3 settings.
- **Inventory management** – the Nortel ENMS device inventory viewer (DIV) is used to track network inventory of Nortel enterprise products. Using DIV, network managers can track the physical as well as the contractual data for their network assets. DIV also has the flexibility to import/export inventory data.

Market Information

Here's what customers using the Nortel Enterprise Network Management System are saying:

"It gives me much more control of my network."

"When I use expanded view, it is just like standing in front of the device."

"The Web GUI is great to use when I am off-site and have to troubleshoot."

"With Nortel ENMS our surveillance, problem solving and troubleshooting are much easier."

"I can use it to shut down a port that's causing network problems, giving my techs time to get on site and deal with the offending PC or server."

"The base lining capabilities really help me manage network health."

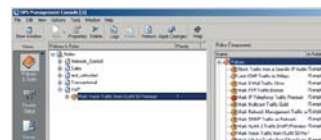
"The visualization capabilities have really helped me to train and empower my junior techs. Now I have more time for my work."

Technical Specifications

System requirements	Sun Sparc Systems Up to 5,000 nodes: • Sun 2000, or Ultra 60 with 1.2 GHz CPU Over 5,000 nodes: • SunFire V240, or Sun 2000 with 2.0 GHz CPU • 2 GB RAM minimum with 20 GB free disk space • Color monitor, CD drive, 1.44 MB 3.5-inch floppy disk drive (recommended) • Operating system: Solaris 2.8 • Supported network management platforms: – HP Network Node Manager 7.0.1 for Sun Solaris – Tivoli TME 10 NetView 7.1.4 for Sun Solaris, Windows NT or 2000/2003 systems
Campus	• Intel-compatible 1.2 GHz Pentium IV type processor minimum • 1 GB RAM with 20 GB free disk space • Color monitor, CD drive
Enterprise	• Intel-compatible 2.0 GHz Pentium IV type processor minimum • 2 GB RAM minimum with 20 GB free disk space • Color monitor, CD drive • Operating system: Windows NT Server or Windows 2000/2003 Server • Supported network management platforms: – HP Network Node Manager 7.0.1 for Windows NT/2000 – Tivoli TME 10 NetView 7.1.4 for Windows NT/2000

Client requirements	• Windows NT 4.0 Workstation, Windows 2000/3000 Intel compatible 512 MHz Pentium IV-type processor minimum • Professional, Windows 98, Windows XP • 512 MB RAM with 5 GB free disk space • Color monitor, CD drive • Browser support Internet Explorer 6.1, Netscape 7.x HP/UX systems • Server hardware for HP-UX Systems: – C3000 with 2.0 CPU – 412 MHz processor with 2 GB RAM minimum – Color monitor and 20 GB hard drive • Operating system: HP/UX 11i
Device support	• IP Telephony components – Nortel Communication Server, Business Communications Manager, Nortel Communication Server 1000 and Nortel Multimedia Communication Server 5100 (MCS 5100) • Ethernet Switches – Nortel Ethernet Switches, Nortel Business Policy Switch 2000, Nortel Ethernet Routing Switch 5000 series, Nortel Ethernet Routing Switch 8600 • Routers/Layer 3 devices – Nortel Ethernet Routing Switch Portfolio, Nortel Multiprotocol Router Portfolio, Nortel Communications Manager, Nortel Application Switch, Nortel VPN Router Portfolio, Wireless Mesh Networking, Nortel WLAN Portfolio • Optical Ethernet – Nortel Optical Metro Platform 1000 Series and 8000 Series • Other – System 5000 hubs, Centillion

Nortel Enterprise Policy Manager (EPM)



Overview

Nortel Enterprise Policy Manager (EPM) is a single, network-level application that allows administrators to manage network bandwidth, prioritize traffic streams and set network access policies. Nortel Enterprise Policy Manager is part of a comprehensive Nortel Management solution that includes Nortel Enterprise Network Management System for discovery, diagnostics and troubleshooting; Nortel Ethernet Switching Element Manager for online configuration of Ethernet switching devices; and Nortel Communication Server Manager for comprehensive enterprise voice management.

Ideal For

Enterprises that rely on their network infrastructure to deliver communication services and business applications

Business Challenges

- Do you feel confident that you have the comprehensive security management needed to thwart external network attacks?
- Can you count on your current management solution to:
 - Reliably deploy and maintain security protection policies?
 - Ensure network-level admission control to protect against denial of service (DoS) and distributed denial of service (DDoS) attacks?
 - Implement policies for access control, based on user profile and RADIUS authentication?
- Are you concerned about internal security violations that can result in network downtime and regulatory violations?
- Can your current management solution ensure quality of service (QoS) for new applications that place increasing demands on network bandwidth and network reliability?

Typical Applications

Enterprise IT managers are faced with increasing application demands. The network is viewed as a strategic asset that must support dynamic business goals. This new reliance

increases the sheer volume of traffic on the network as well as dictating new service parameters to ensure quality and availability for applications such as CRM, SCM, call centers and IP telephony. Network managers faced with this trend and these demands must define policies that will ensure sustainable network performance. They must also begin to build or re-architect networks that can support applications and network-access security according to a policy-enabled service set.

Business justification for this activity is intuitive. By building or re-architecting a network that supports policy-enabled control for quality of service (QoS) and network-access security, the network manager creates a flexible infrastructure that can be optimized on an application-by-application basis. This flexibility extends to the security domain as well, enabling the network manager to respond quickly and easily to new threats. With this inherent flexibility, the network manager will be able to respond to the ever-changing business environment. With central control over network performance, any new or existing application can be fine-tuned for improved performance and cost-effectiveness. This can result in deferred costs for extra bandwidth or the ability to bring a new revenue or productivity application online more quickly. In today's economy, time-to-money is a crucial business metric.

Network Diagram

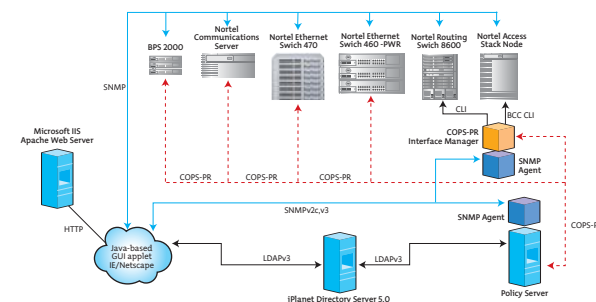


Figure 1: Network diagram of typical deployment

Key Points

- Nortel Enterprise Policy Manager makes it easy to maximize current bandwidth usage by simplifying traffic prioritization based on pre-defined rules or policies. Advanced packet classification and the ability to priority mark, police and meter traffic enable the network manager to efficiently combine traffic attributes when setting policy conditions to deliver increased performance to support IP telephony or other advanced applications or services without incurring additional bandwidth costs.
- Nortel Enterprise Policy Manager provides centralized, application and user-based policy provisioning that enables rapid response to emerging threats.
- Nortel Enterprise Policy Manager, together with TrueControl™ from Rendition Networks, increases business uptime for enterprise customers by providing consistent and scalable configuration control across multi-vendor networks.
- Nortel Enterprise Policy Manager, working in conjunction with the Solsoft Policy Server, improves processes and productivity by consolidating security policy management.
- Nortel Enterprise Policy Manager alarms and statistics are integrated into the Nortel Enterprise Network Management System to enable correlation of a policy violation with other network problems. The system can then be used to troubleshoot and diagnose the problem before application performance is impacted.

Features and Benefits

- Apply traffic filtering policies quickly across multiple device types, using a single console.
- Prioritize business-critical traffic flows for effective bandwidth management and quality of service (QoS).
- Respond to network threats in minutes, not hours or days, using broad network access control against denial of service attacks, viruses and worms.
- Screen users logging into the network, especially those coming from wireless/public connections such as schools, meeting rooms, or hospitals, using RADIUS authentication and EAP (802.1x) support.
- Implement user-based policies that ensure application-level authorization to access sensitive assets and data.
- Assess and control the impact of new policies on applications and services, using closed-loop analysis tools.
- For delay-sensitive applications like IP telephony, Nortel switching devices are pre-configured with default mappings for high-performance voice services. The Nortel Enterprise Policy Manager auto-QoS software reads these default mappings and creates an IP telephony policy that marks and meters the voice traffic. That policy can then be implemented on other devices throughout the network with a simple click of the mouse.

- The Nortel Enterprise Policy Manager filter/policy import utility retrieves information directly from the filter table in a network device and converts it into policy objects that can be used to provision similar devices.
- The Nortel Enterprise Policy Manager filter change alert enhances network security by signaling the network or security administrator whenever the actual network/device state is inconsistent with the expected state. It also enables managers to track and correct unauthorized filter changes that could constitute a security breach and/or result in degradation of network performance.
- Standards-based architecture provides scalability and reliability for large networks and interworking with various management standards, including diffServ, IEEE 802.1p, COPS-PR and LDAP.
- Advanced security provisioning capabilities complement existing firewall implementations and IP VPN devices by adding an extra layer of protection to network resources.
- Nortel Enterprise Policy Manager device support includes Nortel Ethernet Switch 460, 470 and 5510, Nortel Business Policy Switch 2000, Nortel Ethernet Routing Switch 8300 and 8600, Nortel Routing Software, Nortel Communication Server 50/200/400 and Nortel VPN Gateway.

Market Information

Here's what customers using Nortel Enterprise Policy Manager are saying:

"It really works and is very powerful."

"To be able to limit traffic at the port level is really useful."

"Policy is implemented within 7 seconds."

"We ran our key applications on a high-priority queue and solved a number of problems. Nortel EPM made it easy to implement."

"I like the Web browser interface."

"The product has low overhead, almost negligible."

Device support

- Nortel Ethernet Switch 460 and 470
- Nortel Ethernet Switch 5510
- Nortel Business Policy Switch 2000
- Nortel Ethernet Routing Switch 8300 and 8600
- Nortel Multiprotocol Routers
- Nortel Communication Server
- Nortel VPN Router Portfolio

Technical Specifications

System requirements

UNIX environment

Server hardware

- UltraSparc 500 MHz with 512 MB RAM

Operating system

- Solaris 2.8

Supported network management platforms

- Optivity Network Management
- Tivoli TME 10 NetView 7.1
- HP OpenView Network Node Manager 6.2

Client device

- Java Runtime Environment (JRE) v1.4.2 is required

Windows environment

Server hardware

- Pentium III, 750 MHz with 256 MB RAM

Operating system

- Windows NT Server, Windows 2000/2003 Server

Supported network management platforms

- Optivity Network Management System 10.0 or higher
- HP OpenView Network Node Manager 6.2
- Tivoli TNM 10 NetView 7.1

Client device (Windows XP or 2003 Operating System)

- Pentium III, 750 MHz with 256 MB RAM
- Java Runtime Environment (JRE) v1.4.2 is required

Proactive Voice Quality Management (PVQM)

Overview

Proactive voice quality management (PVQM) is a solution Nortel has co-developed with NetIQ. It gives the network manager the capability to ensure the overall quality of IP telephony deployments. PVQM continuously and passively measures the user quality of experience (QoE) for all IP telephony communications, conducts system health checks for IP telephony servers, and provides troubleshooting and resolution for any performance degradation or fault conditions. PVQM provides real-time, proactive notification and problem resolution of emerging voice quality problems while a call is ongoing, without end-user involvement or awareness.

Ideal For

- Any customer introducing IP Telephony in the network should be interested in tools to assure service levels through cost effective management approaches.
- Medium/large enterprises with one of the following business challenges:
 - Implementing a Nortel Communication Server 1000 4.0 IP Telephony and wants to manage service quality down to the IP Phone level
 - Has a need to monitor and report on service quality for IP Telephony
 - Has a network of Business Communication Managers and is looking for a remote management solution providing rich performance reporting capabilities
 - Looking for diagnostics tool sets to support their IP Telephony infrastructure

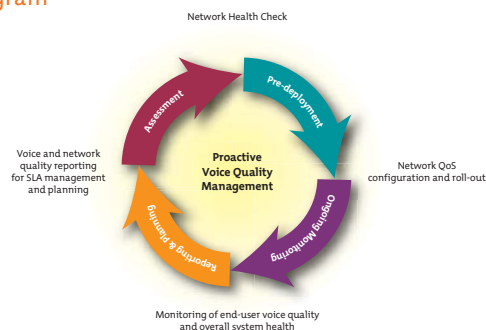
Business Challenges

- Are you interested in assessing your network to determine if it is ready to handle Internet Telephony?
- Are you looking for tools that can help you monitor the experience of your IP Telephony users and your network performance?
- Do you need a cost-effective solution for troubleshooting network problems in real-time?

Typical Applications

- VoIP Readiness Assessment and pre-deployment
- Monitoring and Reporting - Managing VoIP Availability and Quality Needs

Network Diagram



Key Points

- **End User Experience** – Focused on the end user Quality of Experience, PVQM provides the necessary tool sets to optimize operational processes around maximizing service up-time, thus providing the right focal point business operations.
- **Network Infrastructure Correlation** - Automated/expert trouble-shooter that quickly pinpoints call quality problems in Voice over IP (VoIP) networks and easily explains why you are experiencing reduced call quality.
- **Real-time Management** – Don't wait for your users to call and complain about poor service. Instead, manage voice quality in real-time as calls are in progress by using PVQM.

Features and Benefits

Successful implementation of VoIP applications requires integrated management solutions that allow you to take control of your entire voice network and server infrastructure. Understanding how data traffic will affect voice applications — before deployment — and then continually monitoring and diagnosing the status of IP Telephony devices will help maximize success. For all stages of deployment, NetIQ's products provide the most comprehensive solution available on the market. NetIQ delivers assessment, monitoring and diagnostic products to help you ensure a successful implementation and accelerate your overall return on VoIP investment. In addition, Enterprise Policy Manager and Enterprise Network Management System complement your investment in Nortel data solutions, providing point-and-click management of your converged network. Optimized tools to take costs out of your business while ensuring IP Telephony service quality.

Given the absolute business-critical nature of voice service, deployment, ongoing monitoring and troubleshooting activities for IP Telephony demand optimized tool sets that ensure you can

stay on top of your service quality needs. In the PVQM solution set, there are a number of capabilities that do just that.

- **NetIQ AppManager** — AppManager is used for ensuring ongoing VoIP performance, availability and call quality. AppManager provides sophisticated Knowledge Scripts that allow you to work smarter by monitoring critical resources and performance issues, and perform sophisticated troubleshooting activities automatically or behind the intuitive Web console interface.
- **NetIQ Vivinet Diagnostics** — Vivinet Diagnostics is an automated/expert troubleshooter that quickly pinpoints call quality problems in VoIP networks and easily explains why you are experiencing reduced call quality. The Vivinet Diagnostics software reduces the time needed to resolve voice quality issues and lessens the skills required for VoIP troubleshooting, in both pre-deployment and post-deployment environments. Vivinet Diagnostics can be invoked using synthetic IP clients today and will be automatically invoked (planned 2005) when a real-time R-value (Quality of Experience) trap is received from a CS 1000 system.
- **Nortel Enterprise Network Management System** — The Enterprise Network Management System is the end-to-end domain manager for the Nortel portfolio of converged solutions. It provides a fast and efficient way to manage and troubleshoot converged networks with a comprehensive set of network visualization, discovery, fault and diagnostic capabilities. It helps managers identify problems before they impact network services. Maintaining optimum user QoE in Web services, IP Telephony and other business-critical applications is important. Enterprise Network Management System provides a consolidated network infrastructure tool for Nortel solutions.

- **Nortel Enterprise Policy Manager** —

Enterprise Policy Manager is a system level software application designed to manage traffic prioritization, Quality of Service and network access security for business applications in the enterprise networking environment. Network managers can now take a proactive approach to bandwidth management, security and prioritization of business-critical traffic flows across the organization. Enterprise Policy Manager supports network managers by providing centralized control of advanced packet classification and the ability to priority mark, police, meter or block traffic. Use Enterprise Policy Manager to consistently deploy QoS provisioning across the network to support the needs of IP Telephony.

Market Information

Proactive Voice Quality Management's unique approach spans all aspects of an IP telephony project from network assessment to the end user experience. PVQM is a solution that partners with industry leaders in network management tools to reduce total cost of ownership and create a robust and comprehensive tool suite focused on measuring and delivering the highest voice quality in a converged network. PVQM measures voice quality from the end user experience and provides system feedback to ensure the ongoing quality level associated with a given Service Level Agreement (SLA).

Enterprise Subscriber Manager



Overview

Enterprise Subscriber Manager is a powerful PC-based tool that simplifies, streamlines and automates the management of Nortel PBX systems. With Enterprise Subscriber Manager you can save time and money every day and help maximize uninterrupted, quality phone service. Enterprise Subscriber Manager gives detailed reports on switch data and provides a single, easy-to-use interface to perform moves, adds and changes (MACs).

Ideal For

- Large and small businesses
- Businesses that want to simplify and enhance the management of their Nortel Meridian 1 PBX and Nortel CS 1000 communications network
- Businesses that want to minimize downtime with the use of consolidated alarm view and alarm notification features
- Businesses that require effective tools for monitoring and reporting on network usage, optimizing performance and planning for the future
- Businesses that require LDAP integration to serve a variety of business applications in their network

Business Challenges

- Today the management of assets and services is accomplished one element at a time. With large and small networks this process can be complex, manually driven and time consuming. Nortel takes the approach to keep the subscriber in mind and simplify and automate management process across the network and add an easy to use interface.
- Nortel's Enterprise Subscriber Manager simplifies provisioning methods by focusing on individual subscriber needs not system requirements and constraints. ESM reduces the complexity of set up and deployment that fundamentally changes the way you provision and deliver Quality of Experience and reduce Total Cost of Ownership.

Typical Applications

Enterprise Subscriber Manager provides the ability to:

- Facilitate major switch cuts (even if it is a non-Nortel PBX — if the non-Nortel PBX supports exporting data to a text file, then Enterprise Subscriber Manager can import the data)
- Move large groups of stations within or between PBXs
- Populate new switches with ease
- Provide callers with immediate help through your help desk

Key Points

- Automates data extraction and reporting
- Simpler, more logical interface
- Uses templates for easy creation of frequently-used profiles
- Logical defaults propagate other fields, eliminating manual data entry and errors
- Easier MAC administration, including multiple create, modify and delete

Features and Benefits

- **Multiple copy/move feature** - Station configurations are easily copied from old switches to new Nortel switches, making installations fast and accurate. You can also implement moves and copies of stations within one PBX or between PBXs for easy departmental moves or PBX expansions.

- **Single interface intuitive workflow** - Quality of Experience is improved because data is entered once and propagated to the targeted devices since the business logic is built within the Enterprise Subscriber Manager's application. This results in fewer keystrokes, fewer errors and less troubleshooting.
- **Immediate or Scheduled global change** - When new services are available for general deployment, it may take weeks to roll out these services using traditional methods. Enterprise Subscriber Manager speeds up this cycle by allowing the provisioning administrator to deploy immediately and/or schedule for another time and date. Enterprise Subscriber Manager applies global changes, such as a network class of service upgrade, to selected groups of stations. And it's incredibly easy to specify the stations for upgrading with Enterprise Subscriber Manager's sorting and filtering functions.
- **Customizable Work Environment** - Enterprise Subscriber Manager allows each administrator to customize their work environment.
 - **Framework** — This window contains all of your change/project views and monitors, as well as administrator, system, template and report views.
 - **Shortcuts** — This window is similar to the desktop of a PC. It contains links to frequently used records.
 - **System Lists** — Containing a hierarchal view of all the systems licensed with Enterprise Subscriber Manager by system type, records within the systems can be accessed by clicking the + next to the system.
 - **Global Lists** — Used with multiple systems of the same type, these lists contain all records for each type of system.
- **Station Templates** – Create commonly used phone sets and associated settings and save them for future use. Whether it is from scratch, from existing stations or from text or spreadsheet files, by using Enterprise Subscriber Manager for templates you can create large numbers of stations quickly and efficiently while ensuring consistency of key layout, class of service attributes and many

other field values. Other Enterprise Subscriber Manager template features allow you to define multiple station configurations, easily cut from non-Nortel to Nortel switches, and rapidly populate switches when large numbers of employees or students move at the same time.

- **Tracking and Reporting** - Enterprise Subscriber Manager tracks and reports information that is normally hidden within the switch. So when you make a deletion or change, you can see all the other services that are affected and optionally change or delete them. Multiple modify lets you make many changes instantly.
- **Swap** – Swapping stations is fast and easy. Just select two terminal numbers and swap them from the menu bar. There's no need for multiple steps involving temporary moves. Make chained moves with ease.
- **Multiple Move** - An office change often causes a series of sequential moves — an employee leaves the company, another employee wants the first employee's office space, a third employee decides to move into the second employee's office space, and on it goes. With Enterprise Subscriber Manager's multiple move feature, chained moves are almost entirely automated.

Market Information

- Medium Enterprises - 250 to over 1,000 subscribers
 - Centralized single administrator management
- Large Enterprises - 1,000 to over 100,000 subscribers
 - Multiple administrators/multiple access levels
- Managed service providers
 - Management by customer
- Scheduling of move, add, change (MAC) requests

Technical Specifications

System recommendations	• Microsoft Internet Explorer 5 or newer • Pentium IV processor 2 GHz Intel-based or faster • Microsoft Windows XP with Service Pack 2 or 2003 Server • 512 MB RAM or more • CD-ROM drive • SVGA resolution graphics or better • Monitor with 256 colors and 800x600 resolution or better • Mouse • External or removable backup of the Enterprise Subscriber Manager database • Network connectivity • 10 GB hard disk space or more • One or more modems, RS-232 communications connections or network connections to send changes to the systems being managed
Client Workstations	• Pentium III processor 600 MHz Intel-based or faster • Microsoft Windows XP with Service Pack 2 or 2003 Server • 512 MB RAM or more • SVGA resolution graphics or better • Monitor with 256 colors and 800x600 resolution or better • 1 GB hard disk space or more • Microsoft Internet Explorer 5 or later
Enterprise Subscriber Manager Database Server/Communication Server PC	• Microsoft Internet Explorer 5 or later • Pentium IV processor 2 GHz Intel-based or faster • 1 GB RAM or more • Microsoft Windows XP with Service Pack 2 or 2003 Server • 10 GB hard disk space or more • Network access for client/server interactions via file sharing or TCP/IP with DNS (Domain Name Service) enabled. All PCs running Enterprise Subscriber Manager must be able to make a TCP/IP socket connection to the database server. Note: You can use the "ping" command to verify the connection. • One or more modems, RS-232 cables or network connections for communication with the Communication Server 1000 (CS 1000) and branch office systems and a network connection to the LDAP subscriber database • Tape or network backup for the server
Compatibility	• Succession* 1000 Release 3.0 and 4.0 (including survivable cabinet, media gateway and branch office) running on all supported platforms • Meridian 1/Succession 1000 support: – Navigation and system associations (main office, branch office) – Analog, digital and IP phone sets – Corporate Directory feature support for M390x and IP Phone 20xx • Meridian M1 release support: – Release 19-25 running on Meridian 1 PBX 11C (including survivable cabinet and media gateway), 51c, 61c, 81/81C

Nortel IP Address Domain Manager

Overview

The Nortel IP Address Domain Manager software solution provides automated IP Address, DHCP and DNS server management to increase IP network performance, availability and reduce costs associated with IP network management. IP Address Domain Manager minimizes downtime by streamlining IP address management. In addition, the software supplies innovative tools to simplify Domain Name Service (DNS) and Dynamic Host Configuration Protocol (DHCP) management.

The Nortel IP Address Domain Manager software solution allows network managers to control IP addressing and standards-based DNS and DHCP services from a common interface, increasing the efficiency of management personnel and reducing the possibility of errors. Simplifying IP addressing is at the core of Nortel IP Address Domain Manager's functionality. By providing a central platform from which an organization's entire IP address domain can be managed as a whole, the software enables static addresses, dynamic addresses, and IP Address Domain Manager DNS and DHCP Servers to be effectively managed in relation to one another. Nortel IP Address Domain Manager also removes major technical barriers to DHCP implementations by supporting dynamic DNS (DDNS) updates and DHCP redundancy at every level of the product.

Ideal For

Any organization that is looking for an effective way to automate the management of their IP address domain.

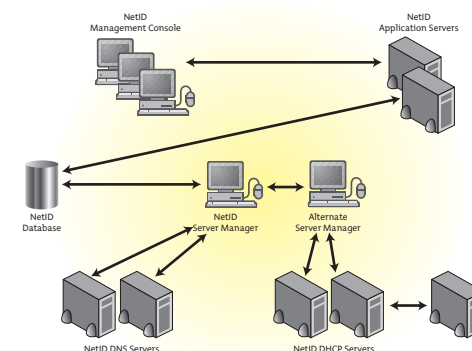
Business Challenges

- Are you running out of IP address space?
- Are you having difficulty keeping accurate records of the IP addresses assigned?
- Do you need an improved method for reclaiming statically assigned addresses that are no longer in use?
- Do you have to manually update DNS information and configure devices that need access to the network?

Typical Applications

Nortel IP Address Domain manager is ideally suited to growing enterprises that are increasingly relying on IP services and IP enabled devices in business applications. As the size of your IP address domain increases it becomes essential to find more reliable and cost effective ways to manage it - this is where IP Address Domain manager can be of exceptional value.

Network Diagram



Key Points

- Simplifies IP Address Management by providing system-level control, ensuring that address conflicts are corrected and updated information on address availability is supplied.
- Supports Dynamic DNS Updates to ensure that lookup information for domain names is updated automatically across the network.
- Offers High Network Availability by eliminating downtime caused by IP address conflicts.
- Delivers Centralized Control with distributed management capabilities via an intuitive, browser-based interface.

Features and Benefits

The Nortel IP Address Domain Manager is a software solution that consists of the following components:

- **Database** - IP addressing information is stored in the IP Address Domain Manager database (a Sybase or Oracle database). Multiple users can access this information from the management console.
- **Management Console** - Provides an intuitive platform for IP address management and the management of the DNS and DHCP Servers. The Java-based interface enables managers to access the central database from Web browsers. Views can be customized so administrators see networking information according to the fields they want displayed. For example, DHCP configuration can be viewed either by server or subnet.

- **Application Server** - Generates Management Consoles through which network administrators can view and modify the information stored in the database. The Application Server is responsible for committing network, subnet, host, DNS and zone parameters specified by the administrator to the database. It also provides managers with updated network, DNS and DHCP information.
- **Server Manager** - The interface between the DNS and DHCP Servers and the central database, it provides the servers with their initial configuration and also sends incremental configuration changes to servers across the network. The Server Manager is responsible for committing DNS and DHCP information to the database.
- **DNS Server** - Linked to the database by the Server Manager, the DNS server supports standards-based DDNS updates and DNS reconfiguration (changing server policy and zone structure). The DNS Server is based on BIND 9.x and is designed to interoperate with other BIND-compliant DNS Servers.
- **DHCP Server** - A BootP/DHCP server that is configured from the Management Console. The DHCP server automatically assigns IP addresses and names to specified hosts.

Product Features Include:

- **High Network Availability** – IP Address Domain Manager features an approach that delivers built-in fault tolerance at every level, enabling managers to correct network problems before a major outage occurs. Alternate Server Managers can be configured to maintain an open connection to the database. In the event of a WAN or database outage, each component continues to function independently. DNS and DHCP Servers operate using their local configurations and then automatically update the database as soon as the outage is corrected. In addition, the DNS and DHCP Servers generate alarms and warnings that are made available to the managers from the Management Console. In the event of an isolated server outage, system backup is provided by DHCP redundancy and a fault-tolerant DNS Server, allowing isolated outages to remain virtually transparent to end-users.
- **Integrated IP Address, DNS, and DHCP Management** - The Management Console provides a common point from which IP address and DNS and DHCP information can be managed. Essential management tasks, such as moving IP addresses, entering domain names and adding new subnets, can be performed from the Management Console's intuitive graphical interface. Configuration parameters for the DNS and DHCP Servers are also defined from the Management Console and stored in the database. Servers obtain their configuration from the IP Address Domain Manager database through the Server Manager, providing a single configuration point for servers across the network.
- **Active Server Management** - The IP Address Domain Manager Active Server Management feature supports status monitoring of individual DNS and DHCP servers, with the Management Console providing a display of the configuration and real-time status of the servers. The Management Console serves as a collection point for alarms and warnings

from the DNS and DHCP servers. The alarms also generate Simple Network Management Protocol (SNMP) traps that can be monitored by other applications in the network management software suite.

- **Web-based Management Console** - The Management Console is displayed as a window generated from a Java-enabled Web browser. Immediate access to the central database ensures currency of information and also prevents duplication of effort among the management staff. The cross-platform capability of Java allows IP Address Domain Manager to be used across the enterprise environment.
- **Centralized Control with Distributed Management** – IP Address Domain Manager features flexible access controls that support distributed management of IP addressing tasks. Users can be granted access rights that restrict access to specified subnets, sub domains and ranges, limiting their access to the IP addresses that are their direct responsibility.
- **Personal Views** - In addition to limiting the information that users can modify, network managers can also limit the information users can see. The only information users can see is data that the IP Address Domain Manager administrator has placed in their personal view.
- **Ease of Use** - The Management Console provides an intuitive, user-friendly tool for IP address management as well as DNS and DHCP management. Information is presented graphically and organized hierarchically, and customizable views enable network administrators to view information according to specific fields.
- **Persistent Dynamic DNS Updates** - The DNS Server saves to a disk any DDNS updates it receives to ensure that no data is lost while it is being committed to the database. Interruptions of the transfer of DDNS updates to the database can occur if the DNS Server is restarted or if it is sent its configuration from the database. Once the DNS Server resumes its normal operation,

it will refer to its local record of DDNS information and reattempt to commit any unconfirmed records to the database via the Server Manager.

- **DHCP Redundancy** - Using DHCP redundancy, the IP Address Domain Manager helps ensure high availability of DHCP services. With a primary and a backup DHCP Server maintaining the same address ranges, DHCP clients are able to obtain an IP address even if the primary server goes down.
- **Dynamic Addressing** – IP Address Manager controls the allocation of DHCP addresses through the association of pools of client IDs or Media Access Control (MAC) addresses within a DHCP range. Only members of the client pool are allowed to receive an address from a DHCP range associated with a client pool.
- **IP Audit Tool** – Network administrators can compare the addresses stored in the database with those currently in use. IP Address Manager checks all data as it is entered, and the IP Audit Tool is available to verify data at any time. Administrators have the option of deleting unused addresses or retrieving them for reassignment and newly detected addresses are automatically added to the database.

Automated VLSM Design – IP Address Manager automatically calculates subnet masks, thereby eliminating the common errors associated with VLSM (Variable Length Subnet Mask) design and architecture.

Market Information

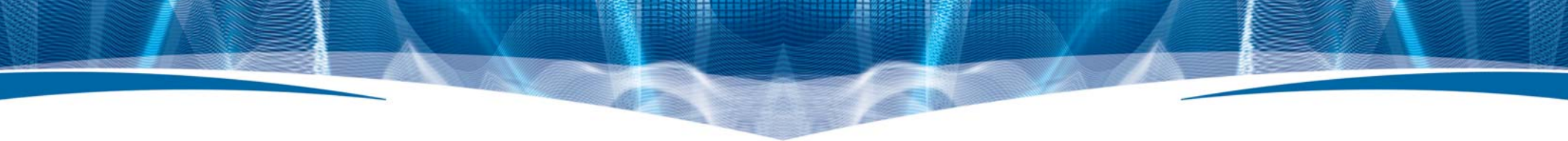
The IP Address Management (IPAM) market is defined to include graphical user interface (GUI), IP address management, and DNS/DHCP configuration and management functions in either a software or appliance solution. This dynamic global market is estimated at \$220M in 2005 (Forrester) and is expected to continue rapid growth as more IP addresses become active. The use of IP address space is accelerating as more IP-enabled devices are deployed (IP phones, 3G wireless, mobile computers, PDAs). The market is also anticipating growth to be fueled by the widespread adoption of IPv6, which is expected to occur first in Asia and in certain vertical segments such as the military.

Technical Specifications

Product	Disk Space	Memory	Platform	Hardware
ADM DHCP Server	4 GB	500 MB	Windows 2000, 2003 Solaris 2.8, 2.9, 2.10 HP-UX 11i	Pentium III 500Mhz SUN UltraSPARC HP
ADM DNS Server	1 GB	500 MB	Windows 2000, 2003 Solaris 2.8, 2.9, 2.10 HP-UX 11i	Pentium III 500 Mhz SUN UltraSPARC HP
ADM Application Server	1 GB	1 GB	Windows 2000, 2003 Solaris 2.8, 2.9, 2.10 HP-UX 11i	Pentium III 500 Mhz SUN UltraSPARC HP
ADM Server Manager	4GB	1 GB	Windows 2000, 2003 Solaris 2.8, 2.9, 2.10 HP-UX 11i	Pentium III 1 GHz SUN UltraSPARC HP
Oracle 9i Oracle 10g	650 MB + 2 KB per IP address	256 MB	Any platform	As supported by database vendor
Sybase 12.5.x Server	500 MB + 2KB per IP address	512 MB	Any platform	As supported by database vendor

Ordering Information

For further information, please contact your local Nortel representative.



> Nortel Multiservice Switch Portfolio

Nortel's Multiservice Switch portfolio offers enterprises with multiple disparate networks a way to experience lower total cost of ownership while having superior voice quality and business-grade IP services. These switches provide high network availability and reliability for end-to-end Quality of Service (QoS) when multiple networks are converged. By enabling flexible, reliable, and secure LAN/WAN networks, Nortel Multiservice Switch products optimize network resources and help future proof enterprise networks.

- Nortel Multiservice Switches
- Nortel Multiservice Switch 7400 Series
 - Nortel Multiservice Switch 7420
 - Nortel Multiservice Switch 7440
 - Nortel Multiservice Switch 7460
 - Nortel Multiservice Switch 7480
- Nortel Multiservice Switch 15000

Nortel Multiservice Switches

Overview

Building separate networks for voice, video and data is costly and inefficient. Nortel's Multiservice Switch portfolio is a reliable and secure wide area network platform delivering mission-critical applications such as voice, data and video including Ethernet, Frame Relay, ATM and IPVPNs over a converged cost-effective infrastructure.

- The Nortel Multiservice Switch 7400 series (7420, 7440, 7460, and 7480) is designed to allow enterprises to converge their voice, video and data mission-critical applications to reduce total cost of ownership with a reliable and secure platform. This industry leading switch delivers superior voice quality, business-grade IP services and end-to-end QoS for companies wanting to converge multiple disparate networks – making it an ideal solution for the challenges in today's enterprise networking environment. Nortel Multiservice Switch 7400 also offers value-added functionality such as multiservice access technology that allows for the provisioning of multiple services on a single FP, high-density voice networking and voice transport. This makes Nortel Multiservice Switch 7400 ideal for corporations with distributed contact centers that require reliable high-quality packetized voice across international circuits; enhanced virtual IP routing, which allows corporations to deploy scalable embedded IP routing over ATM with COS/quality of service (QoS) and/or to deploy their own private network-based IPVPN for segregating traffic at layer 3 (by departments, ministries, network applications) over a shared infrastructure; and MPLS, which allows corporations to evolve to MPLS when and if it makes business sense.
- The Nortel Multiservice Switch 15000 offers a solution for enterprise organizations that require high capacity and trunking speeds that exceed STM-1/OC3 bandwidth. Nortel Multiservice Switch 15000 supports ATM, frame relay, IPVPN, MPLS, circuit emulation and voice services. Nortel Multiservice Switch 15000 is suited to be a backbone platform and is integral to the design of a high capacity, versatile, reliable and scalable solution for the provision of carrier-grade performance for core switching. Nortel Multiservice Switch 15000 utilizes the same software stream, has common network management tools, and has the same look and feel as the Multiservice 7400 products – making it a seamless transition to high capacity requirements.

Ideal For

- Nortel Multiservice Switch 7400 series is a good choice for:
 - Organizations looking for network convergence of voice, video, LAN and data traffic over a common network infrastructure
 - Enterprise sectors such as finance and insurance, utilities, transport, railways and air traffic control, police and emergency services, government networks and defense networks
 - Organizations with mission-critical applications that require virtually zero downtime
 - Organizations with distributed contact centers that are looking for a high-quality packetized voice solution to save on facilities costs
 - Large organizations/governments that are looking for Layer 3 traffic segregation (by department, government ministry, network application), over a common infrastructure

- Nortel Multiservice Switch 15000 is ideal for:
 - Large enterprises, especially in the finance, government and utility sectors
 - Users who require a large backbone network and interfaces that range from channeled DS3/E3 to STM-16/OC-48
 - Large enterprises with mission-critical traffic, requiring a true "carrier grade" switch

Business Challenges

- Is cost control one of your top networking priorities?
- Are you currently running multiple services across multiple WAN links?
- Do you have a distributed network, either nationally or internationally?
- Is one of your largest concerns network reliability?
- Do you have a private PBX network with tie lines?
- Is administering your PBX network one of your largest operational costs?
- Do you have a distributed call center where reliable call handling is a must?
- Are you looking to save money in facilities costs?
- Are you looking for a solution that will optimize your bandwidth requirements?
- Are you a government body that would like to facilitate transactions and information sharing between departments and are looking for a private network-based IPVPN solution as a mechanism to do this?
- Are you looking at high bandwidth solutions (E3/DS3 to STM-16/OC-48) to meet your customer requirements?
- Is having a multiservice core switch a benefit to your business?

Nortel Multiservice Switch 7400 Series



Typical Applications

- T1 grooming at headquarters
- WAN for international contact center
- Backbone switching solution for branch access
- Voice/fax networking for PBXs
- Ethernet connectivity
- IP routing with COS/QoS
- Private network-based IPVPN services
- Layer 2 connectivity (e.g. ATM, frame relay) for existing data equipment/network
- Video conferencing

Key Points

- **Network convergence** – Nortel Multiservice Switch 7400 provides convergence for ATM, voice, fax, video, LAN and data services across a single network link.
- **Bandwidth savings** – Achieve bandwidth savings through dynamic bandwidth allocation, voice (8K) and data compression, silence suppression, fax demodulation and optimized LAN access protocols.

- **High voice quality** – Nortel Multiservice Switches allow for TDM voice quality over ATM, supporting a wide range of signaling protocols, codecs, voice features and COS and priority queuing.
- **QoS optimization** – Nortel Multiservice Switches support multiple priority system (MPS) to allow dynamic traffic management based on application characteristics and QoS priorities.
- **Scalability** – The high density DS1/E1 MSA32 FP and the 4-port DS1/E1 MVPe FP provide scalable, flexible, cost-effective multiservice and voice solutions. Network-wide, Nortel Multiservice Switch 7400 can support thousands of nodes.
- **Low cost of operations** – Nortel Multiservice Switch 7400 supports switched virtual circuits, avoiding a large number of provisioned connections and dynamically providing the best available traffic path.
- **Capacity** – Nortel Multiservice Switches PVG converts conventional circuit-switched voice traffic to packet voice for Succession network evolution.

Features and Technical Specifications

ATM services	• SVCs, SPVPs, SPVCs, PVPs, and PVCs • UNI 3.0, 3.1, 4.0 with interworking ILMI 4.0 • Point-to-multipoint (logical and spatial) • Inverse multiplexing over ATM (IMA) n x DS-1/E1 • VPT (Virtual Path Termination)
ATM traffic management services	• ATMF service categories: CBR, VBR (rt/nrt), UBR, UBR with MDCR Shaping and UPC enhancements • Dual leaky bucket traffic shaping (inverse UPC) • Separate statistics for GCRA1 and GCRA2 UPC violations
Congestion management	• EPD/PPD/LPD, W-RED (per connection, virtual circuits in virtual path) • AAL5 auto detection
Advanced queuing and scheduling	• Eight quality of service classes per link/channel • Per connection WFQ (weighted fair queuing) for each class
Performance monitoring	• Cell loss ratio, availability ratio, cell transfer delay
ATM networking	• PNNI, AINI, IISP • SPVCs and SPVPs across UNI, AINI, PNNI, and IISP interfaces • H-PNNI support • PNNI DBR (Domain-based rerouting) • PNNI path and connection trace • Specified paths over PNNI and H-PNNI • PNNI over IMA
MPLS networking	• Signaling (LDP-DU, RSVP) • Routing protocols (OSPF, IS-IS)
Circuit emulation services	• ATM CES 2.0 (AAL-1) • Structured and unstructured services • PVCs, CES signaling over SVCs and SPVCs
IP services	• IPVPNs for intranet service, VPN access • IP class of service • Differentiated Services (RFC2474) • Routing protocols: OSPF, RIPv2, BGP-4, IS-IS • IPVPN over ATM (RFC2764) or MPLS (RFC2547) • Virtual local area network (VLAN) • Virtual Router Redundancy Protocol (VRRP) • IP accounting • IP Policing • MD5 authentication for OSPF, BGP, LDP
Frame relay services	• FR UNI and NNI (FRF.1, FRF.2) • (ITU-T, ANSI, Frame Relay and Vendor Forum) • Frame relay usage-based accounting and detailed statistics • X.121 and E.164 addressing schemes • PVCs and SVCs • Closed user groups (CUGs), signaled per DLCI and per port • SVC call redirection and hunt groups (FRF.4) • FR-ATM service and network interworking (FRF.8 and FRF.5) • Fragmentation and reassembly for delay reduction (FRF.12)
Packet voice services	• VoATM (AAL-1 or AAL-2) and VoIP options • Toll-quality voice encoding, ITU-T G.711 PCM, G.726 ADPCM or G.729 CS-ACELP • Silence suppression, comfort noise generation and dynamic downsampling • Congestion management • 56/64 kbps clear-channel fax and modem support • ITU-T G.165- and G.168-compliant echo cancellation: ITU-T G.164- and G.165-compliant tone detection • ETSI QSIG, Euro ISDN, NIS, CAS, and MCDN signaling 5

Interfaces	Control Processor with and without BITS interface
ATM UNI/NNI interfaces	8 port DS1/E1 IMA 3 port DS3/E3 2 and 3 port OC-3/STM-1 Single Mode and Multimode 2 port STM-1 electrical 2 port STM-1 electrical channelized (ATM, IMA, CES)
Circuit emulation	4 port DS1/E1 AAL1 2 port STM1 electrical channelized
Ethernet interfaces	6 port 10 Base-T 2 port 100 Base-T 4 port 10/100 Base-T 8 port 10/100 Base-T
Frame relay interfaces	8 port V.35 8 port V.11 4 port E1 4 port DS1/E1 channelized 8 port DS1 1 port DS3/E3 1 port DS3 channelized 1 port HSSI
Multiservice access interface	- Any service including ATM, FR, FRATM, FR-NNI, FR ISDN dialup, HTDS, AAL1 CES and IP, any channel 32 port DS1/E1 channelized 32 port DS1/E1 channelized with dual STM-1/OC-3 ports (Singlemode, Multimode) 32 port DS1/E1 channelized single slot
Voice interfaces	1 port DS1/E1/TTC2M 4 port DS1/E1/TTC2M - Voice Service Processor AAL2
TDM interfaces	2 port DS3/E3c 32 port E1
Server cards	VPN Extender
Architecture and capacity	- Multi-processor architecture - MSS 7480: 16-slot shelf, variant - MSS 7460: 8-slot shelf, variant - MSS 7440: 5-slot shelf, variant - MSS 7420: 3-slot shelf, variant 1.6 Gbps load sharing bus architecture
Packaging	MSS 7420 (DC only) - Complete shelf unit dimensions (h x w x d): 133 mm x 492 mm x 524 mm (5.25" x 16" x 21") MSS 7440 - Complete shelf unit dimensions (h x w x d): 445 mm x 267 mm x 559 mm (17.50" x 10.50" x 22") - Cabinet dimensions: 1969 mm x 610 mm x 693 mm (77.50" x 24" x 27.30") SS 7460 (DC only) - Complete shelf unit dimensions (h x w x d): 355 mm x 483 mm x 495 mm (14" x 19" x 19.5") MSS 7480 - Complete shelf unit dimensions (h x w x d): 972 mm x 483 mm x 553 mm (38.25" x 19" x 21.75") - Cabinet dimensions: 1969 mm x 610 mm x 693 mm (77.50" x 24" x 27.25") - Seismic cabinet (NEBS Zone 4) 1970 mm x 600 mm x 790 mm (78" x 24" x 31") - Universal Frame: 2120.50 mm x 600 mm x 600 mm (83.66" x 23.62" x 23.62")

Mounting options	- Nortel supplied cabinet or standard 19" EIA/IEC rack Power -48 VDC/-60 VDC nominal voltage - AC power option available
Standards compliance	- Safety - CSA C22.2 no. 950, EN 60950, UL 1950 EMC - EN 55022/FCC Part 15B Class A, EN 50082-1 - Seismic - Up to Zone 4

Nortel Multiservice Switch 15000



Typical Applications

Nortel Multiservice Switch 15000 supports similar feature sets available on the Nortel Multiservice Switch 7400 platform (same software stream), but with higher density and higher speed interfaces. Typical applications include:

- High capacity backbone switching for existing Nortel Multiservice Switch 6400/7400 networks
- IP routing with COS/quality of service (QoS)
- Private network-based IPVPN services for traffic segregation at Layer 3 (by departments, ministries, network applications) over a shared infrastructure
- Next generation voice for both core networking and/or packet voice gateway (PVG) VoIP/VoATM applications and full integration into the Nortel voice over IP Communication Server portfolio offering next-generation voice solutions
- Next-generation wireless for multiple access aggregation and packet core solutions that enable GSM, TDMA and CDMA networks to seamlessly evolve to 2.5G and 3G networks, i.e. GPRS, UMTS, CDMA2000
- DSL aggregation to easily handle high-volume traffic while preserving multiple QoS levels for simultaneous applications (voice and data over DSL)
- TDM traffic grooming to support channelled circuit emulation services (CES) and to provide an opportunity to displace legacy DCS solutions
- Optical Ethernet extension services across the wide-area network

- Multiservice over MPLS for rich network convergence options with the ability to “future proof” their networks at their own pace
- Layer 2 WAN interworking with traditional WAN technologies such as frame relay with emerging Ethernet-based services

Key Points

Nortel Multiservice Switch 15000 offers a high capability backbone solution with reduced complexity and capital costs, additional access options and peace of mind through a proven, highly secure solution.

- **Proven Reliability** – Designed to meet the most stringent networking requirements, Nortel Multiservice Switch 15000 provides equipment redundancy, hitless switchover, 1+1 protection for optical interfaces and 1:N sparing for electrical interfaces. One of its main differentiating features is that it supports hitless software upgrades for ATM media, eliminating one of the single largest contributors to network downtime.
- **Profitability** – Nortel Multiservice Switch 15000 is unique in its ability to provide advanced ATM, frame relay, IPVPN, MPLS and circuit-switched voice services all on a single platform reducing cost of ownership.
- **Platform evolution** - Nortel enables convergence of data, packet voice and wireless networks with interoperability options between key technologies (FR, ATM, IP/MPLS, Ethernet) so that the customer can evolve at their own pace.

Features and Technical Specifications

MSS 15000	
Dimensions	H – 83.66" (2125 mm) W – 23.62" (600 mm) D – 23.62" (600 mm)
Standards compliance	Bellcore: GR-1089 core, GR63-core Safety : CSA C22.2 no.950, EN 60950, UL1950 EMC: EN 55022/FCC Part 15B Class A Siesmic: Up to Zone 4
Power	48 vdc/-60 nominal voltage
Interfaces	ATM UNI/NNI interfaces • Unchannelized – DS-1/E1, IMA (nxDS1/nxE1), J2, DS-3/E3, OC-3c/STM-1, OC-12c/STM-4, OC-48c/STM-16 • Channelized – DS-3, STM-1 Frame relay interfaces • V.11, V.35, HSSI, DS-1/E1, DS-1ch/E1ch, DS-3, DS-3ch, STM-1ch IP interfaces • Ethernet: 10/100BaseT and Gigabit • Serial interfaces: V.11, V.35, HSSI, DS1/E1, DS3/E3 and STM-1 • Optical interfaces: OC-3/STM-1, OC-12/STM-4, OC-48/ STM-16 • VPN Extender Card circuit emulation and voice interfaces • DS-1/E1, DS-1ch/E1ch, DS-3, DS-3ch, DS-3ch TDM, DS-3,OC-3/STM-1 Structured and unstructured Multiservice access interface • MSA32, any service, any channel
ATM services	• SVCs, SPVPs, SPVCs, PVPs, and PVCs • UNI 3.0, 3.1, 4.0 with interworking • ILMI 4.0 • Point-to-multipoint (logical and spatial) • ATM (IMA) n x DS-1/E1 • VPT (Virtual Path Termination)
ATM traffic management services	• CBR, VBR (rt/nrt), UBR, UBR with MDCR
Shaping and UPC capabilities	• Dual leaky bucket traffic shaping (inverse UPC) and UPC • Separate statistics for GCRA1 and GCRA2 UPC violations
Congestion management	• EPD/PPD/LPD, W-RED (per connection, virtual circuits in virtual path) • AALS auto detection • Eight quality-of-service classes per link/channel • Per connection WFQ (weighted fair queuing) for each class
Performance monitoring	• Cell Loss Ratio (CLR), Availability Ratio (AR), Cell Transfer Delay (CTD)
ATM networking	• PNNI, AINI, IISP • SPVCs and SPVPs across UNI, PNNI, AINI, and IISP interfaces • H-PNNI support • PNNI DBR (Domain-based re-routing) • PNNI path and connection trace • Specified paths over PNNI and H-PNNI • PNNI over IMA
MPLS networking	• Signaling (LDP-DU, RSVP) • Routing protocols (OSPF, IS-IS)

IP services	• IPvPNs for intranet service, VPN access • IP class of service • Differentiated Services (RFC 2474) • Routing protocols: OSPF, RIPv2, BGP-4, IS-IS • IPvPN over ATM (RFC2764) or MPLS (RFC 2547) • Virtual LAN (VLAN) • Virtual Router Redundancy Protocol (VRRP) • IP accounting • IP policing • MD5 authentication for OSPF, BGP, LDP • Ethernet Line Service
Circuit emulation services	• ATM CES 2.0 (AAL-1) • Structured and unstructured services • PVCs, CES signaling over SVCs and SPVCs
Voice services	• VoATM (AAL-1 or AAL-2) and VoIP options • Toll-quality voice encoding, ITU-T G.711 PCM, G.729 ADPCM or G.729 CS-ACELP • Silence suppression, comfort noise generation and dynamic down speeding • Congestion management • 56/64 kbps clear-channel fax and modem support • TU-T G.165- and G.168-compliant echo cancellation: ITU-T G.164 and G.165-compliant tone detection • ETSI QSIG, Euro ISDN, NIS, CAS and MCDN signaling
Frame relay services	• FR UNI and NNI (FRF.1, FRF. 2) • ITU-T, ANSI, Frame Relay and Vendor Forum • Frame relay usage-based accounting and detailed statistics • X.121 and E.164 addressing schemes • PVCs and SVCs • Closed user groups (CUGs), signaled per DLCI and per port • SVC call redirection and huntgroups (FRF.4) • FR-ATM service and network inter-working (FRF.8 and FRF.5) • Multilink Frame Relay (MLFR) (FRF.16) • Fragmentation and reassembly for delay reduction (FRF.12)

Market Information

Nortel was the global market share leader in multiservice switching revenue for 15 consecutive quarters of year-end 2004, according to Synergy Research Group. With more than 45,000 systems shipped to over 1,500 customer networks, Nortel's Multiservice Switching family has proven field experience in delivering carrier-grade reliability and service flexibility for mission-critical enterprise and service provider networks worldwide. Nineteen countries and countless municipalities and government agencies around the world – including the Commonwealth of Kentucky, the Taiwan National Police Agency and the UK Ministry of Defense – rely on Nortel's Multiservice Switch portfolio to protect their critical data and reliably deliver services and information to their citizens.

Ordering Information

For further information, please contact your local Nortel representative.

> Nortel Multiprotocol Routers

The Nortel Multiprotocol Router portfolio provides wide-area network connectivity for networks of all sizes – from very small to very large. High performing, scalable and cost-effective, these solutions provide robust routing demanded by small enterprises and remote offices as well as network centers that support an extended network. The Nortel Multiprotocol Router 2430 is a compact branch office router, ideal for a small branch office. The Nortel Advanced Remote Node Router is designed for small to medium-sized remote sites that require multiprotocol LAN/WAN connectivity to support LAN-based client/server and/or legacy SNA traffic. Nortel's Multiservice Access Switch 4400 Series (formerly Passport 4400) provides powerful, efficient and reliable solutions to cost effectively and efficiently support new business applications. High-performance routing capabilities for large, bandwidth-intensive remote offices are provided by the Nortel Multiprotocol Router 5430, which supports numerous mission-critical applications. And growing remote offices and enterprise network centers will value Nortel's Access Stack Node Router, which supports up to 50,000 packets per second on 12 network interfaces. The Nortel Backbone Node Router line delivers all types of data across various network topologies for mid-range and large enterprise networks with larger regional and headquarters sites.

- Multiprotocol Routers
 - Nortel Multiprotocol Router 2430
 - Nortel Advanced Remote Node (ARN) Router
 - Nortel Multiservice Access Switch 4400 Series (4430, 4450, 4455, 4450)
 - Nortel Multiprotocol Router 5430
 - Nortel Access Stack Node (ASN) Router
 - Nortel Backbone Node Router
 - Nortel Backbone Link Node Router
 - Nortel Backbone Concentrator Node Router

Nortel Multiprotocol Router 2430



Overview

The Nortel Multiprotocol 2430 is a high-performance, flexible, yet low-cost branch office solution. Its flexible WAN and LAN options, small size and quiet operation make the Nortel Multiprotocol 2430 switch the ideal solution for any small branch office.

The Nortel Multiprotocol 2430 offers two WAN adapter module slots that provide an array of options for WAN requirements. The WAN modules support serial, ISDN BRI (S/T and U), V.34 modem and T1/FT1, E1/FE1 and 56K CSU/DSU selections. An autosensing 10/100 Ethernet LAN gives Nortel Multiprotocol 2430 users flexibility and investment protection. Nortel BayRS software offers extensive WAN services support, allowing the most cost-effective primary and back-up links usage for remote site applications. Nortel network management applications support comprehensive node configuration, monitoring and control. The Nortel Multiprotocol 2430 meets the business needs of flexible connectivity, ease of use and high performance for small branch environments at a cost-effective price.

Ideal For

Enterprise organizations that require multiprotocol branch access

Business Challenges

- Are you looking for a solution that will support your growing bandwidth requirements?
- Do you have limited network management expertise in your branch locations?

Typical Applications

- **High-performance, low-cost connectivity** – The Nortel Multiprotocol 2430 provides the performance, scalability and flexibility of much “bigger” multiservice access devices at an industry leading price.
- **Bandwidth management** - The Nortel Multiprotocol 2430 has software features that allow for reduced costs through bandwidth management (compression, QoS) and simple remote management and monitoring (through Nortel network management).
- **High-speed LAN/WAN** - The Nortel Multiprotocol 2430 ensures high-speed WAN communications for remote sites requiring

full and/or multiple T1/E1 services. The Nortel Multiprotocol 2430 supports the industry-wide migration to faster, multiple-dedicated and/or dial WAN links. Autosensing 10/100 Ethernet allows small branch offices to upgrade their LANs as they need.

Key Points

- **Value** – The Nortel Multiprotocol 2430 is a high performance, flexible, yet low-cost office router. Its sophisticated design, quiet operation and range of mounting options allow it to be used in any small office environment.
- **Performance** – The architecture of the Nortel Multiprotocol 2430 ensures concurrent execution of processor-intensive applications, with WAN bandwidth optimization, multiprotocol support, SNA network integration and remote office link security.
- **Connectivity** – the Nortel Multiprotocol 2430 meets a wide variety of connectivity needs by supporting an autosensing 10/100 Ethernet and up to two WAN ports. A PCMCIA console modem provides out-of-band remote management and diagnostics.

- **Investment protection** – the Nortel Multiprotocol 2430 provides ample performance and network interfaces.
- **Reduced cost of ownership** – By extending LAN and WAN interface flexibility and performance, the Nortel Multiprotocol 2430 delivers the highest level of investment protection of any available enterprise-access platform.
- **Comprehensive LAN/WAN support** – The Nortel BayRS software supports all major LAN protocols. Nortel BayRS also supports the major bridging protocols and WAN options, as well as the full range of dial services and SNA integration protocols.
- **Optimizing bandwidth management** – Optimized bandwidth via software compression, protocol prioritization, traffic filters and bandwidth aggregation deliver increased network performance and throughput.
- **Best-in-class network management** – The Nortel network management application, with embedded RMON support for all network devices, provides complete management solutions for the smallest remote office to the largest network center.
- **Pay-as-you-grow** – The Nortel Multiprotocol 2430 provides users with an access routing platform designed to support the growth of a remote office. Start with a single-LAN-by-single-WAN system, add a V.34 modem for analog backup, then upgrade to digital backup via ISDN BRI.

Features and Benefits

- **High performance at a low price** – With a 50 MHz processor and standard 16M DRAM, the Nortel Multiprotocol 2430 offers the features and performance of more expensive routers, but at a much lower price point. This makes the Nortel Multiprotocol 2430 the perfect solution for small branch offices with demanding network and budgetary requirements. Additionally, the Nortel Multiprotocol 2430's quiet operation, sleek enclosure and variety of mounting options allow it to be used virtually anywhere.

- **Simplified management** – The Nortel Multiprotocol 2430 simplifies configuration and management by using a variety of powerful tools, including EZ-Install, EZ-Update and Nortel network management. This eases the burden for IT staff and allows for centralized management and monitoring. The Nortel Multiprotocol 2430 supports the use of a Xircom PCMCIA “Realport” 56K V.90 modem for out-of-band remote management.
- **Flexible connectivity** – The Nortel Multiprotocol 2430's support for 10/100 LAN and a variety of WAN interfaces make it an ideal platform for remote sites with varied connectivity needs and LAN-based client/server traffic over frame relay, PPP, leased line, or dial-up links. Integrating transmission devices into the Nortel Multiprotocol 2430 chassis reduces the number of multivendor, separately managed devices and cabling.
- **Traffic management** – Comprehensive traffic management capabilities are provided to the Nortel Multiprotocol 2430 through the use of Nortel BayRS data compression, traffic prioritization, uniform traffic filters and differentiated services queue management services (DSQMS).
- **Remote installation and management** – remote installation of the Nortel Multiprotocol Router 2430 is simplified through the use of EZ Install and EZ Update, two software applications designed to simplify installations, reconfigurations and software updates from a central site.
- **HTTP-based monitoring** – The embedded Web server complements and extends the functionality of existing SNMP-based and command line interfaces (CLIs) such as site manager and the T1/BCC. The HTTP-based interface allows authorized Web browsers to access device management information for monitoring and troubleshooting.

Market Information

With a 50 MHz processor and standard 16M DRAM, the Nortel Multiprotocol Router 2430 offers the features and performance of more expensive routers, but at a much lower price point. The modular architecture of the 2430, along with the availability of a wide variety of

easily upgraded WAN adapter modules, assure an easy, cost-effective migration path for upgrading to the newest WAN access technologies. This makes the 2430 the perfect solution for small branch offices with demanding network and budgetary requirements.

Technical Specifications

Architecture	• Base module using Motorola MC 860T microprocessor • One 10/100 Ethernet • Two WAN adapter modules per base module • One PCMCIA modem slot • One PCMCIA flash memory slot
Connectivity	• Ethernet (RJ-45) • 10/100BASE-TX (RJ-45) • Serial (44-pin: RS-449/422, RS-232, RS-530, V.24, V.35, X.21) • ISDN BRI S/T (RJ-45) • ISDN BRI U (RJ-45: integral NT1) • 56/64 Kbps DSU/CSU (RJ-45) • T1/FT1 DSU/CSU adapter module (RJ-45) • E1/FE1 adapter module (RJ-45) • E1/FE1 adapter module (BNC) • V.34 modem (RJ-45) • PCMCIA 56K V.90 modem
Packaging	• Tabletop/wall-mount/rack-mount • Quiet, sleek enclosure • Kensington-compatible locking slot • AC voltage 100/240 VAC at 1.0 A maximum
Physical specifications	• Height: 3.4 inches (8.6 cm) • Width: 14.4 inches (36.7 cm) • Depth: 8.0 inches (20.3 cm) • Weight: 3.5 lbs
Environmental and regulatory	• Altitude: 0 to 8000 ft (0-2400 m) • Humidity: 10% to 95% (noncondensing) • Temperature: 32° to 122° F (0° to 50°C) • Safety: UL 1950, EN60 950, CSA 22.2 950, AS3260 • RFI/EMI: FCC Part 15, Class A, CISPR 22A, VCCI Class A, AS3548 Class A

Ordering Information

For further information, please contact your local Nortel representative.

Nortel Advanced Remote Node (ARN) Router



Overview

Nortel Advanced Remote Node (ARN) Router delivers a comprehensive set of branch office functionality, enabling organizations to achieve significant competitive advantages. Its modular design provides the capability to build highly flexible networks, delivers high performance throughput, and supports a wide range of field-upgradeable LAN and WAN options for data communication.

Ideal For

- The ARN is ideal for small to medium-sized remote sites that require multiprotocol LAN/WAN connectivity in support of LAN-based client/server and/or legacy SNA traffic.

Business Challenges

- Do you require Multiprotocol branch access routing with support for a wide range and number of interfaces?
- Do you need a solution that offers advanced IP multicast, VPN tunneling and extensive Quality of Service capabilities?

Typical Applications

- **Legacy traffic transport** – The Nortel Advanced Remote Node (ARN) Router provides up to nine serial interfaces, enabling remote site users to pass SNA and X.25 traffic over the multiprotocol backbone via X.25 PAD, Nortel DSLw for SDLC, transparent synchronous pass-through, BSC pass-through, polled Async and IPEX. These features reduce WAN costs through the consolidation of parallel links normally used in connecting remote and corporate locations.
- **Dual LAN capability** – All Nortel ARN Router models can be configured, either at the factory or as a field upgrade, with a second LAN interface. In addition to providing mixed LAN media support (fast Ethernet, Ethernet and token ring), dual-LAN capability allows small sites to configure two “communities” as separate LANs, providing network security via LAN firewall techniques.

- **High-speed WAN** – The high performance design of the Nortel ARN Router ensures high-speed WAN communications for remote sites requiring full and/or multiple T1/E1 services. The aggregate forwarding rate of the Nortel ARN Router easily supports the industry wide migration to faster, multiple dedicated and/or dial WAN links.

Key Points

- **Performance** – The Nortel ARN Router’s high-performance architecture ensures concurrent execution of processor-intensive applications, including SNA network integration (DLSw, APPN, SDLC), WAN bandwidth optimization (compression, prioritization, filters) and remote-office link security (filtering, encryption).
- **Integration** – Integrated WAN transmission device options include 56K or T1/E1/ FT1/FE1 DSU/CSUs, ISDN BRI with or without NT1 and V.34 modems.
- **Connectivity** – The Nortel ARN Router supports up to two LAN (fast Ethernet, Ethernet and/or token ring) and nine (WAN and/or legacy) interfaces.
- **Investment protection** – The future-proof design of the Nortel ARN Router provides ample performance and network interfaces for current and future application support.

Features and Benefits

- Extended interface density and flexibility; optimized bandwidth
- Supports high performance architecture (HPA)
- Advanced quality of service (QoS) and routing capabilities

Nortel Advanced Remote Node Router is a branch access router that provides enhanced connectivity and forwarding capabilities for remote locations. A Motorola 33 MHZ 68040 microprocessor ensures high forwarding and filtering rates, scaling up to 25,000 pps across each of its network interfaces. The Nortel ARN Router provides high-speed WAN connectivity, high interface density, legacy traffic transport, dial services, dual LAN support and available RMON hardware/software support.

The Nortel ARN Router delivers the performance and modularity to solve today's application needs and meets the increasing demands of the evolving corporate intranet. Its design integrates the functions of multiple devices to reduce the complexity of remote network management. As a result, the Nortel ARN Router significantly lowers the total cost of ownership and provides the highest degree of investment protection for enterprise networks.

Nortel Advanced Remote Node Router delivers a comprehensive set of branch office functionality, enabling organizations to achieve significant competitive advantages. Its modular design provides the capability to build highly flexible networks, delivers high performance throughput and supports a wide range of field upgradeable LAN and WAN options for data communication.

Market Information

The Nortel ARN Router is designed to maximize all aspects of an organization's inter-network investment. By extending LAN and WAN interface flexibility and performance, the Nortel ARN Router delivers the highest level of investment protection of any available enterprise access platform. With route forwarding throughput of up to 20,000 packets per second, the Nortel ARN Router can handle the most demanding remote branch applications with performance to spare. No other remote router can provide the range of integrated WAN devices, serial ports, and LAN interfaces as the modular ARN platform. Only the Nortel ARN Router provides users with an access routing platform designed to support the growth of your remote office.

Technical Specifications

Architecture	• Base module using Motorola MC68040 microprocessor • Two adapter modules per base module • One expansion module per base module • Two data collection modules-one per base module and one per-expansion module
Connectivity	• Ethernet (15-pin AUI connector, RJ-45) • Token ring (9-pin AU connector) • 10/100Base-TX (RJ-45) • 100Base-FX (ST) • Serial (44-pin: RS-449/422, RS-232, RS-530, V.28, V.35, X.21) • ISDN BRI S/T (RJ-45) • ISDN BRI U (RJ-45: integral NT1) • 56/64-kbps DSU/CSU (RJ-45) • T1/FT1 DSU/CSU adapter module (RJ-45) • E1/FE1 adapter module (RJ-45) • E1/FE1 adapter module (BNC) • V.34 modem (RJ-45)
Packaging	• Type: tabletop / wall-mount / rack-mount - AC voltage 100/240 VAC at 1.0 A maximum - Wall receptacle NEMA 5-15R (100/240 VAC) (for use in North America) • DC voltage • Input voltage -48 to 60.7 VDC ($\pm 20\%$) • Input current 1.5 A max. at -38 VDC • Height 2.80 in (7.12 cm) • Width 17.25 in (43.84 cm) • Depth 12.50 in (31.77 cm) • Weight 15 lb (6.80 kg)
Environmental and regulatory	• Altitude 0 to 8000 ft (0 - 2400 m) • Humidity 10% to 90% (noncondensing) • Temperature 32° to 122° F (0° to 50° C) • Safety UL 1950, TUV EN60 950, CSA 22.2 950 • RFI/EMI FCC Part 15, VDE 0878, limit B, CISPR 22B

Ordering Information

For further information, please contact your local Nortel representative.

Nortel Multiservice Access Switch 4400 Series



Overview

Nortel Multiservice Access Switch 4400 Series provides robust and flexible networking for all types of branch traffic. Voice, fax, video, LAN and other data services such as frame relay, SNA, SDLC, X.25, async and HDLC are carried over a choice of link options to provide efficient, reliable and easily-managed services for mission-critical, time-sensitive applications.

Ideal For

The Nortel Multiservice Access Switch 4400 Series delivers powerful, integrated multiservice networking for the enterprise. It is typically used as a central site solution for small to medium sized networks. The Nortel Multiservice Access Switch 4400 is also ideal for large enterprise or carrier networks, providing high performance branch access. Fully scalable, it is suitable for remote networks comprising as few as two nodes to as many as several thousands when deployed in conjunction with the Nortel Multiservice Switch 6400 or 7400 Series.

- Nortel Multiservice Access Switch 4430: the lowest cost solution for branch office termination
- Nortel Multiservice Access Switch 4450: added termination capacity for larger branch and small regional offices
- Nortel Multiservice Access Switch 4455: additional performance to address the needs of large regional and small central site requirements
- Nortel Multiservice Access Switch 4460: performance and voice termination capacity to address the central site requirements of small to medium-sized networks

Business Challenges

- Do you want to reduce your STD and ISD telephone charges? The Nortel Multiservice Access Switch 4400 allows the integration of voice and data networks to permit long distance calls to be carried over the data backbone with full voice quality.
- Do you want to consolidate all of your legacy data services? The Nortel Multiservice Access Switch 4400 allows legacy X.25, async, SNA and other proprietary host networks to be carried over a single network infrastructure.

Typical Applications

Nortel recognizes that deploying separate networks for voice, video and data is a challenging task. It leads to ineffective bandwidth use, application inflexibility and added complexity. The solution is network consolidation over a single platform. Network consolidation provides cost savings, improves business communications and increases efficiency. Nortel Multiservice Access Switch 4400 Series provides flexible networking for all types of branch office traffic over a single network infrastructure. Voice, fax, video, LAN and other data services such as frame relay, SNA, SDLC, X.25, async and HDLC are carried over a choice of link options to provide efficient, reliable and easily managed services for mission-critical applications.

Key Points

The Nortel Multiservice Access Switch 4400 Series adds value to enterprise networks through key benefits such as:

- Bandwidth savings – through dynamic bandwidth allocation, voice and data compression, silence suppression, fax demodulation and optimized LAN access protocols
- Branch office consolidation – for branch offices including voice, fax, video, LAN, SNA and data services across a single network link
- Scalability – supports thousands of nodes when used with the Nortel Multiservice Switch 6400 Series of ATM enterprise network switches
- Low cost of operations – based on switched virtual circuits, avoiding a large number of provisioned connections
- ClearVoice enables toll call savings while ensuring toll call quality
- VoFR and VoIP provide voice integration choices
- Scalability and convergence enabling business growth and new applications
- LAN interfaces including Ethernet 10BASE-T and Token Ring via legacy data module
- WAN interfaces including IP, Frame Relay, ISDN, and leased lines
- A range of connection speeds: 56K/64K CSU/DSU, T1 CSU/DSU, E1 DSU, and ISDN TA
- Legacy data support including SNA over Ethernet and Async over TCP

Features and Benefits

- Cost-effectiveness and scalability – ease of provisioning and maintenance using SVCs and SPVCs plus ongoing manageability simplified by integrated network management
- Integrated WAN solution end-to-end from a single vendor – Nortel Multiservice Switch 6400/7400 for high performance at large sites, Nortel Multiservice Access Switch 4400 optimized for lots of smaller branch sites – integrated solution
- Multiple classes of service (5), integrated for end-to-end QoS
- Priorities mapped to backbone ensure end-to-end quality and integrity
- Prioritization for various IP applications
- Key reliability and network assurance features
- Low-cost dial-backup for all traffic, integrated redundant power, commit and auto-rollback (s/w and config), backup and restore configurations; proven cost-effective mission-critical networks
- Award-winning voice services – proven voice quality
- Full 24/30 channels of the standard G.729 voice
- "Single-hop" call routing across the network

Technical Specifications

Chassis Features	
Form factor	Base card (Ethernet and serial port) 2 or 4 expansion slots 4460 5 slots 2 WAN, 2 Exp 1 PCMCIA Exp
Processor	4400 Motorola 68040 4455 Motorola 68060 4460 dual processors Motorola 860T and 860MH
Memory	16MB Flash 16MB DRAM
Power	AC / DC

Technical Specifications (continued)

Chassis Features	
Redundant power	Yes
Remote software download	Yes
Low-speed serial ports	30
High-speed serial ports	17
Voice Features	
VoFR	Yes
VoIP	Yes
VoATM	4430/50/55 – No; 4460 - yes
Analog support (max # ports)	Yes / 8
FXS, FXO, E & M	8 ports configurable 4460 (FXS and E&M only)
Digital support	Yes
Digital (max # ch)	4430/50/55 – 30 4460 - 60
Compression type	4430/50/55 - G729 4460 - G729 A&B, G711
Signaling support	CAS, QSIG
Echo cancellation	4430/50/55 - 16ms (G165) 4460 - 16ms (G165 & G168)
Silence suppression	Yes
Fax support	24/30 channels + 2 analog or BRI 4460 - 60 channels
Fax demodulation	Yes
LAN protocols # of ports	4430/50/55 – 1 4460 - 2
Ethernet	4430/50/55 - 10BaseT 4460 2-pt 10/100BaseT
Token ring	Yes
Traffic protocols supported	IP, IPX, Appletalk thru bridging
Routing protocols supported	Rip1, Rip2, OSPF
RFC1490	Yes
Trunking Options	
Frame relay	Yes
ISDN	Yes
CSU/DSU	T1/E1, 56k

Chassis Features	
Leased line	Yes
Interface	RS-232, X.21, V.35, V.36
# of PVCs	24 per parent node
# of SVCs	255 SVC DLCIs per PVC
Interworking with WAN switch	Yes
FR/ATM interworking	Yes
Network management	SNMP Nortel Ethernet Switching Element Manager
End-to-end network management	Yes
QoS	End-to-end
Prioritization	4 classes, weighted fair queuing, IP prioritization
RSVP support for IP	No
Configuration	Embedded Webserver, command line

Ordering Information

For further information, please contact your local Nortel representative.

Nortel Multiprotocol Router 5430



Overview

Nortel Multiprotocol Router 5430 provides high-performance routing capabilities for large, bandwidth-intensive remote offices that have outgrown traditional branch office routers. With the ability to support concurrent, compute-intensive applications such as IP quality of service (QoS), IP multicast and compression, the Nortel Multiprotocol Router 5430 satisfies growing requirements for high-traffic, mission-critical applications. It also reduces WAN operating costs by incorporating features to integrate voice, video and data across a choice of WAN services.

Ideal For

- Organizations whose applications demand high bandwidth at remote sites
 - ATM on the WAN
 - Financial industry
- Vertical specific applications pushing large amounts of data
- Organizations whose applications require prioritization (QoS/COS)
 - Dramatic increase in traffic
 - Need more advanced traffic management (DiffServ, WFQ, WRED)
 - Need business-critical traffic prioritized over non-critical traffic
 - Using new latency-sensitive applications like VoIP
 - Want policy-based services across network infrastructure

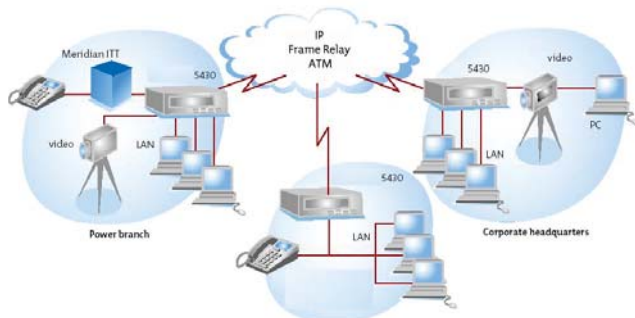
Business Challenges

- Are you looking to integrate voice, video and data applications across a common WAN circuit to reduce the recurring costs of WAN transmission services?
- Do you have heavy performance loads at your remote sites?

Typical Applications

- Multi-protocol branch access routing where a large range or number of interfaces is required
- Core router for small to medium enterprises
- A high-performance branch switch enabling wire speed LAN-to-LAN routing as well as high-speed connectivity back to the central site
- WAN modules that can be used as uplinks from other remote sites that use the Nortel Multiprotocol Router 5430, resulting in more efficient use of the higher speed links to the central site

Network Diagram



Key Points

- Robust routing with scalability, performance and QoS
- Supports multiple WAN technologies – including ATM T1/E1 and T3/E3, frame relay, PPP, and ISDN – to minimize bandwidth and connectivity costs and provide room to grow
- Voice/data convergence
- Flexible design
 - Modular configuration to match site requirements today and tomorrow
 - Interfaces configurable for changing applications
- Serviceability/manageability
 - Nortel Enterprise Network Management System, directory and policy services
 - All active components serviceable without removing chassis
- Control of life-cycle costs
 - Excellent price/performance
 - Investment protection
 - Exploit changing WAN service tariffs (ATM, PPP, FR, VPN)
 - Common and simplified operations reduce impact and costs

Features and Benefits

- **High performance platform** – This router handles heavy performance loads at remote sites. Its high-performance architecture supports concurrent execution of processor-intensive applications including WAN bandwidth optimization, SNA network integration, advanced peer-to-peer networking and remote office link security.
- **Reduced cost through multiservice integration** – It integrates voice, video and data applications across a common WAN circuit to reduce the recurring costs of WAN transmission services. Transport options include ATM T1/E1 and T3/E3, frame relay, PPP, T1/E1, ISDN and ATM circuit emulation services.
- **Simplifies maintenance and serviceability** – The Nortel Multiprotocol Router 5430, with its Advanced Remote Node WAN and PMC I/O modules, is simple to install and service, without opening the chassis.

- **Maximizes investment protection** – The modular architecture of the Nortel Multiprotocol Router 5430 meets the changing requirements of the remote office network.
- **Next-generation architecture** – Utilizing state-of-the-art silicon in a unique architecture, Nortel Multiprotocol Router 5430 is designed from the ground up as a flexible and high performing solution to address “power branch” requirements.
- **Advanced IP and multi-protocol routing**
- **IP QoS services**
 - Differentiated services (DiffServ)
 - Weighted fair queuing (WFQ), random early detection (RED) and weighted random early detection (WRED)
 - RSVP

Market Information

The Nortel Multiprotocol Router 5430 combines several technologies in a unique, multiservice WAN solution for Power Branch offices. These technologies, typically found individually in other products, leverage industry-wide acceptance and high-volume production to quickly deliver features to market at the best price for the application. At the core of the architecture is the telecom-qualified Compact PCI (cPCI) backplane, which provides a standard interface for interconnecting slots using packet, cell, or Time Division Multiplexing (TDM) technologies. Standard mechanical components assure a rugged and reliable product. The use of industry-qualified PCI, H.110 and Utopia bus interfaces drives down the price for this implementation. The PCI Mezzanine Card (PMC) further reduces the price of physical interface options, while delivering the configuration flexibility appropriate to a branch office application. With its high level of integration and high internal bandwidth, the Motorola Power QUICCII processor achieves optimal performance across several high-speed interfaces. The Passport 5430 brings these price-performance benefits to the market in a flexible package. Its mix of technologies will evolve to meet the expanding network requirements of the branch office.

Technical Specifications

Architecture	Base Chassis • Redundant power supply—Universal AC • Main processor board with dual FLASH, 1 PMC slot, dual 10/100 Ethernet • Three expansion modules per base module: 2 PMC slots per slot, 7 per system • Three ARN WAN modules • One V.34 ARN WAN console
Connectivity	10/100Base-TX: RJ-45 Adapter Modules • Serial Adapter Module: 44-pin: RS-449/422, RS-232, RS-530, V.28, V.35, X.21 • ISDN BRI S/T Adapter Module: RJ-45 • ISDN BRI U Adapter Module: RJ-45 integral NT-1 • 56/64 Kbps DSU/CSU Adapter Module: RJ-48-C • T1/FT1 DSU/CSU: RJ-48-C • E1/FE1: RJ-45 or BNC • V.34 Modem: RJ-45 PCI Mezzanine Cards • ATM T1/E1: RJ-48 • ATM T3/E3: mini-SMB • Dual Sync: 68-pin (2-port breakout cable)—X.21, V.35, RS-232, EIA 449, EIA-530 • Quad Serial: 120-pin (4-port breakout cable)—X.21, V.35, RS-232, EIA-449, EIA-530
Electrical Specifications	90 to 264 VAC
Operating Environment	Temperature 50° F to 95° F (10° C to 35° C) - Relative humidity 10%-90% noncondensing
Bandwidth Management	Compression • Protocol prioritization • COPS - DS • IntServ/RSVP • DiffServ Random Early Detection (RED) Weighted Random Early Detection (WRED) Weighted Fair Queuing Code Point Marking
Redundancy Features	Power supply • Virtual router redundancy protocol • Dial backup • Alternate path • Dual flash cards • Redundant interface
ATM	UNI 3.0/3.1/4.0 • UBR for data: AAL5 • CBR for Circuit Emulation Service: AAL1 • RFC 1577, 1483, 1490, and null encapsulation

Ordering Information

For further information, please contact your local Nortel representative.

Nortel Access Stack Node (ASN) Router



Overview

The Nortel Access Stack Node (ASN) Router is a stackable router architecture that provides cost-effective solutions for enterprise network centers. The Nortel ASN Router provides seamless integration of multiple ASN units stacked together and managed as a single router. Adding interfaces beyond a unit's capacity does not require replacing routers or adding complexity to the network.

An ASN stack supports up to 200,000 packets per second with up to 48 network interfaces. The Nortel ASN router supports all major network and bridging protocols, wide area services and IBM standards. Its fault-resilient system software ensures high network availability. Its LAN and WAN interfaces meet connectivity needs for remote and campus offices and its data compression co-processor provides compression over all WAN interfaces, reducing the number of circuits required to meet network bandwidth needs. The ASN satisfies connectivity, performance and availability requirements ranging from workgroup or remote site access to high performance, highly available network centers.

Ideal For

- Enterprise network centers
- Small to medium enterprises as a single node
- Large enterprises as a stacked node

Business Challenges

- Are you looking for a flexible, growth-oriented solution to meet the connectivity needs of your main and remote office locations?
- Is network availability and reliability important to your business?

Typical Applications

- Multiprotocol branch access routing where a large range or number of interfaces is required
- Core router for small to medium enterprises as a single node, for large enterprises as a stacked node
- Remote offices
- Large offices consisting of several LANs, SNA/SDLC devices, or high-speed LANs
- Network centers with application servers and services supporting an extended enterprise network

Key Points

- Ensures network availability
- Enhances network performance
- Extends network connectivity
- Simplifies network administration
- Provides low cost of ownership
- Scalable

Features and Benefits

- **Ensures network availability** – The ASN operates the Nortel suite of extensive, proven multi-protocol and IP services. The ASN maintains high availability through hardware and software fault isolation and recovery and online dynamic reconfiguration. The ASN's hot-swap capability supports replacement of individual ASN units within a stack. ASN stack configurations also support the use of multiple PCMCIA flash memory cards for redundant non-volatile storage of system software. Flash partitioning provides file system redundancy for single ASN configurations.

- **Hardware-based data compression co-processor net module** – The data compression co-processor net module offloads compression and decompression tasks from the main CPU. This module supports ISDN, PPP and frame relay links and is interoperable with hardware and software compression operating in other Nortel routers.
- **Stack packet exchange hot-swap (SPEX-HS)** – The SPEX-HS net module and cable combine to interconnect ASN base units together into a single router and allow any individual unit in an ASN stack to be removed from or added to the stack, without affecting the operation of the remaining units in the stack. The cable has four connectors that allow between 2 and 4 ASN units to be interconnected. Using an extra cable provides redundancy and higher bandwidth. The SPEX-HS net module operates the interconnect bus at 256 Mbps. When two SPEX-HS cables are used, the effective speed of the SPEX-HS is 512 Mbps.
- **Flexible network environments** – The ASN uses a highly scalable architecture, which provides cost effective, growth-oriented solutions for enterprise network centers.
- **High-performance processor** – The ASN's processor module maintains high filtering and forwarding rates. The ASN's 8, 16, or 32 megabytes of DRAM is configurable to support buffers that prevent traffic overflow and network delays. The ASN's optional 256 KB fast packet cache increases forwarding performance. The ASN supports a standard PC type 2 flash memory card for non-volatile storage of the ASN's system software, configuration file and event log. The flash can be locally divided into two partitions of equal size, or additional PC cards can be used to store back-up copies of the software image and configuration file. The ASN's processor module has four interface module (net module) positions for cost-effective network connectivity.
- **LAN and serial interfaces** – The ASN provides network connectivity via a selection of net modules. Redundant LAN interfaces and router features, along with redundant power supplies, ensure continued network operation.
- **Enhances network performance** – The ASN provides high-system performance up to 50,000 pps per ASN unit. A four-unit ASN stack supports forwarding performance up to 200,000 pps, with 512 megabits per second (Mbps) of bandwidth using dual network modules between ASNs. User-configurable DRAM and fast packet cache options optimize system memory requirements.
- **Extends network connectivity** – The ASN provides a cost-effective, entry-level solution for network centers. The ASN's unique "stackable" architecture supports up to 4 ASNs (with up to 12 network interfaces per unit) that can interconnect many networks.
- **Simplifies network administration** – An ASN stack of any size is managed as a single device in the network. As the ASN stack expands, the workload of network operations staff does not increase to support the router. The ASN requires only one software image and configuration file.
- **Provides low cost of ownership** – The ASN reduces equipment costs with features such as high port densities and integrated MCT1, CSUs/DSUs. The ASN also supports large numbers of virtual circuits in a single node. Data compression further reduces the number of required circuits. ASNs allow multiple individual routers to be interconnected to create a single multiprocessor router. This inherent scalability allows future needs to be addressed.

Technical Specifications

Architecture	• Processor module based on Motorola 68040 microprocessor • Four net modules per processor module • Four-unit stack configuration via SPEX-HS • Symmetric, multiprocessor architecture with multiple units • 256 Mbps, processor interconnect with SPEX-HS • 512 Mbps, processor interconnect with two SPEX-HS • 32 context, hardware compression co-processor net module • 128 context, hardware compression co-processor net module
Connectivity	• Ethernet interface (15-pin AUI connector or 8-pin modular) • Token ring interface (9-pin MAU connector) • FDDI (two MIC, one RJ-11 optical bypass) • Synchronous interface (44- and 50-pin connector to RS-422, RS-232, V.35, X.21 adapter cable) • ISDN BRI and ISDN PRI • 100BASE-T interface (40-pin MII connector or 8-pin modular) • MCT1 (RJ-48C, 15-pin, DB connector) • MCE1 (BNC, 75 ohm, 8-pin modular, 120 ohm)
Packaging redundant	Tabletop/rack mount
Dimensions (H x W x D)	10.99cm x 44.45cm x 43.18cm 4.33" x 17.50" x 17.00"
Weight	12.30kg 27 lb
AC voltage	100-240 VAC at 4.0 A max (50-60 Hz)
Wall receptacle	NEMA 5-15R (100-240 VAC, for use in North America)
DC voltage requirements	Input voltage – 48 VDC Input current – 8.5 A max Inrush current – 60 A max
Altitude	0-2,400m 0-8,000ft
Humidity	20%-80% (non condensing)
Temperature	0°C-40°C 32°F-104°F
Safety	UL 1950, TUV EN60 950, CSA C22.2 #950
RFI/EMI	FCC Part 15 Class A, EN55022 Class A

Ordering Information

For further information, please contact your local Nortel representative.

Nortel Backbone Node Router



Overview

Nortel's industrial strength Nortel Backbone Node Router consists of the Backbone Link Node (BLN) and Backbone Concentrator Node (BCN) – multiprotocol routers designed to satisfy the high performance and availability requirements of the most demanding mission-critical backbone inter-networks.

The Nortel Backbone Node Router family delivers enhanced network performance and availability, multivendor interoperability and investment protection. It features a symmetric multiprocessor architecture that uses multiple MC68040- or MC68060-based fast routing engine (FRE) processors, multiple dual PowerPC microprocessor-based ATM routing engine (ARE) processor modules and a 1 Gbps parallel packet express (PPX) to deliver industry-leading performance and availability. Configured with Nortel Routing Services software, the Nortel Backbone Node Routers provide multiprotocol routing and bridging to maximize connectivity and interoperability in multivendor, multiprotocol environments. Comprehensive hardware and software redundancy features provide complete fault resiliency, while dynamic reconfiguration and hot-swap features allow on-line changes in hardware and software configurations.

Ideal For

- Medium to large enterprises with mission-critical backbone networks
- Medium to large network centers or large regional offices
- Multivendor, multiprotocol environments

Business Challenges

Large networks require a high-performance, scalable routing device capable of delivering all types of data quickly and efficiently, over any network topology, with no interruptions in service. Routers in these distributed environments must also provide all the necessary wide area network (WAN) interfaces, while delivering the highest possible throughput across expensive WAN bandwidth. Investments in features like multicasting and quality of service (QoS) mean that organizations need their router to perform at optimal levels well into the future.

Typical Applications

Combining comprehensive local, wide area and ATM connectivity with high performance and availability, the Nortel Backbone Node Routers satisfy all the requirements for data center routing applications. Nortel Backbone Node Routers complement the Nortel Access Stack Node (ASN) Router, Nortel Advanced Remote Node (ARN) Router and Nortel Ethernet Routing Switches 2430 and 5430 to satisfy all connectivity, performance and availability requirements ranging from cost-effective workgroup or remote-site access to high performance, highly available network centers.

The Nortel Backbone Node Router meets the needs of large network centers; it provides full redundancy for continuous network availability, 13 slots support up to 104 WAN interfaces and performance that scales to 5 million pps. The Nortel Backbone Node Router's redundant line cord (RLC) configuration allows sites to connect two power sources to the Nortel Backbone Node Router for enhanced system redundancy, additional resiliency and high availability.

The Nortel Backbone Node Router meets the needs of medium network centers or large regional offices. It is available with or without redundant power supplies. Four slots support up to 32 physical network interfaces and performance scales to 1.5 Mpps.

Key Points

- **Enhances network performance** – Nortel Backbone Node Routers deliver the performance required for the most demanding inter-networks using fast Ethernet, gigabit Ethernet, FDDI, ATM and SNA backbones. Their symmetric multiprocessor architecture, based on multiple routing engines and the 1 Gbps parallel packet express (PPX) processor, delivers the highest performance in the industry – up to 5 million pps of aggregate forwarding. The ATM routing engine provides exceptionally high-performance virtual network routing in ATM-based switched internetworking architectures, supporting up to 2,000 simultaneously active virtual circuits and wire-speed routing between virtual LANs.
- **Increases network availability** – Nortel Backbone Node Routers set the standard for network availability required for mission-critical applications in multiprotocol environments. High availability is made possible by the high-performance SMP architecture, along with hardware redundancy options, fully distributed system software and comprehensive fault management capabilities. Dynamic reconfiguration and non-disruptive operational servicing (hot-swap) allow online changes in hardware and software configuration. Support for redundant AC line cords, power supplies, network interfaces and routers seamlessly yield the highest levels of network availability.
- **Protects network investments** – The Nortel Backbone Node Routers underscore Nortel's commitment to delivering enterprise scale, standards based products. For example, the same link modules are used in the 4-slot BLN and in the 13-slot BCN routers. This high level of interoperability and compatibility protect investments in both products and maximize the valuable expertise of highly trained IT staff.

Features and Benefits

Both members of the Nortel Backbone Node Router family scale to meet the throughput and connectivity requirements of the largest networks. Providing aggregate system-forwarding performance that scales to five million packets per second (pps), the Nortel Backbone Node Router supports up to 104 WAN interfaces, 52 local area network (LAN) interfaces and 13 ATM or fiber distributed data interfaces (FDDI). The Nortel Backbone Node Router supports forwarding speeds of over 330,000 packets per second (pps), via up to 32 WAN interfaces, 16 LAN interfaces and 4 ATM or FDDI interfaces.

Both routers feature comprehensive hardware and software redundancy options for the utmost in fault resiliency under all conditions. Utilizing Nortel routing services multiprotocol routing services, the Nortel Backbone Node Router facilitates interoperability in multivendor environments with support for major network and bridging protocols and wide area services.

LAN connectivity includes Ethernet/802.3, 4 and 16 Mbps token ring/802.5, FDDI, and 100/1000Base-T. Wide-area connections are provided through synchronous lines operating from 1200 bps to 52 Mbps, including fractional T1, T1/E1, HSSI and DSOA support. ATM networks can operate at up to 155 Mbps when connected using a SONET/SDH STS-3/STM-1 interface.

- **Industry-leading performance and scalability** – Innovative software architecture increases performance and provides complete fault resiliency by distributing network tasks among multiple processor modules, while confining computer memory-intensive tasks to a single processor module. High port density for the largest networks is combined with unmatched performance.

- **Optimizing WAN bandwidth** – Industry-leading hardware and software compression delivers a scalable solution that can be deployed across any Nortel Backbone Node WAN link interface. Nortel hardware compression can compress up to 60 Mbps of data, freeing up processing cycles to perform advanced functions like priority queuing and traffic filtering.
- **Unparalleled interoperability** – Committed to standards-based products, the Nortel Backbone Node Routers are fully interoperable across Nortel product lines to provide for compatibility and investment protection.
- **Unsurpassed scalability** – The Nortel Backbone Node Router's symmetric multiprocessor architecture incrementally adds processing power with each link interface. Supporting up to 5 million packets per second (pps) of aggregate forwarding and offering high-performance connectivity for up to 104 WAN interfaces per router including up to 52 T1 interfaces, the Nortel Backbone Node Router family meets the demands of the most mission-critical applications in any network center.
- **Comprehensive LAN/WAN support** – Nortel Routing Services supports all major LAN protocols (IP, IPX, AppleTalk, DECnet, OSI, VINES, ST-II and XNS); all major WAN options (frame relay, ATM, ISDN PRI, X.25, HDLC, PPP multilink, SMDS and SDLC); dial backup, bandwidth-on-demand and dial-on-demand, as well as bridging and IBM's DLSw, APPN (with HPR) and synchronous pass-through enabling the Nortel Backbone Node Router to adapt to almost any network environment.
- **Superior network management** – Nortel's family of network management tools provides comprehensive router management solutions for various platforms. Device management support is included in the Nortel command console (NCC) and embedded Web server to perform configuration, troubleshooting and monitoring.
- **Optimizes network performance** – Nortel symmetric multiprocessor architecture delivers the highest performance in the industry – up to 5 million pps forwarding throughput.
- **Reduced WAN costs** – WAN optimization features such as hardware and software-based data compression, priority queuing, uniform traffic filters and bandwidth aggregation significantly reduce WAN costs.
- **Delivers enhanced IP services** – Nortel is an industry leader with advanced IP services such as progressive traffic management, policy management and internetworking services to deliver highly optimized IP networks. Nortel routing services provide advanced security through IPSec interoperability with Nortel VPN, bi-directional NAT support, IPSec/NAT forwarding filters and RADIUS enhancements for SecureID.
- **Proven layer 3 solutions** – Fully integrated virtual LAN (VLAN) support with Nortel Ethernet Switches and Nortel Ethernet Routing Switch 8600 layer 2/3 switches deliver multiprotocol migration and WAN remote office concentration. In addition, Nortel provides differentiated services (DiffServ) and virtual router redundancy protocol (VRRP) support.

Technical Specifications

	BLN	BLN 2	BCN	BCN RLC
Physical Dimensions	BLN: (H) 8.7 inches x (W) 19.0 inches x (D) 19.7 inches; [(H) 22.1 cm x (W) 48.3 cm x (D) 50.0 cm]]	(H) 14.0 inches x (W) 17.3 inches x (D) 22.9 inches; [(H) 35.6 cm x (W) 43.9 cm x (D) 58.2 cm]]	(H) 24.4 inches x (W) 19.0 inches x (D) 19.7 inches; [(H) 62.0 cm x (W) 48.3 cm x (D) 50.0 cm]]	(H) 24.4 inches x (W) 19.0 inches x (D) 19.7 inches; [(H) 62.0 cm x (W) 48.3 cm x (D) 50.0 cm]]
Type	Tabletop/ Rack-Mount	Tabletop/ Rack-Mount	Rack-Mount	Rack-Mount
Weight	65 lbs	125 lbs	210	210
Power Supplies	1 AC	1-2 AC or DC 1-4	AC or DC	4 AC
Base Unit Options	BLN Base Unit: Includes a 4-slot BLN chassis with one SRM-L, one Flash memory card, an integral 620-watt power supply, and documentation. Nortel Multiprotocol Router software suite.	BLN-2 Redundant Base Unit: Includes 4-slot BLN-2 chassis with one SRM-L, one Flash memory card, two 620 watt power supplies, and documentation. Nortel Multiprotocol Router software suite. BLN-2 Redundant DC Base Unit: Includes a 4-slot BLN-2 chassis with one SRM-L, one Flash memory card, two -48 V dc power supplies, and documentation. Nortel Multiprotocol Router software suite. BLN-2 Non-redundant Base Unit: Includes a 4-slot BLN-2 chassis with one SRM-L, one Flash EPROM card, a 620-watt power supply, and documentation. Nortel Multiprotocol Router System software suite.	BCN Base Unit: Includes a 13-slot BCN chassis with one SRM-L, one Flash memory card, one 620-watt power supply, and documentation. System software includes the Nortel Multiprotocol Router software suite. BCN DC Base Unit: Includes a 13-slot BCN chassis with one SRM-L, one Flash memory card, a -48 Vdc power supply, and documentation. System software includes the Nortel Multiprotocol Router software suite.	BCN RLC AC Base Unit: Includes a 13-slot BCN chassis with a SRM-L, SRM-F, and four 620-watt power supplies. BCN RLC AC Spare Chassis: Includes a 13-slot BCN chassis. Power supplies and SRMs must be ordered separately
System Hardware Redundancy Options	Redundant System Resource Module (SRM-F) Additional AC or DC power supply 16M Flash Card spare-formatted			

Technical Specifications (continued)

	BLN	BLN 2	BCN	BCN RLC
Connectivity				
LAN Interfaces (Max)	• Gigabit - 4 • (4) 10/100Base T - 16 • 100Base-T - 8 • Ethernet - 16 • Token Ring - 16 • FDDI - 4 • ATM - 4	• Gigabit - 4 • (4) 10/100Base T - 16 • 100Base-T - 8 • Ethernet - 16 • Token Ring - 16 • FDDI - 4 • ATM - 4	• Gigabit - 13 • (4) 10/100Base T - 52 • 100Base-T - 26 • Ethernet - 52 • Token Ring - 52 • FDDI - 13 • ATM - 13	• Gigabit - 13 • (4) 10/100Base T - 52 • 100Base-T - 24 • Ethernet - 52 • Token Ring - 52 • FDDI - 12 • ATM - 10
Serial Interfaces (Max)	• Synch (RS-449, RS-422, RS-232, V.35, X.21 - 32 • Synch with Compression Co-processor - 32 • HSSI - 4	• Synch (RS-449, RS-422, RS-232, V.35, X.21 - 32 • Synch with Compression Co-processor - 32 • HSSI - 4	• Synch (RS-449, RS-422, RS-232, V.35, X.21 - 104 • Synch with Compression Co-processor - 104 • HSSI - 13	• Synch (RS-449, RS-422, RS-232, V.35, X.21 - 104 • Synch with Compression Co-processor - 96 • HSSI - 11
ISDN PRI/Multichannel T1	• Dual - 8 • Quad - 15		• Dual - 26 • Quad - 52	• Dual - 24 • Quad - 52
ISDN PRI/Multichannel T1	8	8	26	24
Power Requirements	BLN AC: AC Voltage 100-120 V AC at 10 A min. 200-240 V AC at 5 A min. NEMA 5-15R (110-120 V AC) NEMA 6-15R BLN: 48 V dc Power Supply Requirements Input voltage: -41 to -58 V DC Input current: 63 A max. Inrush current: 80 A peak max.	BLN-2: 1-2 AC or DC 1-4; AC Voltage 100-120 V AC at 12 A min. 200-240 VAC at 6 A min. 2 NEMA 5-15R (110-120 V AC) 2 NEMA 6-15R (200-240 V AC) BLN-2: 48 V dc Power Supply Requirements Input voltage: -41 to -58 V DC Input current: 63 A max. Inrush current: 80 A peak max.	BCN: AC voltage 200-240 V AC at 13A 100-120 V AC at 16A NEMA L6-20R (USA) IEC 309 16A (Europe) NEMA L5-20R (USA)	BCN RLC: AC voltage AC wall receptacle required NEMA L6-20R (USA) IEC 309 16A (Europe) (200-240 V AC)
Environmental and Regulatory Specs	Altitude: 0-8000 ft (0-2400 m) Humidity: 10%-90% (non-condensing) Temperature: 32 °-104 °F (0 °-40 °C) Safety: UL 1950,TUV EN60 950, CSA 22.2 950 RFI/EMI: FCC Part 15-J Class A, VDE 0871/0878			

> Nortel IP Services Routing Portfolio

Nortel IP Services Routing Portfolio offers unique benefits for enterprises, service providers and government organizations that need a scalable, resilient, secure solution to deploy a multitude of applications. In fact, the Nortel IP Services Routing Portfolio is the only true convergence platform available today for large enterprises and data service providers. Any large organization will benefit from the portfolio's numerous benefits, including universal aggregation to deploy broadband services; easy deployment into large network-based IP VPNs; a suite of IP security services to protect the network and its users; and much more.

- Nortel Services Edge Router 5500

Ordering Information

For further information, please contact your local Nortel representative.

Nortel Services Edge Router 5500



Overview

The Nortel Services Edge Router 5500 is an industry-leading IP services switch that combines both network transport services and high-touch IP services in a single platform. It is the only true convergence platform available to large enterprises and data service providers today.

For the enterprise, the Nortel Services Edge Router 5500 delivers industry-leading high-touch IP processing power for large mission-critical networks. It is designed to simplify network operation and reduce equipment costs while offering a host of important network based services, such as VPNs, traffic management and policing, quality of service (QoS), firewall and security services – all within a single device.

For service providers, the Nortel Services Edge Router 5500 brings IP services to broadband data access, just as the Nortel DMS-100 brought advanced call services to voice. Located at the network's edge, the Nortel Services Edge Router 5500 delivers scalable and reliable subscriber aggregation regardless of the access and transport technologies/protocols used in the customer network. The Nortel Services Edge Router 5500 then uses the power of its 100+ processors to provide advanced IP services to these subscribers. These network-based IP services include a dedicated firewall for each subscriber, secure IP VPNs (supporting intranet, extranet and remote access), advanced quality of service, network address translation (NAT) and personalized content delivery services.

Ideal For

- Large enterprises especially in the finance, utilities and hospitality industries that require a scalable, resilient and redundant solution to aggregate thousands of remote users and provide scalable IP VPN services
- Large enterprises that want to deploy a range of advanced IP and security services such as FW, intrusion detection and NAT without having to deploy and manage a multitude of discrete appliances
- Government organizations and government departments with the need for security and large-scale user management
- Service providers offering broadband services, access wholesale services, managed network-based IP-VPN solutions and managed IP security services

Business Challenges

Enterprises:

- Do you manage a large IP network with hundreds or thousands of users?
- How many discrete devices and applications do you need to manage to provide the set of services your company requires such as Internet access, IP security, remote access, QoS, IP-VPN, etc.? Would you like to consolidate and reduce the number of hardware platforms?
- Do you need to provide secure intranet, extranet and remote access for your customers, suppliers and for your mobile workforce? Would you like to consolidate this into an easy-to-manage, secure and centralized VPN solution?
- How much does your carrier infrastructure cost? Would you like to make your network independent of the underlying access technology and take advantage of services like xDSL and cable modem access?

- How much of your time is spent on adds, moves and changes in your network? Would you like to provide self-management capabilities to the employees in your company, your customers and your suppliers?
- How much do you know about the real-time performance of your network? Would you like to see up-to-the-minute statistics on the performance of all your VPNs and other network services in a centralized fashion?

Service providers:

- Do you need to provide broadband aggregation services on xDSL, cable or wireless networks scaling to thousands of users?
- Who is your target market for managed IP services? Would you like to expand it?
- Do you offer CPE-based IP services? What is your up-front investment per customer? What is your cost per truck-roll? What profit margin do you receive from selling IP services?
- If you sell access and broadband aggregation only, what is your customer turnover rate? What differentiates you from the competition?

- **Remote office aggregation** – with universal support of user technologies and centralized management from the Nortel Services Edge Router 5500, service providers deploying the Nortel Services Edge Router 5500 in the network to enable the provision of large-scale managed applications for the residential, SoHo, SME and corporate market
- **Universal broadband aggregation** – unique broadband aggregation and subscriber management services specifically for the DSL, dial-up, cable access and wireless access markets
- **Advanced wholesaling of access networks and IP services** – for access providers, expanded business models through a number of advanced wholesaling features
- **Advanced high-touch IP services** – a rich set of value added high-touch IP services – security, CoS/QoS and traffic steering, and customized content delivery – enabling service providers to grow their top line services revenue
- **Subscriber self-management and on-line reporting capabilities**

Typical Applications

Enterprises deploying the Nortel Services Edge Router 5500 in their network will enable centralization and rapid deployment of applications such as:

- **VPNs (VR- and/or MPLS-based)** – technology and access agnostic VPNs, with site-to-site, remote access, extranet access and firewall-enabled local Internet access options
- **Visitor-based networks** – flexible, secure and billable access for guests of the hospitality industry
- **Network-based security** – with stateful firewall, encryption, denial of service (DoS) protection, anti-spoofing and NAT
- **Differentiated services** – for special treatment of different organizations, departments and users and enforcement of QoS for applications such as VoIP

Key Points

- In the enterprise the Nortel Services Edge Router 5500 delivers industry leading high-touch IP processing power for large mission-critical enterprise networks. It is designed to simplify network operation and reduce equipment costs for the enterprise while offering a host of important network-based services, such as virtual private networks (VPNs), traffic management and policing, quality of service (QoS), firewall and security services from within a single device. Its universal access capabilities enable rationalization of network connections in the enterprise network operations center (NOC), while its robust processing power enables granular policy enforcement to the end-user level. The Nortel Services Edge Router 5500 is

equipped with a rich set of network-based security features such as stateful firewall, denial of service (DoS) protection and network address translation (NAT). It also is designed to enable flexible network-based IP-VPN options, with support for both virtual router/IPSec and MPLS tunneling options.

Traffic management, tiered services and content management are also supported on the Nortel Services Edge Router 5500 platform - enabling the high degree of control required in support of demanding enterprise applications such as voice over IP. The Nortel Services Edge Router 5500 is also designed to enable centralized network management of all these services for greater operational simplicity for enterprise sites. With the network-based Nortel Services Edge Router 5500 as the enterprise's primary service mediation and delivery engine, network managers have the ability to control these services from a single device instead of multiple devices that may not be centrally located.

- In the service provider infrastructure the Nortel Services Edge Router 5500 has been the undisputed leader in IP service platforms since its inception in 1999. It delivers scalable, reliable and cost-effective advanced IP services and subscriber aggregation regardless of the network access and transport protocols/technologies. Capabilities of the Nortel Services Edge Router 5500 extend to virtualized stateful firewalls, IP-VPNs (intranet, extranet, remote access and MPLS based), advanced QoS and CoS, NAT policy-based routing and personalized content delivery.

Features and Benefits

- **Universal aggregation** – The Nortel Services Edge Router 5500 aggregation solution is unique in supporting a broad spectrum of subscriber types and access technologies. Its rich feature set and powerful hardware platform can lower the costs of providing broadband aggregation and subscriber management services specifically when selling the Nortel Services Edge Router 5500 into DSL, dial-up, cable and wireless service provider markets.

Subscriber types that can be terminated over the SER include PPPoE, PPPoA, IP over ATM, IP over frame relay, HDLC/PPP over frame relay, L2TP, IPSec, GRE, VLAN tagged and IP-Demux. The SER uniquely identifies each terminated subscriber and applies the pre-determined IP service policies according to the subscriber's profile. Universal aggregation allows service providers to offer concurrent broadband access services to multiple types of access networks, spreading the cost of aggregation services across different customer types. In situations where subscribers have purchased additional IP services, these services can be preserved on the SER as subscribers migrate from one type of access technology to the next. The benefit is reduced churn of the subscriber base. For PPPoA, PPP/L2TP and PPP/HDLC connections, bandwidth-on-demand services are also supported through multi-link PPP.

Unlike many broadband remote access servers in the market today, the Nortel Services Edge Router 5500 differentiates itself through its built-in IP services capability that enables seamless deployment of high-touch services to broadband subscribers. The service capacity of any broadband access network must grow along with the subscriber base. With its distributed architecture, the Nortel Services Edge Router 5500 can terminate

32,000 subscribers per chassis, or 128,000 subscribers per seven-foot rack. Because the SER is designed to support both aggregation and IP services, service capacity associated with subscription is not compromised.

- **Advanced wholesaling** – The Nortel Services Edge Router 5500 allows access providers to expand their business models through a number of advanced wholesaling features. Logical virtual routers, in the form of ISP contexts with independent administrative domains coupled with a flexible set of L2TP tunneling and switching capabilities, enable service providers to create different outsourced or self-managed wholesale models. These wholesale features are complemented by authentication mechanisms that are made equally flexible by the extensive use of subscriber templates and RADIUS-based configurations.
- **IP VPNs** – Enterprises have long been receptive to virtual private networks as a means of lowering the total cost of WAN connectivity. While IP-VPNs are often positioned as a lower cost alternative to layer 2 VPNs, the true value of IP-VPNs is the ubiquitous nature of the underlying TCP/IP protocol. Because IP has proliferated in private and public networks, an IP-based VPN can easily expand its boundaries from fixed sites out to individual users over the Internet. IP applications can also take full advantage of the network services uniquely designed for them, based on a set of pre-defined service policies. Ready for these applications and more, the Nortel Services Edge Router 5500 has been deployed to run some of the largest network-based IP-VPNs, including an industry award-winning offering.
- **Universal IP-VPNs** – The Nortel Services Edge Router 5500 network-based IP-VPNs or virtual private routed networks (VPRNs) can be rolled out rapidly and inexpensively to many enterprises over a common network of SERs. Functioning as either a provider edge router or label edge router, the SER supports various VPN

membership, VPN discovery and tunneling mechanisms, making it suitable for deployment in both IPSec-VPN and MPLS-VPN environments. With support for the Nortel VPN Client termination, both site-to-site and remote access VPNs can be offered as integrated services over a common Nortel Services Edge Router 5500 platform. This complete solution has the advantages of ubiquitous access and common policy control, allowing a VPN to grow without excessive cost and management overhead.

For enterprises that are not ready to outsource their remote access services, the Nortel Services Edge Router 5500 can also support L2TP tunneling as a virtual private dial-up network (VPDN) service. Through a comprehensive suite of capabilities over a common Nortel Services Edge Router 5500 platform, service providers can now offer a flexible set of network-based intranet, extranet and remote access IP-VPN services.

- **Additional IP-VPN services** – While the cost of IP-VPN deployment can be lowered through the Nortel Services Edge Router 5500 network-based offering, the value of these solutions can be increased by using the high-touch IP services already built into each system. A common set of network policies, variable for different sites or remote subscribers, can be applied dynamically at the SER before admittance into the destined VPRN. These network-based IP service policies can be related to private IP address usage, firewall rules, content filtering, traffic shaping and a host of other IP services. For example, a firewall policy can allow a VPN site to directly access the Internet without being routed through a firewall at the corporate headquarters, thereby reducing delay and a potential bottleneck.

While many network-based IP-VPNs are provisioned through route configuration and tunnel setup between VPN nodes, a Nortel Services Edge Router 5500-based VPRN leverages both its knowledge of VPN subscribers (during authentication), and the layout of the

SER-based network to offer network-wide intelligence. These can include intelligent meshing, a dynamic tunnel setup and tear-down mechanism based on existing VPN traffic, or network-wide VPRN accounting. Network level intelligence offers tremendous cost savings in the running and operation of universal IP-VPN services and is equally applicable for either IPsec- or MPLS-based IP-VPNs.

While the traditional IP VPN market focuses on only site-to-site connectivity, Nortel Services Edge Router 5500 enables service providers to add sophisticated remote access, extranet and simultaneous VPN plus Internet capabilities. Its full range of IP services can also be applied to enterprise end-users.

- **Advanced high-touch IP services** – The Nortel Services Edge Router 5500 provides a rich set of value-added high-touch IP services, enabling service providers to grow their top line services revenue. These include a wide range of security, CoS and traffic steering services.
- **IP security services** – Anchoring the Nortel Services Edge Router 5500 IP security suite is the industry's first network-based ICASA certified state aware firewall. The Nortel Services Edge Router 5500 state-aware firewall is centrally managed and provides a sophisticated user interface to define firewall rule sets. The Nortel Services Edge Router 5500 firewall is capable of tracking complex IP applications such as H.323 or SIP-based voice-over-IP services. By extracting key parameters from the associated control plane, consistent firewall policy filters can be applied to entire conversations instead of limited traffic flows. When configured properly, subscribers can also be protected from certain types of denial-of-service attacks. Over 2 million Nortel Services Edge Router 5500 firewall licenses have been sold since the first product shipment.

To complete the suite of IP security services, the Nortel Services Edge Router 5500 also supports anti-spoofing to prevent a hacker from impersonating legitimate users, NAT to protect user IP addresses and IPsec data encryption to protect data content in transition. For security management, logging can be enabled for these security services and that data can be fed into reporting systems for analysis.

Nortel Services Edge Router 5500 IP security services are complemented by a flexible set of authentication services via RADIUS, LDAP, proxy SecureID and CHAP/PAP negotiations for PPP subscribers. For security services such as content filtering, intrusion detection or anti-virus protection, Nortel continues to work with a number of industry leading partners to offer complete solutions for network-based deployments.

- **IP-CoS services** – As the networking community has realized that the quality of service (QoS) found in traditional connection oriented networks is impractical in IP networks, the industry has moved toward a more practical alternative: IP class of service (CoS). The concept behind IP CoS relies on the marking and classification of IP packets; then, nodes within the network can apply the necessary packet processing based on a number of traffic engineering techniques and queuing algorithms. Depending on transport infrastructure, the classified IP flows can also be mapped to QoS features that are associated with the underlying transport services. The Nortel Services Edge Router 5500 supports a full range of IP CoS features that can be combined to enable tiered services based on subscribers or applications. From a SER service provisioning perspective, the IP CoS services include diffServ marking, L3 traffic shaping and L3 traffic policing. The SER's traffic shaping implementation can be flow based or rule based, with optional rate limiting capabilities based on service class or

service connection. For traffic policing, both single rate three-color marker (SRTM) and two rate three-color markers (TRTM) are supported. Last but not least, the Nortel Services Edge Router 5500 can map its L3 classes to L2 ATM virtual circuits to take advantage of any underlying ATM QoS services. For Ethernet access, VLAN-based 802.1P priority mapping is also supported. The Nortel Services Edge Router 5500 IP CoS services are expected to play an increasing role in the support of certain time sensitive traffic over an integrated IP network and also in the support of service level agreements (SLA) for tiered services.

- **IP traffic steering services** – The Nortel Services Edge Router 5500 vision of network-based services includes present and future high-touch IP services. These value-added capabilities can range from dedicated server-based traffic processing to distributed content subscription and delivery networks. The underlying assumption is that a subscriber-aware broadband service node is ideally positioned to bridge subscribers to their desired network services and content, which in turn allows service providers to evolve their service offerings and business models. A number of IP traffic steering capabilities, also known as SER service delivery interfaces (SDIs), are designed into the Nortel Services Edge Router 5500 iSOS system to enable integration with service capabilities that are external to the SER. SDIs supported by SER iSOS today include Web steering (WS), policy based forwarding (PBF) and personal content portal (PCP). Web steering can be used to redirect HTTP-based traffic to a proxy, cache or content-filtering server external to the SER for related services. Since these services are typically not deployed locally to the SER, the Web steering SDI also incorporates automatic network address translation, support for up to 254 remote servers and a built-in service health-check.

Policy-based forwarding is an extremely flexible SDI supported on any physical or virtual interface. It allows a traffic policy to be set up for ingress traffic to bypass normal route lookup and forwards the traffic toward the pre-determined next-hop interface based on policy rule-match.

Personal content portal (PCP) is perhaps the most powerful SDI of all. An application that incorporates the PCP API set can transparently intercept a subscriber HTTP session and hold the subscriber captive, push a Web page to the subscriber, release the subscriber to the intended HTTP destination, or replace the subscriber service policies on a temporary basis. Because a timer function is built into PCP, the subscriber can be held captive at any time desired, which allows a service provider to have full control over subscriber services. Since PCP only provides the subscriber control mechanism for the PCP application, the power of PCP-based services is limited only by the creativity in the definition of the applications. The application can be as simple as pushing a welcome page to the subscriber, or as forward-looking as offering a selection of personalized content and on-demand network services.

Technical Specifications

Dimensions	• 19" (48.26 cm) width • 19.25" (48.9 cm) height • 11 RU - 4 per 7' rack • 18" (45.72 cm) depth
Weight	• 135 lb (61 kg) fully loaded • 39 lb (18 kg) empty
DC power	• 1500 watts fully loaded • -38V DC min to -60V DC max • 40 Amps
AC power	• 90 to 260 VAC @ 50 to 60 Hz • 60 Amps 16 Amps per input
Safety	• UL 1950, CSA 950, CE Mark
EMI	• FCC Part 15 Class A • EN 550 22A - Altitude • -197 to 10,000 ft (-60m to 3048 m)
General system characteristics	• 14 slots modular chassis at 622 Mbps or 1.2 Gbps full duplex operation • Logical backplane for non-stop operation • Hot-swap and redundancy support for all modules • Distributed DC entry (AC optional) • 4 systems per 7 foot telco rack
System modules	• One or two Control and Management Card (CMC) modules providing routing and management for the system, each equipped with 2 Fast Ethernet ports and 3 management ports (Serial, Aux, Fast Ethernet) • One or two 2.5, 5, or 10 Gbps non-blocking Switch Fabric Cards (SFC) with full per flow queuing • Up to 6 Subscriber Service Cards (SSC), each with up to 4 Subscriber Service Modules (SSMs) processor groups
Interface modules	• 4 port OC-3/STM-1 ATM (SM or MM) • 2 port OC-12/STM-4 ATM with optional APS (SM or MM) • 3 port DS3/E3 + 1 port OC-3/STM-1 ATM (SM or MM) • 4 port Channelized DS3 • 2 port Channelized STM-1 (SM or MM) • 1 port Gigabit Ethernet (SM or MM) • 8 port Fast Ethernet
Connectivity/access services	• RFC - 1661 PPP • RFC - 1662 PPP in HDLC-like Framing • RFC - 1973 PPP in Frame Relay • RFC - 1990 PPP Multilink Protocol • RFC - 2364 PPP Over AAL5 (or PPPoA) • RFC - 2516 PPP Over Ethernet (or PPPoE) • RFC - 2661 Layer Two Tunneling Protocol - L2TP – LAC/LNS – Intelligent tunnel switching and load balancing • RFC - 1490 Bridged/Routed IP Over Frame Relay (Now RFC 2427) • RFC - 1483 Bridged/Routed IP Over ATM (Now RFC 2684) – Independent bridged subnets – Bridge groups • RFC - 2401 IPSec • RFC - 2784 GRE • IEEE 802.1Q Virtual LANs • IPDemux • L2TP over IPSec • RFC 1542 - DHCP Relay • RFC 2138/2139 Radius

Technical Specifications (continued)

Routing services	• RFC – 1058 RIP v1 • RFC – 2453 RIP v2 • RFC – 2328 OSPF v2 • RFC – 1771 BGP v4 (including RFCs -1997, 1966, 2439, 1965) • RFC – 1142 IS-IS (Trunk only) • RFC – 2236 IGMP v2 Proxy
Authentication access services	• RFC – 2138, 2139 RADIUS • RFC – 2251 LDAP • Proxy SecureID (RSA Certified)
IP-VPN services	• VPN deployment models • Virtual Private Routed Networks (VPRN) — RFC 2764-based IP VR-VPNs • BGP/MPLS VPN : RFC 2547-based VRF-VPNs • Virtual Private Dial Networks (VPDN) • Virtual Leased Lines (VLL) • Remote Access VPN – Termination of Windows-based Nortel VPN Client – VPRN Topology Optimization: Intelligent Meshing, Hub and Spoke • Tunneling: L2TP, IPSec, L2TP/IPSec • Encryption: AES (128-bit), 3DES, DES • Hash Algorithms: SHA-1, MD-5 • Key Management Algorithm: Asymmetric cryptography, Diffie Hellman Group 1 (768 bits) and Group 2 (1024bits) • Encapsulation: ESP • ESP IPSec Mode: Tunnel Mode, Transport Mode (L2TP/IPSec only) • Control Path : IKA SA negotiation – Phase 1 — Main Mode, Aggressive Mode (for Nortel VPN Clients only) – Phase 2 — Quick Mode, with optional PFS • Authentication: Pre-shared keys for static tunnels, RADIUS for user authentication • Hub-spoke topologies with both MPLS and IPSec VPNs • Management VPNs for Managed CPE based services utilizing MPLS backbones • Explicit FEC—an intelligent mechanism to differentiate and prioritize between different traffic types in an MPLS VPN
Service Creation System (SCS) system specifications	SCS System server modules • Domain Server • Regional Server • LDAP Server • Pull Server • Log Server • CORBA Server • Service Management Center CNM Server SCS system interfaces • Command Line Interface (CLI) • SNMP (Agent and Proxy) • CORBA API • RADIUS • Accounting and Service Log Files (XML, Binary or ASCII formats) • Personal Content Portal (PCP) Software Development Kit

Market Information

Nortel solutions are the engines behind some of the largest network-based service provider IP-VPNs and award-winning DSL broadband services in North America, and are today provisioned worldwide. These solutions are meeting the evolving demands of vast carrier networks and individualized enterprise requirements alike.

Ordering Information

For further information, please contact your local Nortel representative.

> Nortel Optical Metro Platforms

Nortel Optical Metro Platforms are leading-edge, next-generation SONET platforms that offer DWDM with various services, including TDM, storage and Ethernet. The Nortel Metro Platform 6500 combines and extends the advantages of the market-leading Nortel Networks next-generation SDH/SONET and metropolitan DWDM platforms in a complementary manner. The Nortel Optical Multiservice Edge 6110 is an extension of the Optical Metro Platform 6500 that provides a compact and low-cost, multiservice CLE for aggregation and transport of TDM and Ethernet traffic over SDH or SONET networks. The Nortel Optical Metro Platform Series 3000 includes platforms that enable powerful and flexible SONET and Ethernet to be delivered to customer-premise environments. And the Nortel Optical Metro 5000 Series – including the 5100, 5200 and 5200 E/C – harnesses the power of DWDM to transparently deliver high-bandwidth network services across an open, scalable and survivable optical transport platform.

- Nortel Optical Metro Platform 6000 Series
 - Nortel Metro Platform 6500
 - Nortel Optical Multiservice Edge 6110
- Nortel Optical Metro Platform Series 3000
 - Nortel Optical Metro 3400 / 3500
 - Nortel Optical Packet Edge System
- Nortel Optical Metro Platform Series 5000
 - Nortel Optical Metro Cabinet 5100
 - Nortel Optical Metro Cabinet 5200
 - Nortel Optical Metro Cabinet 5200 E/C

Nortel Optical Metro Platform 6500



Overview

Nortel Networks Optical Metro Platform 6500 combines and extends the advantages of the market-leading Nortel Networks next-generation SDH/SONET and metropolitan DWDM platforms in a complementary manner. It is a global platform that can be deployed in both SDH and SONET environments supporting a broad mix of services ranging from E-1/ DS-1 private lines through STM-1/4/16/64 and OC-3/12/48/192 private lines and high-speed data connectivity. Next-generation data capabilities are offered for both Optical Ethernet (10/100 BaseT, 100FX, GE and 10GE) and optical storage connectivity (Fiber Channel and FICON). In addition, service-forecast tolerant, protocol- and bit-rate-transparent interfaces enable high-capacity multi-Gbps transparent wavelength services over existing SDH/SONET infrastructures.

As a next-generation optical convergence solution, the Nortel Optical Metro Platform 6500 enables enterprises to provision high-growth optical broadband services with the lowest total cost of implementation and operation. This is accomplished through:

- Convergence of Layer 0 (photonic), Layer 1 (SDH/SONET) and Layer 2 (packet) connection and bandwidth management functionality on a single platform
- Unrivalled switching flexibility and scalability, providing single-stage unconstrained 80 Gbps VC-12/ VT-1.5 to 160 Gbps VC-4/3 /STS-1 TDM capacity and granularity
- Very high-density data, optical and electrical interfaces that may be combined for industry leading, cost-efficient mixed-service applications
- Versatile optical and data service interface technology that enables service forecast-tolerant deployment of Layer 0/1/2 services through flex-reach, carrier-grade pluggable optics and remotely selectable bit-rates that vastly improve shelf utilization and align system costs with actual end-user demand

Ideal For

The Nortel Metro Platform 6500 can be deployed in several enterprise vertical applications, including healthcare, financial, education, government, utilities and manufacturing.

Typical Applications

- Full-rate and sub-rate storage extension (fiber channel and FICON) and gigabit Ethernet over SONET/SDH to extend reach between enterprise sites to 1000s of miles
- Real time disk mirroring using FICON or fiber channel or Gige
- Multiservice aggregation of voice, data and storage
- Link geographically dispersed enterprise's local area networks with any-to-any layer 2 connectivity and RPR
- Education: school districts, colleges, universities – converged voice, data and video network to deliver next-generation education applications
- Government: local, state and federal institutions – link together government, business and citizens
- Finance: financial service, banks, insurance companies – transport and store mission-critical financial data
- Healthcare: HMOs, hospital systems, health services – distribution and storage of medical imaging and records
- Manufacturing: high tech, automotive, publishing – scalable networks that enable collaborative file sharing and e-commerce

Features and Benefits

As a next-generation optical convergence solution, the Metro Platform 6500 enables service providers to provision both established services and emerging high-growth optical broadband services with the fastest time to revenue, lowest total cost of implementation and operation. The same values for convergence are made affordable to the business premises through the compact and cost-effective Nortel Optical Multiservice Edge 6110. This is accomplished through:

- Convergence of Layer-0 (photonic), Layer-1 (SONET/SDH) and Layer-2 (Packet) connection and bandwidth management functionality on a single platform
- Unrivalled switching flexibility and scalability, providing single-stage unconstrained 80 Gbps VC-12/VT-1.5 to 160 Gbps VC-4/3 /STS-1 TDM capacity and granularity
- Very high-density data, optical and electrical interfaces that may be combined for industry leading cost-efficient mixed-service applications
- Versatile optical and data service interface technology that enables service forecast-tolerant delivery of Layer-0/1/2 services through flex-reach, carrier-grade pluggable optics and remotely selectable bit-rates that vastly improve shelf utilization and align system costs with actual end-user demand
- Leveraging the large installed base of SDH/SONET networks through service enabling technologies, such as:
 - Standards-based packet adaptation to SONET/SDH through Resilient Packet Ring (RPR), Generic Framing Procedure (GFP), Virtual Concatenation (VCAT) and Link Capacity Adjustment Scheme (LCAS) for the efficient transport and management of high-speed data connectivity
 - Service Management Channel (SMC), for more effective service-level performance and fault monitoring and reporting to help define, report and enforce flexible service level agreements

- Automatically Switched Transport Network (ASTN) and Ethernet and Optical Internetworking Forum (OIF) User-Network Interface (UNI) capabilities to help service providers roll out dynamic and innovative high-growth optical broadband services
- Interworking with standard optical networks and complementary synergies with Nortel Networks optical and packet solutions to build a scalable and flexible dynamic optical foundation for delivery of high-capacity, differentiated data connectivity services
- Best-in-class compact platform for space and power efficiency – with up to 4 Optical Multiservice Edge shelves deployed on a standard ETSI (SDH) or ANSI (SONET) equipment rack

Market Information

As a next-generation optical convergence solution, Nortel Optical Metro Platform 6500 enables service providers to provision both established services and emerging high-growth optical broadband services with the fastest time to revenue and lowest total cost of implementation and operation. The Nortel optical solutions portfolio is enabling the next step in the transformation of optical networks worldwide. This evolutionary progression is moving service provider networks toward greater service diversity and customer responsiveness at sharply reduced cost points. These solutions enable scalable and flexible next-generation networks to be built on a foundation of market-proven technology and platforms that deliver on the promise of quality, reliability and security while opening a wide window toward new opportunities that await innovative service providers in the realm of services yet to be imagined.

Technical Specifications

Service Interfaces

The Optical Metro Platform can be configured for multiservice aggregation with the following service interface types supported.

Optical Interface Type	Ports/card	Ports/shelf	(protected)
STM-64/OC-192 IR2 (40 Km.)	1	12	(6)
STM-64/OC-192 LR+ DWDM (110 Km.)	1	12	(6)
STM-16/OC-48 SFP	2	24	(12)
STM-16/OC-48 LR+ (110 Km) DPO	2	24	(12)
STM-1/4 or OC-3/12 (per-port selectable)	8	96	(48)
GE/FC/FICON GFP pt-pt SFP	4	48	

Electrical Interface Type	Ports/card	Ports/shelf
E-1 (1:4 protection)	63	504
DS-3/EC-1 (1:4 protection)	24	192

SFP: Small form-Factor Pluggable optics supported include:

- STM-16/OC-48 15 and 80 Km reach variants
- STM-1/4/OC-3/12 15 Km reach
- STM-1/OC-3 80 Km reach
- TM-4/OC-12 80 Km reach
- GE/FC/FICON SX and LX

The OME also supports: DWDM pluggable optics (DPOs) for STM-16/OC-48.

Nortel Optical Multiservice Edge 6110



Overview

Nortel Networks Optical Multiservice Edge 6110 (OME 6110) is the first of a family of compact, low-cost multiservice access products optimized for deployment in customer sites and in collector networks where lower service capacity is required. It can be used to offer new Ethernet services to the metro edge, as well as traditional TDM services over SONET/SDH networks. OME 6110 is an extension of the Nortel Metro Platform 6500, offering service flexibility at the customer location with a smaller, more cost-effective footprint. The OME 6110 is integrated with the Nortel Networks optical network management, forming a complete end-to-end, fully managed solution. It is ideal for small offices and business parks that demand reliable and assured quality of service and flexible bandwidth availability.

Ideal For

The OME 6110 provides low-cost, multiservice aggregation and transport of client services over SONET/SDH networks. The compact size and cost-effective attributes – including the ability to reliably deliver simultaneous data and voice services to customer premises – make the OME 6110 an ideal solution for business access applications.

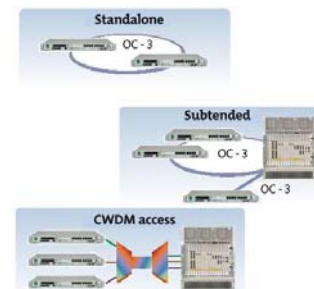
Typical Applications

The OME 6110 is ideal for small offices and business parks that demand reliable and assured quality of service and flexible bandwidth availability. The product is equally well suited for deployment in access or collector networks in remote and suburban areas with low capacity requirements, or as a transport component of wireless base stations.

The OME 6110 can be deployed in the following configurations:

- Standalone configuration: The OME 6110 can operate on a standalone network collecting DS1/E1, DS3/E3, and/or Ethernet and dropping them off at remote sites on the network.
- Subtended configuration: The OME 6110 can be subtended off of either Optical Metro 3000/4000 or Metro Platform 6500 shelves to collect DS1/E1, DS3/E3, and Ethernet traffic from the access edge to feed into the core of the network for further transportation.
- CWDM access: The OME 6110 combined with CWDM filters can send traffic on wavelengths to offer fiber relief and extended reach.

Network Diagram



Key Points

- Low-cost entry configuration for E1/DS1-only services
- In-service expansion for new services
- Cost-optimized and designed for CLE deployments
 - Minimal CPE rack space
 - No rectifiers required; built-in AC or DC power
 - Fits in 19-, 21-, and 23-inch racks
 - Front access cabling
- GFP, VCAT, and LCAS supported

Features and Benefits

The OME 6110 is a cost-effective, multiservice edge device that uniquely offers the following:

- **Evergreen service** — The OME 6110 supports legacy traffic as well as next-generation Ethernet on a single platform, allowing service providers to future-proof their SONET/SDH networks to accommodate increasing demand for Ethernet services.
- **Flexibility**
 - **Service flexibility** – Full service mix including SONET, SDH, and Layer 1/Layer 2 Ethernet
 - **Reach flexibility** – The OME 6110 uses small form-factor pluggable (SFP) optics for networking interfaces. Each platform can be configured and optimized for the distance requirements of a given application by inserting the appropriate SFP module.
 - **Protection flexibility** – Can be deployed with or without protection, in a standalone, subtended configuration or CWDM access model. Both 1+1 and UPSR/SNCP network protection protocols are supported.

- **Interoperability flexibility** – The OME 6110 can be networked with other OME 6110s or deployed as extensions of other Nortel Networks optical products. Specifically, the OME 6110 has been successfully tested for interoperability with Optical Metro 3000, 4000, and the Optical Multiservice Edge family of products.
- **Management flexibility** – TL-1 + SNMP northbound interfaces, OMEA/Optical Network Manager network management, and an HTTP Web-based Craft UI that runs directly on the network element. No craft software is required for the PC.
- **Data communication flexibility** – Can be managed over Open System Interconnection (OSI) or Internet Protocol (IP) DCC networks. 'Path' DCC is also supported for transparency across leased circuits.
- **Global support**
 - Supports SONET, SDH, and J-SDH on the same platform for in-territory and out-of-territory deployments
 - The OME 6110 also provides a lower total cost of ownership with low power consumption and built-in support for both AC and DC powering, removing the need for external rectifiers. Extensive fault monitoring and loop-back capabilities simplify troubleshooting and lower operational expenses.

Technical Specifications

Description	Multi-service chassis, customer-located equipment
Dimensions	H - 44 mm/1.8 in. (1U) x W - 445 mm/17.5 x D 270 mm/10.6 in.
Weight	Fully equipped: 5.1 kg
Standards	Safety EN 60950 • EMC GR-1089 CORE, EN55022 • Other compliances: ITU-T K.11, K.20, K.21, FCC68
Power	• AC power supply: 90V-240V 50/60Hz • DC power supply: 40-56VDC • Maximum power consumption: 30W (depending on service modules used)
Cooling Unit	• Dimensions: 204 mm x 32 mm x 20 mm • Flow: 0.08 cubic meter/minute • Inbuilt dust filter • Hot-pluggable
Mounting Options	• 19", ETSI and 23" rack mountable
Client Interface Modules Supported	The OME 6110 comes with a built-in support of 16 DS1/E1 in the base chassis. In the Optional Service Slot, it can support the following cards: • 28 x E1/DS1 • 8 x 10/100-Mbps Ethernet • 3 x E3/DS3 • 1 x STM-16/OC-3 • Gigabit Ethernet (future)
Network Interface	• STM-1/OC-3 network uplink • STM-4/OC-12 (future)
Architecture	• Non-blocking TDM fabric capable of aggregating VC-12/VT-1.5, STS/VC-3, and VC-4 mapped services to an OC-3 or STM-1 line interface
Management	• Ethernet Lan Interface or modem • TL-1 and SNMP northbound interfaces • Web-based Craft UI • Integrated Nortel Networks Optical Network Manager
OAM Interfaces	• LAN port to a data communications network (DCN) • RS-232/F1 port for modem access or for user byte access
Environmental Alarms	• Four telemetry outputs • Seven telemetry inputs

Nortel Optical Metro Platform Series 3000

Overview

The Nortel Optical Metro Platform Series 3000 is a family of market-leading next-generation SONET platforms that sets a new economic benchmark for cost reduction while providing differentiated data and storage services on existing networks. Its fully non-blocking switching architecture provides unmatched bandwidth management capabilities along with innovative service modules enabling the industry's highest density service termination without stacking multiple shelves. The Nortel Optical Metro Platform Series 3000 is equipped with resilient packet ring technology, generic framing protocol (GFP) service mapping, virtual concatenation (VCAT) and storage compression that enable efficient bandwidth utilization with a full suite of native rate client data and storage interfaces. The Nortel Optical Metro Platform Series 3000 is deployed by major service providers and enterprises and is continuously recognized as one of the market leading solutions.

Ideal For

Mid-sized enterprise sites with mission-critical applications or services that are best transported over a next generation SONET network, including:

- Optical Ethernet transport and switching to meet the increasing bandwidth and QoS performance needs of enterprise organizations deploying CRM, IP telephony, collaborative applications, Web-based applications and IP-video solutions
- Site interconnect or LAN extension services needed to support network or server consolidation goals
- High-speed Internet access for enterprise data centers to support customer contact and employee mobility
- Storage area networking (SAN) over SONET networks to meet business continuance and disaster recovery needs, or to comply with industry and government regulations

Business Challenges

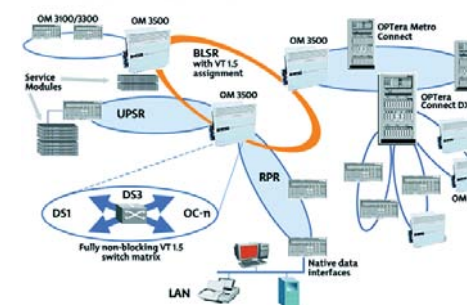
- Is your business demanding more and more bandwidth and performance?
- Is your network able to support the QoS and scalability required for new applications and services?
- Do you have specific networking or storage requirements that need to be addressed?
- Would you like to reduce the cost and complexity of your metro network?
- Is your Internet connectivity meeting your requirements for scalability, flexibility and resiliency?
- Do you have a proven disaster recovery and/or business continuance plan?
- Is your storage reliable and secure?
- Are your insurance premiums for "business disruption" policies increasing?

Typical Applications

- Full-rate and sub-rate storage extension (fiber channel and FICON) and gigabit Ethernet over SONET/SDH to extend reach between enterprise sites to 1000s of miles
- Real-time disk mirroring using FICON or fiber channel or GigE
- Multiservice aggregation of voice, data and storage
- Link geographically dispersed enterprise local area networks with any-to-any layer 2 connectivity and RPR
- Education: school districts, colleges, universities

- converged voice, data and video network to deliver next-generation education applications
- Government: local, state and federal institutions – link government, business and citizens
- Finance: financial service, banks, insurance companies – transport and store mission-critical financial data
- Healthcare: HMOs, hospital systems, health services – distribution and storage of medical imaging and records
- Manufacturing: high tech, automotive, publishing – scalable networks that enable collaborative file sharing and e-commerce

Network Diagram



Network diagram of typical deployment

Key Points

- **Simple** – lowers the total cost of ownership by removing bandwidth bottlenecks and providing transparent support for existing and new enterprise applications and services
 - A flexible network architecture suitable for core and enterprise network builds
 - Compatible with all common optical data communication protocols
 - Remote network management
- **Scalable** – up to 48 wavelengths per fiber¹ and up to 10 Gbps on each wavelength
 - Extended distance support via amplified solutions
 - Wavelength capacity to quickly add additional bandwidth¹
 - Multi-service support: DS1, E1/DS1, DS3/VT Transmux, DS3, EC-1/STS-1, OC-1, OC-3, OC-12, OC-48, OC-192, Ethernet (10/100 Base-T, 100 Base-FX and 1000 Base-SX/LX) and storage

- interfaces (FICON and fiber channel with distance extension and compression)
- **Resilient** – carrier grade, 99.999% availability is a key requirement for business continuity
 - Less than 50 milliseconds cut-over time to an alternate network path
 - In-service upgrades to hardware and software
 - Generic framing protocol (GFP) interfaces enable storage protocol transport directly over existing SONET or SDH networks enabling enterprises to take advantage of SONET/SDH resiliency and availability
- **Secure** – Supports security features that block intrusion attempts and hacking tools
 - Enables centralized user access management through RADIUS servers
 - Supports challenge/response mechanism which addresses many security issues associated with sending authentication information over unsecured links

Features and Benefits

Nortel Optical Metro Platform Series 3400

The Nortel Optical Metro Platform Series 3400 is part of Nortel's industry-leading next-generation SONET portfolio. It provides multi-service aggregation at medium-density sites with a wide variety of services such as TDM (DS1, DS1/E1, Tmux, DS3, STS-1, OC-1, OC-3 and OC-12) and Ethernet (10/100 Base-T). It is scalable from OC-3 to OC-12 without interrupting the existing services. Its fully non-blocking switching architecture offers unrestricted bandwidth management capabilities and enables cost efficient delivery of voice, video and data traffic in the metropolitan area.

The Nortel Optical Metro Platform Series 3400 supports a wide array of optical hub capabilities and self-healing ring topologies and its flexible universal service interface slots can support any service mix without architectural limitations or complex engineering rules.

Optical Packet Edge System

The Nortel Optical Packet Edge System enables businesses to cost-effectively implement and operate a flexible and scalable metropolitan network. By sharing the bandwidth of the optical ring, Optical Packet Edge System yields significant fiber efficiency that can be quickly upgraded and expanded as the number of enterprise sites and their bandwidth requirements grow.

It offers native Ethernet interfaces that are common in enterprise IT networks, eliminating the need for costly and complex adaptation devices. Organizations realize savings on both network adaptation equipment as well as network interface investments.

The Nortel Optical Packet Edge System is based on resilient packet ring (RPR) technology pioneered by Nortel and currently standardized by the IEEE 802.17 working group. RPR provides interoperability between multi-vendor equipment. The key benefits of RPR, include:

- High bandwidth delivery
- Cost-efficient bandwidth sharing between sites
- Native-rate Ethernet transport with carrier-grade availability and scalability
- Connectionless, packet-based networking
- Reduced need for external routers and DS-1/VT-1.5 facilities between LAN locations
- Seamless inter-working with SONET and IP networks
- Ability to support a mix of packet and TDM traffic over the same network
- Restoration times of less than 50ms in the case of fiber cut or node failure

Nortel Optical Metro Platform Series 3500

The Nortel Optical Metro Platform Series 3500 is a cost-effective and versatile next-generation SONET platform that offers TDM, Ethernet and storage services and is fully scalable from OC-3 to OC-12/OC-48/OC-192 in a single shelf.

It provides multiservice aggregation in high-density sites from TDM (DS1, DS3, Transmux, STS-1, OC-3, OC-12 and OC-48), Ethernet (10/100 Base-T, 100 Base FX and Gigabit Ethernet¹ over GFP/VCAT/LCAS or RPR) to storage (fiber channel and FICON). It is scalable from OC-3 to OC-192 with integrated DWDM optics (48 wavelengths) and its non-blocking switching architecture offers the highest bandwidth management flexibility in the industry while enabling cost efficient delivery of voice, video and data traffic in the metropolitan area.

- Point-to-point, survivable ring (RPR, UPSR, BLSR) and mesh topology including multiple ring support provide flexibility in planning and deploying these solutions to support enterprise applications and services
- Cost-effective bandwidth with greater scalability, better granularity and lower cost/ Mbps via 24 protected and up to 48 unprotected wavelengths in one system with mixed configurations possible
- DWDM support for operational simplicity and fiber efficiency
- Per wavelength and in-band optional protection switching as well as fiber

switching ensures that business applications and services are continuously available

- SDH /SONET path trace and performance monitoring capabilities aid in troubleshooting and problem resolution
- Resiliency is maintained via in-service upgrade by remote software download
- Flexible design options with support for 850 to 1310 nm interfaces and single mode or multimode fiber support

- Accessible by network managers using TCP/IP based network management communications
- Amplifier support for extended distance networks (up to approx 200km depending on fiber)
- Optical network modeling tool for simplified network deployment, upgrades and planning

Technical Specifications

	Nortel Optical Metro 3400	Nortel Optical Metro 3500
Optical interfaces	• OC-1, OC-3, OC-12	• OC-3, OC-12, OC-48, OC192
TDM interfaces	• DS1, DS3, Transmux, STS-1	• DS1, DS3, Transmux, STS-1
Ethernet interfaces	• 10/100 Base-T	• 10/100 Base-T, 100 Base-FX, 1000 Base-SX/LX (GigE) over GFP/VCAT/LCAS or RPR
Storage interfaces		• FICON and fiber channel with distance extension capabilities and compression
		

Market Information

- Number 1 worldwide for metro DWDM²
- Number 1 in multi-service SONET/SDH³
- Number 1 in Ethernet over SONET/SDH⁴
 - Nortel #1 Worldwide Ethernet over SONET/SDH for 2003 and 2004, 2005⁵
 - Nortel #1 Worldwide Ethernet over WDM for 2003 and 2004, 2005⁵
- First complete optical engineering certification program
- First commercial optical Ethernet network
- First with 10-gigabit Ethernet WAN
- First with Layer 2 resilient packet rings and distributed MPLS VPNs

- Nortel developed GFP and worked with ITU for standardization
- Chair CWDM ITU standardization committee and RPR alliance
- In some regional locations Nortel provides a fiber acquisition service for enterprise channel partners as we recognize that locating fiber on which to build these solutions can be difficult.

1. Only available on the Nortel Optical Metro Platform Series 3500. Nortel Optical Metro Platform Series 3400 supports 10/100 Ethernet and SONET rates up to OC-12

2. According to Dell'Oro - IQ04 and full year 2003 reports

3. According to Dell'Oro - 2001 and 2002 reports

4. According to IDC - 2002 and 2003 reports

5. According to March 2005 Infonetics

Nortel Optical Metro 5000 Series

Overview

The Nortel Optical Metro 5100/5200 platform delivers coarse and dense wavelength division multiplexing (C/DWDM) capabilities for enterprises that need resilient optical transport services across a single fiber pair. The Nortel Optical Metro 5100/5200 is protocol and bit-rate independent to enable open, flexible and scalable networking across multiple topologies. Enterprise locations over 250 miles apart can be networked with this cost-effective, forecast tolerant, transport solution. The Nortel Optical Metro 5100/5200 simplifies network planning and reduces operating costs, while providing scalable capacity and carrier-grade resiliency.

Ideal For

The Nortel Optical Metro 5100/5200 platform can be deployed in several enterprise vertical applications, including healthcare, financial, education, government, utilities and manufacturing.

Enterprise organizations with mission-critical applications or services, including:

- Storage area networking (SAN) to meet business continuance and disaster recovery needs, or to comply with industry and government regulations
- Digital information services including, X-rays, MRIs, ultrasound graphs, video and media production, intellectual property, financial data and customer information
- Large-scale grid computing for applications such as climate, genomic, geophysical and astrophysics research, along with engineering and design
- Enterprise data centers with increasing needs for performance, resiliency and scalability

Business Challenges

- Is your business creating more and more digital information?
- Is your storage reliable and secure?
- Do you have specific networking or storage requirements that need to be addressed?
- Are your insurance premiums for "business disruption" policies increasing?
- Do you have a proven disaster recovery and/or business continuance plan?

Typical Applications

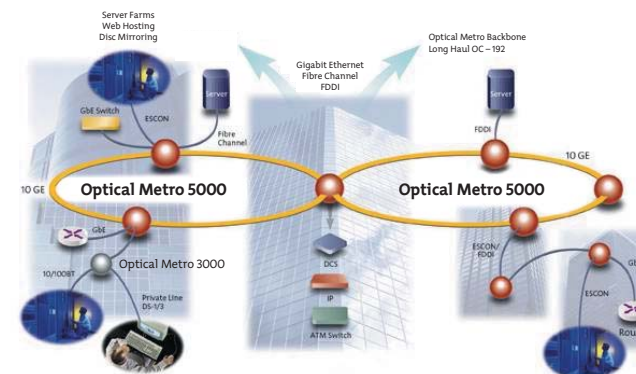
Digital content represents the lifeblood of a company. To mitigate the risk of loss, enterprises are increasingly adopting storage extension into their enterprise data centers. These technologies can replicate business-critical data to a secondary remote site. Transmitting this information over distances of up to 400 km requires these key components provided by the Nortel Optical Metro 5100/5200 platform:

- Carrier-grade performance with zero data loss
 - Scalable throughput
 - Low latency
 - Low jitter
 - High security
- LAN interconnection using 10G Ethernet (WAN PHY and LAN PHY), 1 Gigabit Ethernet, ATM or fast Ethernet
- Remote data storage using ESCON or fiber channel (FC100 and/or FC200)
- Geographically dispersed storage/processing using ESCON, FICON or Gigabit Ethernet/10G Ethernet
- Full-rate and sub-rate storage extension (fiber channel) and Gigabit Ethernet over SONET/SDH to extend reach between enterprise sites to 100s or even 1000s of miles
- Real-time disk mirroring using ESCON or fiber channel with SRDF
- IBM zSeries interconnectivity for disaster recovery and continuous availability using geographically dispersed parallel sysplex (GDPS)

- PBX interconnection via aggregation with SDH/SONET or ATM (i.e. E1s/T1s into STM-1/OC-1)

- Internet access via packet over SDH/SONET (POS) or gigabit Ethernet
- Live news feeds – high-quality digital video – and more

Network Diagram



Network diagram of typical deployment

Key Points

- **Simple** – lowers total cost of ownership by removing bandwidth bottlenecks and providing transparent support for existing and new enterprise applications and services
 - A flexible network architecture suitable for core and enterprise network builds
 - Compatible with all common optical data communication protocols
 - Interfaces are bit-rate, data format and protocol independent
 - Remote network management
- **Scalable** – up to 32 protected wavelengths per fiber (on Nortel Optical Metro 5200) and up to 10 Gbps on each wavelength
 - Extended distance support via amplified solutions, with optional dispersion compensation
 - Wavelength capacity to quickly add additional bandwidth
- **Resilient** – carrier grade, 99.999% availability is a key requirement for business continuity
 - Less than 50 milliseconds cut-over time to an alternate network path
 - In-service upgrades to hardware and software
 - Generic framing protocol (GFP) and virtual concatenation (VCAT) interfaces enable storage protocol transport directly over

existing SONET or SDH networks enabling enterprises to take advantage of SONET/SDH resiliency and availability
– Certified solutions with IBM, EMC, Brocade, Sun and Dell

Features and Benefits

- Protocol independent and bit-rate independent interfaces give enterprises the flexibility to transport numerous protocols (e.g. Ethernet, IP, SNA, ESCON, FICON, fiber channel, voice, video, etc.) over the same optical system with scalability of up to 10 Gbps per wavelength for each application
- Point-to-point, survivable ring and mesh topology including multiple ring support provides flexibility in planning and deploying this solution to support enterprise applications and services
- Sub rate multiplexers and Muxponder cards that package multiple services on a single 2.5Gbps or 10Gbps wavelength
- Cost-effective bandwidth with greater scalability, better granularity and lower cost/Mbps via 32 protected and up to 64 unprotected wavelengths in one system with mixed configurations possible

- Cost-effective network solutions using CWDM for up to 8 wavelengths and reaches of up to 80 km
- DWDM and CWDM support for operational simplicity and fiber efficiency
- Per wavelength and in-band optional protection switching as well as fiber switching ensures that business applications and services are continuously available
- SDH /SONET path trace and performance monitoring capabilities aid in troubleshooting and problem resolution
- System Level Equalization (R8.0) for automated system-wide equalization when active components are in the system providing simplified operations and intelligence to the optical layer
- Resiliency is maintained via in-service upgrade by remote software download
- Flexible design options with support for 850 to 1310nm interfaces and single mode or multimode fiber support
- Accessible by network managers using TCP/IP based network management communications
- Amplifier support for extended distance networks (over 400km depending on fiber and amplifier locations)
- Optical network modeling tool for simplified network deployment, upgrades and planning
- The Nortel Optical Metro 5100 and 5200 share common interface cards and software for deployment, management, sparing and overall operations simplicity

Nortel Optical Metro 5100	Nortel Optical Metro 5200	Nortel Optical Metro 5200 Cabinet
The space-efficient Nortel Optical Metro 5100 is a low power optical product for small bandwidth requirements serving metro collocation and customer premise applications. It quickly and economically delivers 8 protected wavelengths of CWDM service to metropolitan collocation and customer premise applications. With the 10G transponder, the Nortel Optical Metro 5100 becomes one of the smallest 10G capable platforms in the market (offering two 10G transponders in 5U of rack space).	The flexible Nortel Optical Metro 5200 Multiservice Platform supports 32 protected DWDM wavelengths and offers scalability of up to 10G on each wavelength. A network modeling tool is available to simplify the deployment and operation of this efficient DWDM network solution.	The freestanding Optical Metro Cabinet 5200 is an easy to deploy DWDM cabinet solution that extends the Nortel Optical Metro 5200 functionality and flexibility to metropolitan enterprise and customer premise environment applications. This cabinet delivers the benefits of the Nortel Optical Metro 5200 Multiservice Platform in a pre-tested and preconfigured cabinet. The Optical Metro Cabinet 5200 solution can help businesses reduce installation time and speed deployment by up to 82%.
		

Market Information

- Number one worldwide for metro DWDM since the product introduction in 1999¹
- Number one optical networking vendor globally¹
- 25 of the 27 major financial institutions in New York depend on Nortel Metro DWDM to deliver connectivity for their mission-critical applications
- Over 15,000 Nortel Optical Metro 5100/5200 elements shipped
- Number one in metro DWDM storage connectivity²
- Number one globally in multi-service SONET/SDH¹
- First complete optical engineering certification program

- First commercial optical Ethernet network
- First with 10-gigabit Ethernet WAN
- First with layer 2 resilient packet rings and distributed MPLS VPNs
- Nortel developed GFP and worked with ITU for standardization
- Chair CWDM ITU standardization committee and RPR alliance
- In selected markets, Nortel provides a fiber acquisition service for enterprise channel partners. We recognize that locating fiber on which to build these solutions can be difficult.

¹ According to Dell'Oro - 1Q05, full year 2004
² According to IDC - May 2003 reports

Technical Specifications

	Nortel Optical Metro 5100	Nortel Optical Metro 5200
Optical Storage Connectivity	• ESCON / SBCON • FICON / FICON Express / FC-SB-2 • ISC, ISC-2, HiPerLink, ISC-3 • ETR/CLO sysplex timer • Fiber Channel - FC-12, -25, -50, -100 • Fiber Channel - FC-200	• ESCON / SBCON • FICON / FICON Express / FC-SB-2 • ISC, ISC-2, HiPerLink, ISC-3 • ETR/CLO sysplex timer • Fiber Channel - FC-12, -25, -50, -100 • Fiber Channel - FC-200
Optical Ethernet	• Fast Ethernet (100 Base-FX) • Gigabit Ethernet (1000Base-SX, -LX) • 10GE WAN PHY • 10GE LAN PHY	• Fast Ethernet (100 Base-FX) • Gigabit Ethernet (1000Base-SX, -LX) • 10GE WAN PHY • 10GE LAN PHY
Private Leased Lines	• ATM, SONET (OC-1 to OC-192) • ATM, SDH (STM-1 to STM-64) • Async FOTS, PDH - 150Mbps, 565Mbps • Ethernet and Storage Private Line (GFP mapping, interwork with SONET/SDH)	• ATM, SONET (OC-1 to OC-192) • ATM, SDH (STM-1 to STM-64) • Async FOTS, PDH - 150Mbps, 565Mbps • Ethernet and Storage Private Line (GFP mapping, interwork with SONET/SDH)
Managed Wavelength Services	• 8Mbps - 2.5Gbps flexible rate • 10Gbps wavelengths • C CIR-601 / ITU-R 601, HDTV, DVB-ASI, DV6000, PrismaDT • FDDI	• 8Mbps - 2.5Gbps flexible rate • 10Gbps wavelengths • C CIR-601 / ITU-R 601, HDTV, DVB-ASI, DV6000, PrismaDT • FDDI
Supported Configurations	• CWDM wavelengths protected/16 unprotected per system • Point-to-point, Linear OADM, ring, interop with Optical Metro 5200	• 32 DWDM wavelengths protected/64 unprotected per system • Optical amplifiers allow for 600 km regenerator free transmission • Point-to-point, Linear OADM, Hubbed ring, Dual-hubbed ring, Meshed ring, interop with Optical Metro 5100
Protection schemes	• Path switching, equipment switching, line switching, unprotected	• Path switching, equipment switching, line switching, unprotected

Technical Specifications (continued)

Operational	• Optical connectors FC, SC, MT-RJ, LC	• Optical connectors FC, SC, MT-RJ, LC
Communication ports	• 2 10BaseT (Ethernet) ports • 1 RS-232 25-pin	• 2 10BaseT (Ethernet) ports • 1 RS-232 25-pin
External alarms (Telemetry ports):	• 8 inputs, 4 outputs	• 4 inputs, 4 outputs
Element/Network management	• SNMP v1, TL-1, System Manager, Optical Network Manager	• SNMP v1, TL-1, System Manager, Optical Network Manager
Temperature	• 32B0 to 131B0F (OBO to 55B0C) Relative humidity • 5% to 95% (non-condensing)	• 32° to 131°F (0° to 55°C) Relative humidity • 5% to 95% (non-condensing)
Certifications	• Zone IV (earthquake) • GR-63-CORE (NEBS) Telcordia • ETS 300 019 ETSI • OSMINE compliant	• Zone IV (earthquake) • GR-63-CORE (NEBS) Telcordia • ETS 300 019 ETSI • OSMINE compliant
Power consumption/shelf	• 139 Watts typical, 202 Watts max	• 534 Watts typical, 730 Watts max
Power requirements (nominal)	-48 VDC Minimum: -40 VDC Maximum: -60 VDC AC interface available	-48 VDC Minimum: -40 VDC Maximum: -60 VDC
Shelf dimensions	Height: 176 mm (6.92 in.) Width: 438 mm (17.25 in.) Depth: 297 mm (11.7 in.) Weight: 14.5 kg (32 lb) empty; 16.5 kg (36 lb) (fully loaded) Universal mounting brackets for 19" or 23" frames	Height: 489 mm (19.25 in.) (11U) Width: 438 mm (17.25 in.) Depth: 301 mm (11.85 in.) Weight: 23 kg (50 lb) empty; 34 kg (75 lb) fully loaded

Ordering Information

For further information, please contact your local Nortel representative.

> Nortel Optical Multiservice Platform

Nortel's Optical Multiservice platform combines and extends the advantages of the company's market leading next-generation SDH/SONET and metropolitan DWDM platforms in a complementary manner. A global platform, the Nortel Optical Multiservice Edge 6500 can be deployed in SDH and SONET environments supporting a broad mix of services. This solution is ideal for enterprise organizations in education, government, finance, healthcare and manufacturing environments that need to reduce operating and equipment costs while maintaining a simple, scalable, resilient and secure platform. Ranked Number 1 in numerous categories, this is a winner for mid- to large-sized organizations that transport applications over a SONET or SDH network.

- Nortel Optical Multiservice Edge 6500

Nortel Optical Multiservice Edge 6500



Overview

The Nortel Optical Multiservice Edge 6500 (OME 6500) is a next-generation optical convergence platform that converges multiple services and network layers onto a single platform for more cost-effective support of broadband services. Users are now able to transform their deployed SONET/SDH networks to a high-speed packet optical solution through a smooth and scalable evolution path. Simplification of both the network and its management results in the ability to deliver multiple services, while simultaneously achieving significant capital and operational cost savings.

The Nortel Optical Multiservice Edge 6500 is a global platform that can be deployed in both SDH and SONET environments supporting a broad mix of services ranging from E-1/ DS-1 private lines through STM-1/4/16/64 and OC-3/12/48/192 private lines and high-speed data connectivity. Next-generation data capabilities are offered for both Optical Ethernet (10/100 Base-T, 100 Base-FX, GigE and 10 GigE) and optical storage connectivity (fiber channel and FICON). In addition, service-forecast tolerant, protocol- and bit-rate-transparent interfaces enable high-capacity multi-Gbps transparent wavelength services over existing SDH/SONET infrastructures.

Ideal For

Mid- to large-sized enterprise sites with mission-critical applications or services that are best transported over a next generation SONET or SDH network, including:

- Optical Ethernet transport and switching to meet the increasing bandwidth (large number of GigE or 10 GigE or E3/DS3, etc) and QoS performance needs of enterprise organizations deploying CRM, IP telephony, collaborative applications, Web-based applications and IP-video solutions
- Site interconnect or LAN extension services needed to support network or server consolidation goals
- High-speed Internet access for enterprise data centers to support customer contact and employee mobility
- Storage area networking (SAN) to meet business continuance and disaster recovery needs, or to comply with industry and government regulations
- Digital information services including X-rays, MRIs, ultrasound graphs, video and media production, intellectual property, financial data and customer information

- Large-scale grid computing for applications such as climate, genomic, geophysical and astrophysics research, along with engineering and design
- Enterprise data centers with increasing needs for performance, resiliency and scalability

Business Challenges

- Do you need to achieve dramatic savings and simplify your network through successful optical convergence of layer 0, 1 and 2 services?
- Is your business demanding more and more bandwidth and performance? Need to transport a large number of Gigabit Ethernet or 10 Gigabit Ethernet securely and cost effectively?
- Is your network able to support the QoS and scalability required for new applications and services?
- Do you have specific networking or storage requirements that need to be addressed?
- Would you like to reduce the cost and complexity of your metro network?
- Is your Internet connectivity meeting your requirements for scalability, flexibility and resiliency?

- Is your storage reliable and secure?
- Are your insurance premiums for "business disruption" policies increasing?
- Do you have a proven disaster recovery and/or business continuance plan?

Typical Applications

- Full-rate and sub-rate storage extension (fiber channel and FICON) and Gigabit Ethernet over SONET/SDH to extend reach between enterprise sites to 1000s of miles
- Real-time disk mirroring using FICON or fiber channel or GigE or 10 GigE
- Transport of broadband interfaces for bandwidth-hungry applications
- Link geographically dispersed enterprises' local area networks with any-to-any layer 2 connectivity
- **Education:** school districts, colleges, universities – converged voice, data and video network to deliver next-generation education applications
- **Government:** local, state and federal institutions – links government, business and citizens
- **Finance:** financial service, banks, insurance companies – transport and storage of mission-critical financial data
- **Healthcare:** HMOs, hospital systems, health services – distribution and storage of medical imaging and records
- **Manufacturing:** high tech, automotive, publishing – scalable networks that enable collaborative file sharing and e-commerce
- Standards-based packet adaptation to SONET/SDH through resilient packet ring (RPR), generic framing procedure (GFP), virtual concatenation (VCAT) and link capacity adjustment scheme (LCAS) for the efficient transport and management of high-speed data connectivity
- Compatible with all common optical data communication protocols
- Remote network management
- **Scalable** – example: up to 96 GigE per single shelf in a bay
- Very high-density data, optical and electrical interfaces that may be combined for industry leading cost-efficient mixed-service applications
- Extended distance for data and storage applications
- Multi-service support: DS1/E1, DS3/E3, Transmux, EC-1/STS-1, OC-3, OC-12, OC-48, OC-192, STM-1, STM-4, STM-16, STM-64, Ethernet (10/100 Base-T, 100 Base-FX and 1000 Base-SX/LX), storage interfaces (FICON and fiber channel with distance extension) and transparent wavelengths services via transponders
- **Resilient** – carrier grade, 99.999% availability is a key requirement for business continuity
- Less than 50 milliseconds cut-over time to an alternate network path
- In-service upgrades to hardware and software
- **Secure** - Supports security features that block intrusion attempts and hacking tools
- Enables centralized user access management through RADIUS servers
- Supports challenge/response mechanism which addresses many security issues associated with sending authentication information over unsecured links

Key Points

- **Simple** – lowers the total cost of ownership by removing bandwidth bottlenecks and providing efficient support for existing and new enterprise applications and services
- A flexible network architecture suitable for core and enterprise network builds
- Convergence of layer-0 (photonic), layer-1 (SONET/SDH) and layer-2 (packet) connection and bandwidth management functionality on a single platform

Features and Benefits

The Nortel Optical Multiservice Edge enables network simplification, driving down solution deployment costs. Its industry leading service interface densities, pioneering 80 Gbps unconstrained single-stage VT-1.5/VC-12 switching, integrated layer-2 (packet) switching and a wide range of carrier-grade pluggable optics modules with selectable bit-rate, wavelength and reach enable platform configurations to be better aligned with actual enterprise demand and also to improve shelf capacity utilization.

As an evolution of market proven Nortel optical technology, the Nortel Optical Multiservice Edge 6500 delivers a compact and versatile solution that sets new economic benchmarks for deploying broadband connectivity with the highest level of scalability and flexibility, reliability and security.

- Reduced equipment and operating costs
- More efficient broadband connectivity for bandwidth-hungry enterprise applications
- Multi-service diversity and high interface density enabling lower total cost of ownership
- Versatile optical interface reach, rate and wavelength deployment

Market Information

- Number 1 worldwide for metro DWDM¹
- Number 1 optical networking vendor globally¹
- Number 1 in next-generation optical equipment²
- Number 1 in global metro DWDM³
- Number 1 in multi-service SONET/SDH⁴
- Number 1 in Ethernet over SONET/SDH⁵
- First complete optical engineering certification program
- First commercial Optical Ethernet network
- First with 10 Gigabit Ethernet WAN
- First with layer 2 resilient packet rings and distributed MPLS VPNs
- Nortel developed GFP and worked with ITU for standardization.
- Chair CWDM ITU standardization committee and RPR alliance
- In some regional locations Nortel provides a fiber acquisition service for enterprise channel partners as we recognize that locating fiber on which to build these solutions can be difficult.

Technical Specifications

Performance	
Total Backplane Capacity	160 Gbps plus bandwidth for transparency/slot
Add/Drop	Full Connectivity (add/drop)
Transmux	Up to 192 DS1/STS-1 can be accessed per shelf
Cross-connection (Fabric size and granularity/Number of STS-1/VT1.5 or VC-3/VC-12)	Four matrices: 1536 x 1536 STS-1, 10,752 x 10,752 VT1.5; 1536 x 1536 STS-1, 43,008 x 43,008 VT1.5; 1536 x 1536 STS-1; 3,072 x 3,072 STS-1
TSA/TSI	Full TSI, TSA, Drop-and-Continue, Hairpinning
Rings Supported	12 OC-192/STM-64 rings; 24 OC-48/STM-16 rings; 96 OC-12/STM-4 ring; 96 OC-3/STM-1 rings per shelf
Data Support	Integrated packet fabric, RPR
Virtual Concatenation, GFP, LCAS support	VCAT, GFP, LCAS supported
Tributary Interfaces	
OC-192/STM-64 Ports/Chassis	16 STM-64/OC-192 ports/chassis
OC-48/STM-16 Ports/Chassis	48 STM-16/OC-48 ports/chassis
OC-12/STM-4 Ports/Chassis	96 Selectable STM-1/STM-4 OC-3/12 ports/chassis
OC-3/STM-1 Ports/Chassis	192 Selectable STM-1/STM-4 OC-3/12 ports/chassis
T3/E3/J3 Ports/Chassis	96 E3 ports/chassis; 192 DS3/STS-1 ports/chassis
T1/E1/J1 Ports/Chassis	504 E1 ports/chassis; 16,128 DS1 ports/chassis through DS1 service modules (84 DS1 ports/service module, shelf and modules are managed as a single NE); 448 DS1 ports/chassis inskin
10 GigE Ports/Chassis	14 x 10GigE ports/chassis
1 GigE Ports/Chassis	96 GigE/Fiber Channel/FICON ports/chassis
10/100 BaseT Ports/Chassis	128 10/100BT ports/chassis
POS Ports/Chassis	96 POS ports/chassis
ATM Ports/Chassis	96 ATM ports/chassis
Asynchronous ports and DWDM capabilities	96 async ports/chassis
Other (Fiber Channel, FICON, ESCON)	96 GigE/Fiber Channel/FICON ports/chassis
Ring Interfaces per shelf	
OC-192/STM-64	OC-192 / STM-64 = 8 protected/16 unprotected
OC-48/STM-16	OC-48 / STM-16 = 24 protected / 48 unprotected
OC-12/STM-4	Selectable OC-3/12 STM-1/STM-4 = 48 protected/ 96 unprotected
OC-3/STM-1	OC-3/STM-1 = 96 protected/ 192 unprotected

Architecture	
Shelf Layout	8 slots with 10Gbps + 4 slots with 20Gbps - each slot can be trib/line/transponder
Service Interface Slots	All slots can operate as trib or line slots
Mapping Structure	SONET, SDH, GFP, HDLC, Transparent mapping
Laser source/type (LR/IR/SR)	SR1/I64.1, IR2/S64.2, LR2/L64.2, SFP, and DPO (DWDM Pluggable optics)
DWM Wavelengths Supported	32 wavelengths compatible with OM5200 (16 C-band, 16 L-band); 36 wavelengths in C-band compatible with CPL
Amplification	OM5000 and CPL amplification supported
Equipment Redundancy	Fully redundant, no single point of failure
Clock Source/Timing	Internal, external, SONET / SDH and Japan Timing sources
Features	
Network Mgmt	TL-1, SNMP; GUI: Preside Site Manager, Preside AP
Craft Interface	TL-1 and SNMP; GUI: Preside Site Manager, Preside AP
Test Access	Multi-bitrate with intrusive and non-intrusive modes
OSS/BSS Interface	TL-1 and SNMP
Protection	1+1, UPSR, SNCP, BLSR, MSPring
In-service Upgrades	Remote in-service software upgrade, in-service switch matrix upgrades
ITU Standards Supported	ITU standards supported for 7 Layer OSI; GFP standards, G7041, G707/783, G.7042, 802.17 for RPR
Physical Specifications	
Chassis for max. configuration	4 shelves per 7' bay
Chassis Dimensions (HxWxD)	17.3" (W) x 11" (D) x 22.7" (H) ; 579mm H x 440 W x 280 D; 933mm H with I/O extension
Hot Swappable Cards	All cards are hot swappable
NEBS/ETSI Compliance	NEBS/ETSI full compliancy
ANSI/ETSI Conformance	OME 6500 is a global platform (SONET and SDH); compliant with both ANSI and ETSI
Power Requirements	-40V to -75V dc
Operating Temperature	(5oC to 40oC / 41oF to 104oF)
Operating Humidity	5% to 85% RH
Mounting Options	19" and 23"

Ordering Information

For further information, please contact your local Nortel representative.

1. According to Dell'Oro – 1Q05 and full year 2004 reports
2. According to IDC – 1Q04 report
3. According to IDC – 1Q04 and 2003 reports
4. According to Dell'Oro – 2001 and 2002 reports
5. According to IDC – 2002 and 2003 reports

> Nortel Optical Ethernet

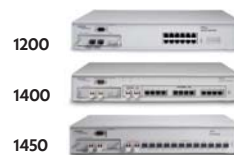
Nortel has one of the broadest Ethernet portfolios in the industry. We leverage our knowledge and experience with service providers as well as enterprises to deliver solutions optimized for a wide range of applications. Our Ethernet solutions include Optical Ethernet solutions (Optical Metro 1000/3000/4000/5000 and Optical Multiservice Edge 1000/6000 families) and Metro Ethernet Solutions (Metro Ethernet Services Unit 1800/1850 and Metro Ethernet Routing Switch 8600 families).^{*} These platforms fulfill varying roles in the network ranging from access to aggregation to core and long-haul functions.

Ethernet is transforming customer networks by enabling high bandwidth applications and simplifying network design through the convergence of voice, video and data over a packet-oriented infrastructure. Service providers as well as large enterprises now support a variety of Ethernet connectivity services such as Ethernet Private Line and Ethernet VPNs which serve as the foundation for enabled services including Internet access, transparent LANs and numerous voice and video applications.

- Nortel Optical Metro 1000 Series (1200 / 1400 / 1450)
- Nortel Metro Ethernet Services Unit 1800/1850

^{*} For details on Nortel Ethernet solutions not covered in this section, please see the Table of Contents for this Guide.

Nortel Optical Metro 1000 Series



Overview

The Nortel Optical Metro 1000 Series (1200 / 1400 / 1450) was designed to simplify the delivery of Ethernet services. Defining a new class of optical Ethernet edge device, it serves as the customer demarcation point and entry ramp onto the service provider's network. As such, the Nortel Optical Metro 1000 Series offers the industry's first consistent Ethernet user-to-network (UNI) interface, delivering cost-effective, secure and scalable separation of customer traffic. In addition, the Nortel Optical Metro 1000 supports Nortel's industry-unique simple end point provisioning, significantly simplifying the provisioning of additions or changes to the network and driving faster time-to-revenue and customer satisfaction.

Ideal For

- Incumbent and new service providers, seeking to extend their networks to the customer premises and to deliver differentiated Ethernet-based services cost-effectively to multiple customers
- Enterprise customers, such as city networks, airports, railway and highway operators, and utility companies who wish to build a network for internal use, or plan to offer services from the infrastructure they build

Business Challenges

- Are your users experiencing slow application and response time?
- Do you have power users requiring Gig power to the desktop?
- Are you suffering from slow server or application access?

- Are you looking for an aggregation or core switch that is easy to install and use?
- Do you have multiple, distant offices (up to 70 km) that need to share resources?
- Are you concerned about cost when considering switching purchase?
- Do you want Gigabit performance without the investment in a chassis based switch?
- Do you expect your business to grow and the associated traffic in your network within the next 6-18 months?
- Do you want to interconnect different sites with different VLAN IDs without having to change the existing VLANs?
- Are you looking for secure and scalable separation of customer traffic?
- Are you looking for the simple creation of any-to-any connectivity?

Typical Applications

Optical Ethernet 1000 may be located in the customer's premises – whether that is an enterprise, multi-tenant/multi-dwelling units (MTU/MDUs), or the service provider's point-of-presence. It can be deployed to support an array of service-delivery scenarios, including point-to-point, point-to-multipoint and any-to-any network configurations. Its ability to provide secure separation of customer traffic, scale to meet growing customer demand and maintain customer priorities enables the delivery of profitable differentiated services.

Optical Ethernet 1000 is typically connected to Nortel Ethernet Routing Switch 8600 high performance gigabit Ethernet switches, or the Nortel Optical Multiservice Edge family, which comprise the metro Ethernet aggregation network. Different metro Ethernet networks can be interconnected by either ATM or through IP/MPLS networks.

Key Points

- Cost-effective and scalable delivery point for Ethernet services in the MDU/MTU, enterprise and point-of-presence
- Varying access options to meet service demands and range of transport alternatives to leverage existing infrastructure
- Secure and scalable separation of customer traffic – transparent and mapped VLAN support
- Simple end point provisioning for faster service uptime and lower cost to implement
- QoS features to enable tiered services and profitable SLAs
- The Nortel Optical Metro 1000 serves as the Layer 2 VPN demarcation point in the service provider network, offering an innovative and industry first consistent Ethernet user-to-network interface (UNI) that enables:
 - Increased scalability of services
 - Quicker provisioning of services
 - Lower operational costs
 - Secure separation of multiple customers' traffic

Features and Benefits

The Nortel Optical Metro 1000 provides a cost-effective means for service providers to offer an array of Ethernet-based services to a variety of customers. Its industry-leading Ethernet UNI ensures scalable and secure customer separation, provides robust QoS and bandwidth limiting features, and enables service providers to establish a line of demarcation and a point at which to collect statistics and information to meet service level agreements.

The Nortel Optical Metro 1000 consists of three different platforms to meet Ethernet service delivery scenarios, i.e., multi-tenant service delivery providing Ethernet services on tenant floors, single unit/enterprise service delivery or delivery of services from a service provider point of presence:

- **Carrier-class NEBS level 3 compliance** – Meeting the most rigorous electrical, environmental, temperature and vibration standards for reliability.
- **Dual gigabit Ethernet ports** – Using provisionable multi-link trunking (MLT). Load sharing between the two gigabit Ethernet ports enables bandwidth to be increased and ensures availability of service with sub-second failover.
- **Varying access or UNI options** – To meet service demands and transport alternatives (10/100 Mbps, 100 Mbps, GE, copper, fiber).
- **Two gigabit Ethernet uplink options** – One or two 1000Base-TX uplink ports, or a dual-port small form factor pluggable (SFP) gigabit interface connector (GBIC) – ensuring cost-effective transport over fiber, RPR and/or DWDM.
- **Services for up to 500 customers per Nortel Optical Metro 1000 device** – By using a transparent domain identifier (TDI)/VPN identifier (VPN-ID) for each customer.
- **Quality of service (QoS) and service level agreement (SLA) support** – Through tunable bandwidth from 1 Mbps to 100 Mbps in increments of 1 Mbps per port, or per TDI/VPN-ID, 802.1p and DSCP priorities mapping, utilization of 4 UNI egress queues and 8 NNI egress queues.

- **Cost-effective and scalable entry/delivery point for Ethernet services in the multi-tenant/multi-dwelling units (MxUs), enterprise and service provider point-of-presence** – Service providers are able to scale their service offerings to meet customer demand by simply provisioning a new UNI port on a customer port, as compared with adding new equipment.
- **Various access options to meet service demands and range of transport alternatives to leverage existing infrastructure**
 - 10/100 Mbps, 100 Mbps, gigabit Ethernet services - copper and fiber
 - Two gigabit Ethernet uplink options: one or two 1000Base-TX uplink ports or a dual-port small form factor pluggable (SFP) gigabit interface connector (GBIC), to ensure cost-effective transport over fiber, RPR and/or DWDM
- **Flexible service connectivity** – Supports point to point, point to multi-point, any to any and ring network topologies. With the latest addition of the daisy chain feature, several Nortel Optical Metro 1000s can be daisy chained to form an access ring and terminated into a Nortel Ethernet Routing Switch 8600 switch to create a logical ring. The access ring feature increases the user-to-network (UNI) port density and reduces fiber uplinks connected to aggregation devices, which lowers CAPEX costs. It also offers full hardware redundancy, easy scalability and provides reliable discovery mechanism for access ring, thereby lowering OPEX. For each access ring, up to 14 OM1000 units can be supported. In addition, various OM1000 platforms can be mixed in the access ring topology.
- **Secure and scalable separation of customer traffic – transparent and mapped VLAN support**
 - Supports up to 500 transparent domain identifiers (TDI) or VPN identifiers (VPN-ID) for customer separation per Nortel Optical Metro 1000 device.

- Unique and industry-leading approach to defining an Ethernet UNI which is consistent across the Nortel Optical Metro 8000 and Nortel Optical Metro 3500.
- **Simple end-point provisioning for faster service uptime and lower cost to implement** – The Nortel Optical Metro 1000 is provisioned with the relevant service SLA metrics and TDI/VPN ID information. Using the auto discovery feature, it automatically learns of other sites in the customer network – thus avoiding the need to provision existing network devices. When adding or deleting a new site to an existing customer network, the service provider needs to only provision the site, enabling simple end-point provisioning.
- **Rate limiting and QoS features to enable tiered services and profitable SLAs**
 - Effective utilization of bandwidth by tuning bandwidth from 1 Mbps to 1000 Mbps in increments of 1 Mbps per port, per TDI/VPN ID.
 - To avoid congestion and manage traffic effectively, the Nortel Optical Metro 1000 has 4 egress queues per UNI port and 8 egress queues per uplink port. These queues are selected based on a service provider 802.1p mapping. They allow the network administrator to ensure the variety of customer traffic receive the appropriate priority.
- **Availability assurance with the TD continuity tool** – TD continuity is a powerful tool for ensuring the availability of service, collecting measurements for validation of the SLA and debugging. TD continuity is also integrated into Nortel service provisioning and supported across the Nortel Optical Metro 3500 and Nortel Optical Metro 8000.

- **Leverages Nortel logical provider edge (LPE) VPN for faster time-to-market and enhanced profitability** – By integrating the Nortel Optical Metro 1000 with the strengths of multi-protocol label switching (MPLS), the Nortel LPE solution provides support for thousands of customers in a retail metro environment, speeds provisioning up to 10 times faster than competing solutions, provides support for many provider edge (PE) devices and reduces operational costs by up to 60%.

Market Information

Successfully delivering services to the enterprise customer requires maximum availability, appropriate performance and the ability to cost-effectively support new customers as demand increases. To ensure resiliency of services and optimal performance, the Nortel purpose-built Ethernet Service Modules provide:

- Varying access or UNI options to meet service demands and transport alternatives (10/100 Mbps, 100 Mbps, GE, copper, fiber).
- Support for up to 500 VPN Identifiers (VPN-IDs) for customer separation per OPTera Metro 1000 device and the ability to provide multiple services per customer per port, a key differentiator.
- Two Gigabit Ethernet uplink options – one or two 1000BASE-TX uplink ports or a dual-port Small Form Factor Pluggable (SFP) Gigabit Interface Connectors (GBICs)—to ensure cost effective transport over fiber, SONET/ SDH and WDM. These Gigabit Ethernet ports utilize provisionable Multi-Link Trunking (MLT) load sharing between the two ports to ensure availability of service with sub-second failover.
- Effective utilization of bandwidth through features such as bandwidth tuning from 1 Mbps to line rate in increments of 1 Mbps per port per VPN-ID, and a mapped NNI feature that uses a VLAN tag within the service provider Ethernet encapsulation header to enhance security or direct traffic within the service provider network.

- Carrier-class NEBS Level 3 compliance meeting the most rigorous electrical, environmental, temperature, and vibration standards for reliability.

Key Industry Firsts Include:

- Consistent Ethernet UNI ensures secure customer separation, supports differentiated services and SLAs, and relieves scaling limitations and end-user addressing complexity.
- Simple End Point Provisioning leverages an autodiscovery capability and Preside Service Provisioning speeds service activation and lower operational costs.
- Virtual Private LAN Services (VPLS) solution model when combined with the OPTera Metro
- Nortel Optical Metro 8000 uses an innovative, functionally distributed model that eliminates the scalability and bandwidth constraints of point-to-point, fully-meshed, or stacked VLAN-based network models to offer Ethernet VPN services.
- VPN Continuity Tool provides service assurance and performance statistics between any two endpoints, captured by the management and billing systems to substantiate SLAs.

Technical Specifications

	Nortel Optical Metro 1200	Nortel Optical Metro 1400	Nortel Optical Metro 1450
			
Role	• In-building aggregation supports up to 100 Mbps	• Adds Gig E customer connectivity	• Aggregation in a point-of-presence
Service (customer) ports	• 12 10/100Base-T ports	• 12 10/100Base-T ports • 2-port SFP	• 12 100Base-FX (single mode fiber GBIC slots ports - a media converter may be used to connect 10/100Base-T ports to the 100Base-FX SMF ports • 2-port SFP GBIC slots
Network ports	• 2-port SFP GBIC slots • 1- or 2-port 1000 Base-T	• 2-port SFP GBIC slots • 1- or 2-port 1000 Base-T	• 2-port SFP GBIC slots • 1- or 2-port 1000Base-T
Performance	Frame Forward Rate (64-byte packets) Up to 2.2 million packets per second (pps) maximum Port Forwarding/Filtering Performance (64-byte packets) For 10 Mbps 14,880 pps maximum For 100 Mbps 148,810 pps maximum For 1000 Mbps 1,488,100 pps maximum Addressing 24,000 MAC addresses		
Data Rate	Optical Metro 1200 ESM • For 10/100BASE-T Mbps front-panel UNI ports 10 Mbps Manchester encoded or 100 Mbps 4B/5B encoded	Optical Metro 1400 ESM • For 10/100BASE-T Mbps front-panel UNI ports 10 Mbps Manchester encoded or 100 Mbps 4B/5B encoded • For 1000 Mbps front-panel UNI ports 1000 Mbps 8B/10B encoded	• For 100BASE-FX front-panel UNI ports 10 Mbps Manchester encoded or 100 Mbps 4B/5B encoded • For 1000 Mbps front-panel UNI ports 1000 Mbps 8B/10B encoded
Reliability	• Carrier-class NEBS Level 3 compliant • Dual gigabit Ethernet uplink ports utilizing provisionable Multi-Link Trunking (MLT)		
Interfaces	Access • 12-port 10/100BASE-T auto-speed sensing (support for up to 100 meters) • 12-port 100BASE-FX (SMF) (support for up to 15 Km) • 2-port SFP GBIC slots using: – 1 port 1000BASE-SX SFP GBIC (mini-GBIC connector types: LC, MT-RJ) (2 Km) – 1 port 1000BASE-LX SFP GBIC (mini-GBIC connector type: LC) (5 Km) – 1 port 1000BASE CWDM SFP GBIC (mini-GBIC, connector type : LC ; 1470nm~1610nm, 40 Km or 70 Km) Uplink options • 1 1000BASE-Tx port (RJ-45 connector) (100 meters) • 2 1000BASE-Tx ports (RJ-45 connector) (100 meters) • 2-port SFP GBIC slots using: – 1 port 1000 BASE-SX SFP GBIC (mini-GBIC connector types: LC, MT-RJ) (2 Km) – 1 port 1000BASE-LX SFP GBIC (mini-GBIC connector type: LC) (5 Km) – 1 port 1000BASE CWDM SFP GBIC (mini-GBIC, connector type : LC ; 1470nm~1610nm, 40 Km or 70 Km)		
Network Protocols and Standards Compatibility	• IEEE 802.3 (Ethernet) • IEEE 802.1p (Prioritizing) • IEEE 802.3u (Auto negotiating) • IEEE 802.1Q (VLAN tagging)		

Technical Specifications (continued)

Physical Dimensions	• Weight: 4.8kg (10.60 lbs) • Height: 7.04 cm (2.77 in.) • Width: 43.82 cm (15.1 in) • Depth: 38.35 cm (15.1)		
Electrical Specifications	Input Voltage 100 to 240 VAC @ 47 to 63 Hz Input power consumption 70 W Input current 0.75 A @ 100 VAC; 0.4 A @ 240 VAC Maximum thermal output 240 BTU/hr	Input Voltage 100 to 240 VAC @ 47 to 63 Hz Input power consumption 60 W Input current 60 A @ 100 VAC; 0.3 A @ 240 VAC Maximum thermal output 215 BTU/hr	Input Voltage 100 to 240 VAC @ 47 to 63 Hz Input power consumption 65W Input current 65 A @ 100 VAC; 0.35 A @ 240 VAC Maximum thermal output 230 BTU/hr
Environmental Specifications	Operating temperature: 0 • to 40 • C (32 • to 104 • F) Storage temperature: -25 • to +70 • C (-13 • to 158 • F) Operating humidity: 85% maximum relative humidity, non-condensing Storage humidity: 95% maximum relative humidity Operating altitude: Up to 3024 m (10,000 ft.) Storage altitude: Up to 12,096 m (40,000 ft.)		
Safety Agency Approvals	• UL Listed (UL1950) • IEC 950/EN60950 • C22.2 No. 950 (CUL) with all national deviations • UL-94-V1 Flammability requirements for PC board • NOM (NOM-019)		
Electromagnetic emissions summary	Meets the following standards: • US, CFR47, Part 15 Subpart B, Class A • Canada, ICES-003, Issue 2, Class A • Australia/New Zealand, NZS 3548:1995, Class A • Japan, V-3/97.04:1997, Class A • Taiwan, CNS 13438, Class A • Europe, EN 55022:1998/A1: 2000 Class A • EMC Directive: Directly published in the EMC Directive of 89/336/EEC with Modification 92/31/EED, 93/13/EC – EN 61000-3-2: 2000 – EN 61000-3-3: 1995/A1: 2001 • Global, CISPR 22:1997/A1: 2000 Class A		
Electromagnetic Immunity	• Global, CISPR 24:1997/A1: 2001 • Europe, EN55024: 1998/A1: 2001		

Ordering Information

For further information, please contact your local Nortel representative.

Nortel Metro Ethernet Services Unit 1800/1850



Overview

The Nortel Ethernet Services Unit 1800 and 1850 are the delivery points for Ethernet services at the edge of the service provider network. These platforms effectively support Internet access, video transport, virtual private LAN service and other applications for multiple customers on a single physical port. It may be deployed in either a ring-based or point-to-point topology in the metro access network. It delivers tunable bandwidth from 64Kbps to 1Gbps in granular increments. Packet classification/QoS and SLA management tools allow providers to offer tiered services to customers.

The Ethernet Services Units are used in conjunction with the Nortel Metro Ethernet Services Module 8668 for the Metro Ethernet Routing Switch 8600 to provide 50 millisecond restoration time with the highest levels of scalability as well as the ability to map individual customer VLANs to separate customer VPNs. The Metro Ethernet Services Module 8668 provides the key User/Network Interface (UNI) functions such as end-to-end management and performance monitoring while the Metro Ethernet Services Units themselves offer a cost-effective and flexible set of service port functions.

Ideal For

- High density, highly populated areas such as big cities and business parks
- Incumbent and new service providers seeking to extend their networks to the customer premises and to deliver differentiated Ethernet-based services cost-effectively to multiple end-users
- Enterprises, such as city networks, airports, railway and highway operators and utility companies, that wish to build a network for internal use, or plan to offer services from the infrastructure they build
- Are you suffering from slow server or application access?
- Are you looking for an aggregation or core switch that is easy to install and use?
- Do you have multiple, distant offices (up to 70 km) that need to share resources?
- Are you concerned about cost when considering switching purchase?
- Do you want Gigabit performance without the investment in a chassis based switch?
- Do you expect your business to grow and the associated traffic in your network within the next 6-18 months?
- Are you looking for secure and scalable separation of customer traffic?
- Are you looking for the simple creation of any-to-any connectivity?

Business Challenges

- Are your users experiencing slow application and response time?
- Do you have power users requiring Gig power to the desktop?

Typical Applications

The Nortel Metro Ethernet Services Unit 1800/1850 enables maximum revenue generation by supporting multiple services and multiple VPNs per port, all in a compact 1U-high unit. For example, multiservice operators (MSOs) seek to deliver the "triple play" - voice, video and data (example applications include VoIP traffic, video content distribution and Internet access), leveraging a single fiber plant. The Nortel Metro Ethernet Services Unit 1800/1850 is typically connected to the Nortel Metro Ethernet Routing Switch 8600 to enable a centralized user-network interface (UNI).

Metro Ethernet Services Unit 1800/1850 can fit into Greenfield (newly established) provider networks, as well as demand-based additions to existing Ethernet access networks. This flexibility allows providers to realize the benefits in either deployment scenario. The Metro Ethernet Services Unit 1800/1850 may also be located at end-user premises - a branch office, multi-tenant/multi-dwelling units, or a service provider's point-of-presence. They can be deployed to support an array of service-delivery scenarios, including point-to-point and ring configurations.

The Metro Ethernet Services Unit 1800 has 24 10/100 Base-T customer-facing ports and two Gigabit Ethernet network-facing ports (available as 2 SPF GBICs or 2 fixed 1000Base-LX ports). The non-blocking architecture provides wire-speed switching for uncompromising performance.

The Metro Ethernet Services Unit 1850 has 12 10/100/1000Base-T or SFP GBIC ports configured as a 4-port (10/100/1000Base-T and SFP combo) base unit + 2 Media Dependent Adapter (MDA) slots, each of which can utilize a 4-port 10/100/1000Base-T MDA or a 4-port SFP GBIC MDA.

Key Points

- Industry-leading highly resilient Ethernet access ring with sub 50 ms failover and highly efficient bandwidth aggregation in a switched Ethernet ring topology
- Cost effective and compact platform for ring or point to point access
- When combined with Nortel Metro Ethernet Routing Switch 8600, organizations benefit from:
 - The Ethernet UNI/NNI capabilities on the 8600
 - Centralized UNI at COs
- Physical demarcation and secure customer separation on a shared uplink (cost optimized for high density demarcation points)
- Multiple services per physical interface for maximum efficiency and flexibility; high quality of service (QoS) IP-video broadcast or video on demand (VoD) services can share the same infrastructure without costly overlay networks
- Multiple classes of services for prioritization and traffic management required to offer and meet strict performance targets, increasing end-user satisfaction
- End-to-end service management including tools to support performance monitoring, service assurance and SLA measurement

Features and Benefits

- **Metro Ethernet Services Unit 1800** is available in two configurations. Both versions are equipped with 24 x 10/100 Mbps customer facing ports. A DC power version supports two fixed Gigabit Ethernet (LX) network facing ports. An AC power version also supports two Gigabit Ethernet network facing ports, which accommodate small form pluggable (SFP) Gigabit interface connectors, including SX, LX and CWDM variants to meet various reach requirements.
- **Metro Ethernet Services Unit 1850** has 12 10/100/1000Base-T or SFP GBIC ports configured as a 4-port (10/100/1000Base-T and SFP combo) base unit. In addition there are 2 Media Dependent Adapter (MDA) slots, each of which can utilize a 4-port 10/100/1000Base-T MDA or a 4-port SFP GBIC MDA. The unit can be DC or AC powered.

- **Configurations available:**
 - 1800: 24 x 10/100 Mbps access, 2 Gig E trunk (fixed LX), DC power
 - 1800: 24 x 10/100 Mbps access, 2 Gig E trunk (SFP GBIC), AC power
 - 1850: 24 x 10/100 Mbps access, + 2 MDA slots, each of which can utilize a 4-port 10/100/1000Base-T MDA or a 4-port SFP GBIC MDA, AC or DC
- **Physical demarcation** and secure customer separation are provided.
- **Multiple services per port** for maximum revenue generation and flexibility
 - Internet access, VPLS, VoIP, VoD, IP-video broadcast and more
- **Cost-effective 1U high unit** – Efficient density for Greenfield build-outs or existing network infrastructures.
- **Ethernet access ring resiliency**
 - Sub 50 ms resiliency with efficient aggregation
 - Supports up to 14 nodes per access ring for efficient access aggregation
- **Supports variety of access methods**
 - Incoming traffic can be tagged (802.1Q) or untagged Ethernet or stacked VLANs.
- **IEEE 802.1Q/p and IETF DiffServ** - Enables multiple classes of service e.g. gold, silver and best effort, etc, and tiered services with appropriate prioritization and traffic management.
- **Packet classification** - Flexible classification is based on port, port + VLAN, port + VLAN + 802.1p bit, port + DSCP, and port + 802.1p combinations, source/destination IP address, TCP/UDP source/destination port, source/destination MAC address.
- **Granular rate enforcement** - Supports rate enforcement of committed information rates (CIRs) and burst window sizes, where packets can be policed in user configurable 1-Mbps increments from 1 Mbps to line rate. Policing parameters can be set on various combinations, including per port, per port per VLAN, per port per VLAN per 802.1p bit, per port per DSCP and per port per 802.1p basis.

- **Ease of management** - Command line interface, SNMPv1/v2 and management applications include Java Device Manager, Preside Service Provisioning, Preside Multi-Service Data Manager and Enterprise NMS for ease of management and flexibility to adapt to specific operation environment for the comprehensive Ethernet service provisioning, fault management and performance monitoring.
- **RMON** - Supports four groups of RMONs including statistics, history, alarms, events from remote monitoring and operational simplicity.
- **IGMP v1/v2** - IP multicast support by examining (snooping) all IGMP traffic in hardware at line rate and pruning unwanted data stream from affecting network or end-station performance.
- **End-to-end service management** including tools to support performance monitoring, service assurance and SLA measurement – Integrated end-to-end VPN continuity check ensures service is up and running at all times and that SLAs are met. SNMP and Web-based management tools simplify operations and reduce expense by easing configuration and decreasing implementation times and troubleshooting activities.

When combined with other Nortel products such as the Metro Ethernet Routing Switch 8600, the Optical Metro 3500 Multiservice platform and/or the Optical Metro 5200 platform, providers can offer profitable Ethernet VPN services over fiber, RPR or WDM.

Market Information

Nortel Metro Ethernet Services Unit 1800 simplifies delivery of Ethernet VPN services as part of an extremely scalable and resilient switched Ethernet solution. Its non-blocking architecture provides uncompromising performance in a 1U-high, cost-competitive solution. It delivers tunable bandwidth from

64Kbps to 100Mbps in granular increments. Packet classification/QoS and SLA management tools allow providers to offer tiered services to customers.

Nortel Metro Ethernet Services Unit 1800 is a high performance, cost-effective platform purpose built for the edge of provider networks as the delivery point for Ethernet-based services. It may be

deployed in either a ring-based or point-to-point topologies in the metro access network.

When combined with the Nortel Metro Ethernet Services Module 8668 for the Ethernet Routing Switch 8600, Nortel Metro Ethernet Services Unit 1800 provides 50 millisecond restoration time with the highest levels of scalability as well as the ability to map individual customer VLANs to separate customer VPNs.

Technical Specifications

	1800	1850
Physical Specifications	Weight 2.8 kg (6.2 lbs.) Height 4.4 cm (1.73 in.) Width 44.1 cm (17.3 in.) Depth 20.8 cm (8.19 in.)	Weight 4.7 kg (10.4 lbs.) Height 4.4 cm (1.73 in.) Width 44.1 cm (17.3 in.) Depth 36.6 cm (14.4 in.)
Performance specifications	Frame forwarding rate 8.8 Gbps switching fabric capacity (64-byte packets) 6.6 Mpps packet forwarding rate Port filtering performance (64-byte packets) Wire speed Address database size: 8K (64-byte packets) Max MTU size Up to 1600 bytes Data rate 10 or 100 Mbps user-facing	Frame forwarding rate 24 Gbps switching fabric capacity (64-byte packets) 17.9 Mpps packet forwarding rate Port filtering performance (64-byte packets) Wire speed Address database size: 16K Max MTU size Up to 9K bytes Data rate 10 or 100 or 1000 Mbps
Interface options	10Base-T/100Base-TX RJ-45 (8-pin modular) connectors for MDI-X interface 1000Base-X Small Form factor Pluggable	10/100/1000Base-T RJ-45 (8-pin modular) connectors for MDI-X interface 1000Base-X Small Form factor Pluggable
Electrical specifications	• AC power supply: 100 -240V AC, 47-63 Hz universal • DC power supply: -40 to -60V DC (48V Nominal) (48V Nominal)	
Environmental specifications	• Operating temperature 0° to 60° C • Storage temperature -25° to - 70° C • Humidity 5% to 95% non-condensing • Altitude 3,024 m (10,000 ft.) maximum	
Safety agency approvals	• UL60950-2000 • CSA 22.2 #60950-00 • IEC 60950/EN 60950 • UL 94-V1 flammability requirements for all PC boards • NOM-019	

Technical Specifications (continued)

Electromagnetic emissions	Meets the following standards: • US: FCC CFR47, Part 15, Subpart B, Class A • Canada: ICES-003, Issue 3, Class A • Australia/New Zealand: AS/NZS 3548 1995, Class A A1:1997/A2:1997 Class A • Japan: VCCI-V-3/02.04 Class A • Taiwan: CNS 13438, Class A • Europe: EN55022: 1998/A1:2000 EN61000-3-2:2000, EN61000-3-3:1995/A1:2001, CISPR 22:1997/A1:2000 Class A
Electromagnetic immunity	EN55024 :1998/A1 :2001

Ordering Information

For further information, please contact your local Nortel representative.

> Nortel Select Products

Nortel, a global leader in the convergence of Voice, Data and Multimedia has a vision of enriching global communications by transforming networks and eliminating boundaries. The Nortel Developer Program builds on this vision by establishing relationships with technology businesses whose innovation and customer insight and business strategies align with and complement Nortel.

Nortel has strategically selected products from this developer community that we believe will create significant value for our customers. These Nortel Select Products, chosen as a result of business plan analysis and customer input, may be co-marketed by Nortel, or, in some cases, may be ordered through Nortel, providing one-stop shopping for these “best-in-class” products.

Purchasing orderable Select Products through the Select Product Program enables eligible Nortel customers to eliminate the need to establish multiple sales/ reseller agreements with each individual Select Product vendor.

Select Products also uniquely provide “peace of mind” for our customers, as these products must achieve Nortel Compatible Product status to be eligible for Select Product designation. Further, maintenance of Compatible Product status throughout new software releases of the Select Product and its supporting Nortel communications platform is required to retain Select Product status.

Nortel Select Products are strategic building blocks for Nortel innovative architecture and assist in providing our customers with the most effective and efficient solution for their communications needs.

Nortel Select Products are available on a regional basis. For regional availability or more information on all Nortel Select Products, please visit our website at www.nortel.com/select or contact us via email at select@nortel.com in North America or SPP_EMEA@nortel.com in EMEA.

- AMC Multi-Channel Integration Suite™
- Citrix Application Gateway
- Concord Communications eHealth® Suite
- ConverTec's Console.NET
- ipDialog's ManiTone™ NN SIP phone
- Mediatrix VoIP Access Devices and Gateways
- Mertek's JCS Cable Assembly
- Opsware Network Automation System (NAS)
- Powerware Network Energy Source (NES)
- Symon Communications Symon Enterprise Server

AMC Multi-Channel Integration Suite™

Overview

AMC Multi-Channel Integration Suite, from AMC Technology, is a suite of enterprise application software components that provide pre-packaged integration between leading CRM applications such as Microsoft, mySAP, and PeopleSoft and a full range of Nortel contact center solutions and communications servers. Through this integration, customers can more efficiently manage customer interactions and deliver superior levels of customer service.

The AMC Suite supports a full range of Nortel contact center solutions and communications servers including Communication Server 1000, Business Communication Manager (BCM) and Symposium Call Center Server (SCCS). Support is provided through standard Nortel CTI server interfaces including Nortel Communication Control Toolkit (NCCT) and LAN CTE for BCM.

The AMC Suite allows contact centers to enable telephony (CTI) functionality in their CRM desktop including softphone controls, caller identification, and screen population. Agents and knowledge workers can place, receive, and transfer customer interactions with full, real-time access to CRM customer data. Call routing can be enhanced using business rules and customer data residing in the CRM application to ensure that the right customer reaches the right agent at the right time.

The server-based, open architecture of the AMC Suite allows customers to manage a true multi-provider environment leveraging existing or new infrastructure investment. Used everyday by thousands of agents around the globe, AMC solutions help innovative organizations to work more effectively and deliver higher levels of customer service.

Ideal For

The primary target market for the AMC Multi-Channel Integration Suite™ is contact centers that have deployed, or are considering deployment of, packaged CRM applications such as mySAP CRM, PeopleSoft CRM and Microsoft CRM for their agents and knowledge workers. This includes contact centers of all types and sizes, supporting companies in all industries and geographies.

Business Challenges

- How can I improve the 'customer experience' through more personalized, tailored, and/or expanded customer service?
- How can I improve operational effectiveness through more efficient processes, distributed or centralized staffing, and/or simpler, consolidated desktop applications?

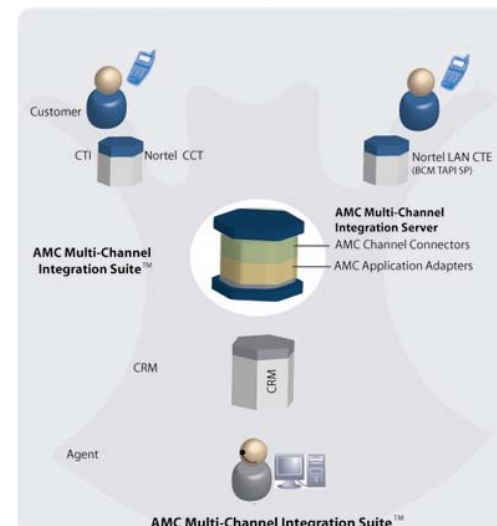
Typical Applications

The typical customer profile is a company that has deployed a packaged CRM application and has recognized the need to integrate with contact center and/or voice communications systems to enhance their ability to serve their customers and to improve operational effectiveness. Frequently, these are companies that are going through a significant investment or upgrade in their contact center infrastructure to achieve specific business objectives. These companies may have large and/or distributed contact centers that can leverage the investment in common systems.

In addition, these enterprises will frequently have deployed the CRM application across other functions such as sales, marketing personnel and internal IT functions. These knowledge workers can also benefit significantly by enjoying the same integration between CRM and telephony as their contact center agent colleagues.

Network Diagram of Typical Deployment

(Where the product resides in the network architecture)



Features and Benefits

Key Features

- Provides pre-packaged integration with leading CRM applications and Nortel contact center solutions.
- Enables full telephony functionality in CRM application desktop including softphone controls, caller identification and screen population.
- Supports standard Nortel CTI server interfaces including Nortel Communication Control Toolkit (NCCT) and LAN CTE for BCM.
- Provides a robust, proven architecture that has been successfully deployed at numerous large enterprises worldwide.
- Supports call control functions including agent login and work mode, telephony channel, conference, transfer, and outgoing call handling.
- AMC Multi-Channel Integration Suite for MS CRM also includes enablement of full email channel functionality.

Key Benefits

- Expands the functionality of the CRM agent-desktop to support full contact center capabilities.
- Allows agents to effectively place, receive, and transfer interactions with full, real-time access to customer data in the CRM application.
- Enables real-time management of customer interactions in a true multi-provider environment leveraging existing or new infrastructure investment.
- Provides a verified solution for efficient implementation and a lower total cost of ownership.

Ordering Information

For further information, please contact the Nortel Select Product Program at (615) 432-4995 or select@nortel.com.

Citrix Application Gateway



Overview

The Citrix (f/k/a Net6) Application Gateway and Voice Office application suite are used by organizations to deploy and manage multiple applications across a broad range of devices including Nortel IP Phone 2004 screens.

IP telephony systems converge voice and data communication onto one network, reducing network costs by merging voice traffic with data traffic on the corporate network. Managing one network means bandwidth is used as efficiently as possible and enables savings in staff and maintenance tasks.

As a result, the benefits of IP telephony have primarily been for telecom or networking departments. The promise of this convergence of voice and data has remained unfulfilled to the end users of these systems. Citrix Voice Office application suite and Application Gateway deliver the benefit of IP Telephony to users by providing practical, converged applications.

Voice Office applications further leverage IP telephony investments by increasing user productivity, simplifying user interaction, reducing user training, and enhancing organizational communications.

Ideal For

Voice Office applications from Citrix are ideal for any user in any organization—regardless of industry or department. Voice office enables organizations to take advantage of their converged IP telephony infrastructure by delivering applications that are focused on making users more productive and saving time. Without Voice Office, user productivity can be constrained by the lack of basic functionality. For example:

- How many voice mail users can rewind a message or perform other simple operations that enable them to be more productive?
- Even though every PBX ships with a directory, why do users spend extra time on looking up information via web directories and manually dialling instead of using the innate PBX directory?
- When someone joins a conference bridge, why does the conference chairperson always have to interrupt the meeting to ask “who joined the bridge”?

- How does the chairperson easily mute one or more users on the bridge that have cell phone static or are in noisy environments?

By making existing applications easier to use or creating entirely new converged applications, Voice Office applications solve the issues mentioned above, thereby increasing user productivity, reducing help desk calls, and simplifying user interaction.

Business Challenges

- How do you fully leverage your converged IP telephony infrastructure?
- How do you reduce voicemail training and help desk calls as well as enable all employees to fully utilize their voice mail system?
- Do you want to provide a directory on phones that employees will actually use, which also saves them time and reduces the need for a live attendant?
- Do you want to provide a directory on phones that provides LDAP integration which also auto-updates?

Typical Applications

Voice Office applications help with the business challenges mentioned above. In a Nortel Business Communication Manager (BCM) or Nortel Multimedia Communication Server 5100 (MCS 5100) environment, Voice Office includes:

- **Express Directory** provides an auto-updating, LDAP-based, organization-wide directory with single keystroke per letter entry. This new directory user interface reduces the time to look-up and dial in by 75% over current solutions as well as the need for live attendants.
- **Visual Voicemail** enables users to see a visual list of their voice messages with the ability to select the most important ones to review, without having to listen to each message in a serial fashion. During message playback, the user can call sender, reply, fast forward, rewind, etc. using labelled soft keys rather than using cryptic control codes.

In a Nortel Communication Server 1000 (CS 1000) environment, Voice Office includes the two features above as well as:

- **Conference Manager** enables Nortel Integrated Conference Bridge (ICB) audio conference management right from the screen of the Nortel IP Phone 2004 including count and announce attendees, drop and mute individual participants, schedule an ad-hoc conference, add 15 minutes to conference, etc.

Voice Office applications are delivered securely and in real-time through the Citrix Application Gateway and are developed using standard APIs such as LDAP and IMAP as well as proprietary APIs into telecom systems such as Nortel Messaging.

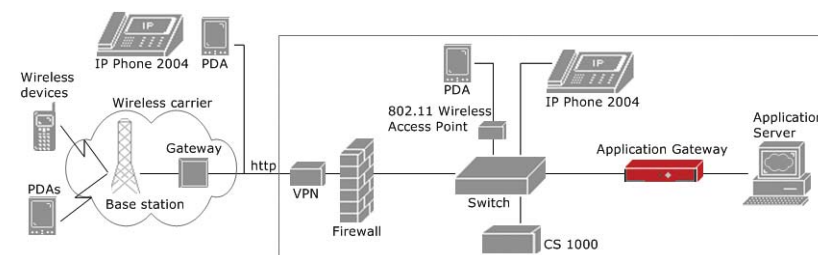
Additionally, any existing HTML/XML application can be transformed into the proper format for use on the screens of the Nortel IP Phone 2004 using the Citrix Design Studio. This enables companies and organizations to leverage applications that they have developed for PC access instead of creating proprietary applications from scratch—all while ensuring that these applications look like they have been custom developed for each type of device.

Example transformed applications include:

- **Enterprise Applications** – E-mail, intranets, conference room booking, company dashboards, time clocks
- **Sales Force Automation** – price lists, sales dashboards and order status
- **Manufacturing and Distribution** – Real-time inventory management and factory-floor automation
- **Hotels and Retail Establishments** – virtual concierge services, reservation management, restaurant listings, price checks, item locator, inventory check
- **Hospitals and Pharmacies** – online reference libraries, patient tracking and resource scheduling applications
- **Education** – School attendance, lunch menus, campus maps and events

Network Diagram of Typical Deployment

(Where the product resides in the network architecture)



Key Points

- Applications deliver the benefits of IP telephony to users
- Packaged applications provide immediate value without any integration or development work whatsoever
- Transformation capability leverages the time, resources, and capital that an organization has spent developing its application portfolio instead of building applications specifically for the screen of the Nortel IP Phone 2004 from scratch
- Simple, easy to use Design Studio enables a "point and click" approach, which provides the ability to rapidly transform applications for interaction on the screen of an Nortel IP Phone 2004 or wireless device
- Future proof--An application transformed using the AG will automatically support new IP Phones by simply downloading a new device definition file for that phone

Features and Benefits

Voice Office applications further leverage IP telephony investments by increasing user productivity, simplifying user interaction, reducing user training, and enhancing organizational communications.

Express Directory Benefits

- Saves employees time
 - Single keystroke per letter entry
 - Look-up in one-fourth the time of a regular directory
- Organizational-wide visibility
- Soft-dial the selected telephone number

Visual Voicemail Benefits

- Browse mailbox at a glance
- Soft key playback control reduces:
 - Training
 - Support calls
- Visual indication of number of messages

Conference Manager Benefits

- Control the conference without cryptic TUI (telephone user interface) commands
- Mute noisy lines right from the screen of the phone
- View who has joined or left the call right from the screen of the Nortel IP Phone 2004

Overall Solution Benefits

- Provides the benefits of a converged IP telephony network to end users by delivering applications that increase user productivity
- Immediate value from the packaged applications and also have the ability to transform their existing applications for interaction using the Nortel IP Phone 2004 or wireless device
- Transformation capability leverages applications developed for PC access instead of creating new applications from scratch
- Nortel IP Phone 2004s can be used as a cost effective alternative to PCs, computer terminals, and other data entry devices such as time clocks

Market Information

With over 600 Application Gateways shipped, Citrix is a market leader in delivering applications to the screens of IP telephones. The Citrix Application Gateway has won the Internet Telephony "Product of the Year" award twice.

Ordering Information

For further information, please contact the Nortel Select Product Program at (615) 432-4995 or select@nortel.com.

Concord Communications eHealth® Suite

Overview

Concord's eHealth Suite empowers network managers to take control of network performance and ensure Quality of Service across the network portion of the infrastructure. eHealth Suite is the only solution that manages, troubleshoots and fine tunes every computerized business process across applications, systems, and networks.

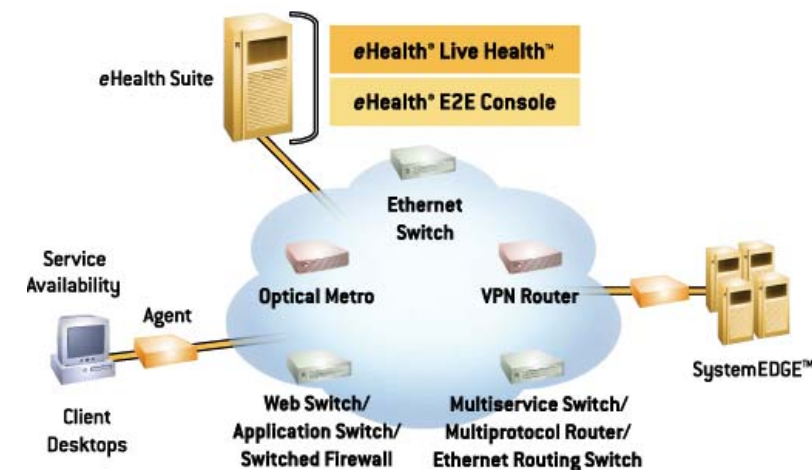
Ideal For

The customer profile for the eHealth products and services is any customer looking to facilitate unified fault and performance management of converged networks, while requiring industry-leading technologies such as those provided by Nortel and Concord.

Typical Applications

Any customer that has deployed, or is interested in deploying, voice solutions over a data network, a data network, or a combination of both, are in need of a management solution that assists in defining capacity planning measures, intuitive reporting, identifying trends, and that articulates service level agreements.

Network Diagram of Typical Deployment



Features and Benefits

Concord's eHealth Suite enables Nortel customers to:

- Manage performance and availability of LANs, WANs, Routers, Switches, Frame Relay, ATM, Remote Access Equipment, QoS, Wireless LAN, DSL, VoIP, and Cable technologies
- Ensure IT infrastructure equipment can withstand peak activity periods
- Measure network usage patterns to identify when to downgrade or where to re-deploy under-utilized resources
- Measure current performance to set service level goals and document subsequent performance for internal clients or for customers to verify compliance with service level agreements (SLAs)
- Identify which resources are at risk of failure with the help of embedded intelligence that allows you to prevent outages and ensure availability
- Perform continuous, active tests to identify faults and response degradation for network circuits
- Leverage existing investments through open integration with various Nortel tools

Market Information

Target markets for Concord's eHealth suite include banking, hospitality, insurance, healthcare, manufacturing, retail, higher education, government, service providers, enterprise, and carrier markets, as well as others.

Ordering Information

For further information, please contact the Nortel Select Product Program at (615) 432-4995 or select@nortel.com.

ConverTec's Console.NET

Overview

Console.NET, a PC-based attendant console for the Nortel Business Communications Manager (BCM) 200/400, provides the capability for Attendants to answer and direct callers in a more informed and professional manner. Using a web browser interface, attendant console capabilities can be extended to those that need it, giving them the power to handle calls effectively and efficiently.

Ideal For

Console.NET is ideal for a business that uses a live Attendant to greet and direct their customers.

Business Challenges

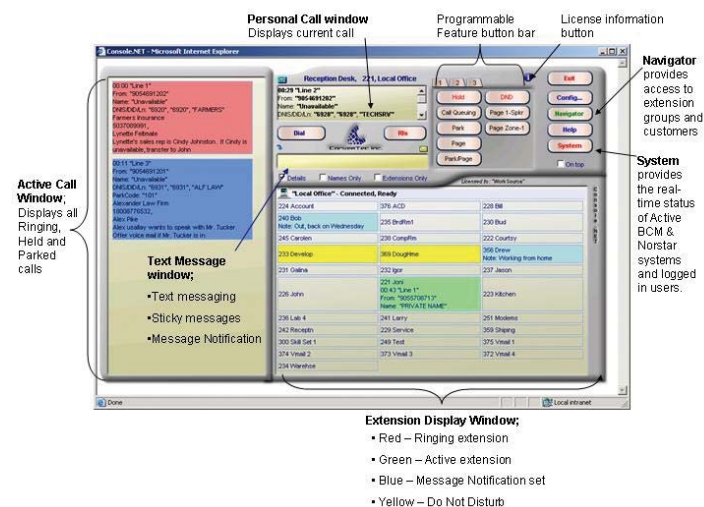
Which person in an organization can be a major influence of how that organization's image is presented? If you answered the Attendant, you are correct.

With the competitiveness of business today, the need to differentiate your company from the others is crucial. Organizations using a live

Attendant to answer calls rely on the Attendant to present the image of the company to the caller.

Typical Applications

Even before answering a call, Console.NET presents information pertaining to the caller to assist the Attendant in directing the call to the appropriate person or group. By default, incoming call information provided for the Attendant includes; CLID, DID/DNIS, Line name and number, target line name and ring time. Enable Call Preview and display even more information pertaining to the caller including; Company name, Contact name and notes such as who the caller usually speaks with.

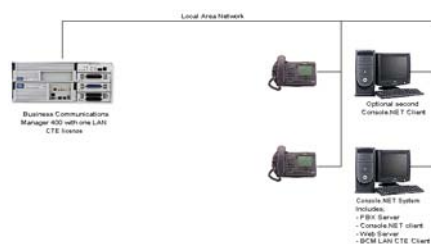


An Attendant may elect to monitor a specific group of extensions or all extensions including voice mail, Hunt Groups and Skill set Transfer DN's. All telephone functions are provided by Console.NET including;

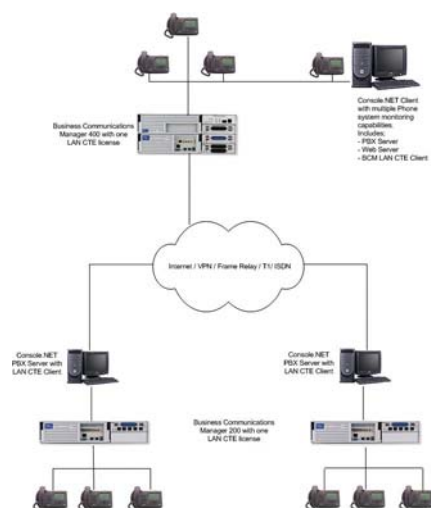
- Answer
- Call Queuing
- Hold
- Park

- Park/Page
- Transfer (blind & screened)
- External Transfer
- Conference
- Page (zone control & speaker)
- Voice Mail Transfer
- Voice Call
- Dial, Speed Dial

Network Diagram of Typical Deployment



Traditional Console.NET architecture - The Console.NET Web Server and PBX Server, along with the BCM LAN CTE Client are running on one Windows 2000 or XP PC. Additional Console.NET client licenses may be added.



Multi-site Console.NET architecture - In this configuration, a single Console.NET user can monitor, in real-time, the status of remote users on a networked or non-networked BCM's. Each remote site must have a Console.NET PBX Service running with a single BCM LAN CTE license.

Key Points

- Console.NET is a "browser based" application, meaning access to Console.NET is through Microsoft Internet Explorer.
- Monitor telephone activity not only your own office but also branch offices. Console.NET may be used in a single site application or may be used to monitor telephone activity from multiple BCM 200/400's.
- Color coded extension buttons allow you to see the status of an extension quickly. Idle, active, ringing, DND, message notification and out of service are all easily viewed with Console.NET.
- Console.NET is a global product with multi-language support. Languages supported include; English, French Canadian, French, German, Italian and Spanish. The language is automatically selected based upon Internet Explorer's language setting.
- In a Business Center environment, Console.NET will provide the Attendant specific greetings to read, DID/target line name, Contact information including email and web site addresses, plus much more.
- Requires just one BCM 200/400 LAN CTE for as many Attendants as you require.
- Easy to install, setup and train. Console.NET was designed with the Telephone Technician in mind. No special network or computer training is necessary.
- Install Console.NET on any Windows 2000 Pro or XP PC or Server and anyone with LAN WAN or internet access can operate Console.NET.
- Multimedia Sales Demo CD's available.

Features and Benefits

Console.NET provides a number of advanced features including;

- **Text Messaging** provides the ability for the Attendant to send a text message to the display of a Nortel telephone to notify a busy employee of a call.
- **Sticky Notes** is a feature that allows the Attendant to attach a new or pre-defined message to a call. This assists an Attendant when having to go back to a caller who has been Parked or placed on Hold
- **Message Notification** allows Attendants to type a message that appears on an extension button to assist them in being better informed as to the status of employees
- **Comprehensive Reporting:** Console.NET provides information related to telephone calls both into and out of an office along with intercom calls between employees. Reports include:
 - Calls by Customers
 - Call type to Extensions
 - Inbound Calls by Extensions
 - Outbound Calls by Extension
 - Intercom Calls
 - Calls by DID/DNIS
 - Call Duration

Ordering Information

For further information, please contact the Nortel Select Product Program at (615) 432-4995 or select@nortelnetworks.com.

ipDialog's ManiTone™ NN SIP phone



Overview

The ipDialog ManiTone™ NN SIP phone integrates seamlessly with Nortel Multimedia Communications Server 5100 (MCS 5100) and Communications Server 1000 (CS 1000) systems, and allows customers added flexibility in deployment of IP telephony services. It leverages the SIP standard to provide advanced calling, conferencing, and messaging features, and protects investments with an upgradeable flash-based architecture.

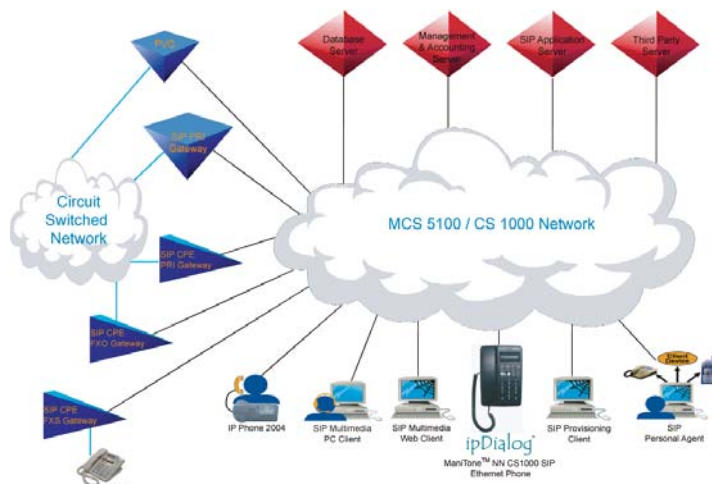
Ideal For

The ManiTone™ phone is ideally suited for use in business enterprises of all sizes. The phone is robust in design, provides an advanced feature-set for business use, and yet is surprisingly cost-effective.

Business Challenges

Do you find that your phone system is old technology and does not provide you with the telecommunication features that modern businesses require? As you upgrade to new, competent technologies such as the Nortel MCS 5100 and the CS 1000, will you not need cost-competitive Ethernet phones that complement those servers?

Network Diagram of Typical Deployment



Key Points

The Nortel MCS 5100 and the CS 1000 enable feature rich IP telephony and multimedia deployments based on open standards. The ipDialog ManiTone™ NN SIP phone ably complements the suite of components that comprise an MCS 5100 / CS 1000 deployment. The ManiTone™ phone is a full-featured Ethernet phone that helps accelerate the deployment of IP telephony services for business customers. Fully tested for interoperability with Nortel MCS 5100 and CS 1000, it is based on the widely deployed SIP standard. It is designed to meet the varied feature requirements of enterprises and system integrators, and is flash memory upgradeable for investment protection. The phone offers a robust design, excellent voice quality, a rich and intuitive user interface, and a comprehensive feature set.

The ManiTone™ phone's built-in Ethernet bridge facilitates deployments within an existing office infrastructure by allowing the phone to share an office LAN port with a PC or other computing equipment. Remote configuration and upgrade capabilities provide ease of management and reduce the total cost of ownership.

Key Benefits

- Comparable in features to high-end legacy phones
- Cost-effective implementation
- Can be configured remotely
- Flash upgradeable design for investment protection

Key Features

VoIP

- Native support of SIP (RFC 3261)
- RTP Payload for DTMF Digits (RFC 2833)

Advanced Calling Features

- Two simultaneous call appearances
- Conference calling (with or without server assist; has on-board mixer)
- Call hold
- Call waiting
- Call forwarding

- Call transfer (blind and consultative)
- Call return (*69)
- Caller ID
- Call waiting caller ID
- Configurable dial plans

Enterprise Phone Functionality

- Ethernet bridge with 2 RJ45 jacks
- Hands-free full-duplex speakerphone
- May be powered from a LAN switch or hub (PoE)

User Interface

- Voicemail retrieval via keypad
- Keypad dialing
- Speed dial from phone book
- Menu layout for easy navigation via LCD
- Tracking of missed/outgoing/incoming calls
- Busy and fast busy tones
- Volume control
- Ringer level control

Display and Indicators

- 2 lines x 16 characters display
- Message waiting indicator (MWI)
- Speakerphone and mute indicators

Configuration, Management, and Software Upgrade

- Web server-based configuration and status check
- Auto-configuration via TFTP across gateways
- Update phone book via web server
- Software upgrade via TFTP
- Headset jack

Market Information

The ManiTone™ phone is uniquely positioned in the market as a feature rich yet cost-effective SIP phone. The above-mentioned list of advanced features, and interoperability with Nortel MCS 5100 and CS 1000 systems clearly put the phone miles ahead of the competition.

Ordering Information

For further information, please contact the Nortel Select Product Program at (615) 432-4995 or select@nortel.com.

Mediatix VoIP Access Devices and Gateways



Overview

Mediatix analog units are designed to protect customer investment in existing analog devices by connecting up to twenty-four phones, faxes or modems to an enterprise VoIP network. For enterprise end-users, the devices provide simple, transparent and cost-effective integration to an IP-based telephony infrastructure without the need to discard existing analog equipment.

Mediatix analog units can also be used to provide IP connectivity to legacy PBX or Key systems, either through analog CO trunk ports or analog extension ports. This capability allows legacy system users to take advantage of VoIP benefits, while preserving the investment made in legacy phone systems.

Mediatix analog units provide enhanced management capabilities with the Mediatix Unit Manager Network, a SNMP-based element management system, designed to allow the remote management and configuration of a large installed base of Mediatix units. Support for leading signaling protocols, high-compression codecs, T.38 and QoS standards ensure that Mediatix analog units provide a superior level of quality.

Ideal For

- Enterprises that want to migrate to VoIP but cannot cost justify a complete "forklift" approach
- Enterprises migrating to VoIP that have an installed base of analog phones/faxes/modems, legacy phone systems or IVR's that need to be retained in the VoIP environment for reasons of cost, functionality or retaining user habits
- Enterprises migrating to VoIP with small branch sites of 1-20 users including homeworkers
- shipping docks, factory floors, dorms, labs, retail outlets or customer hotline phones)
- Are you implementing VoIP and need to connect your fax machines and/or modems to your VoIP network?
- Do you have branch offices that are connected to the PSTN today and you would like to reduce the recurring cost of telephone lines and intra-office long distance charges?
- Are you considering migrating to a VoIP solution, but want to retain your existing IVR system to avoid changing local phone numbers or user habits?

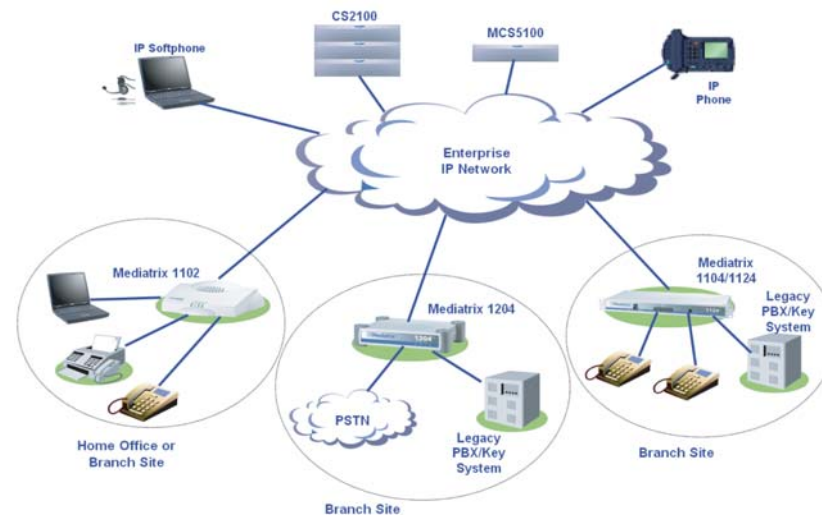
Business Challenges

- Are you considering migrating to VoIP, but find that the business case is not attractive with a "forklift" solution because your installed base of legacy equipment is too costly to replace?
- Are you considering migrating to VoIP, but have sites that do not need to upgrade to the functionality of IP phones? (eg warehouses,

Typical Applications

- Connect faxes and modems to a VoIP network
- Connect remote analog phones and faxes to a VoIP network
- Interface between a VoIP network and a legacy IVR system
- Converging legacy telephone systems to a VoIP network
- Connect customer hotline phones to a VoIP network

Network Diagram of Typical Deployment



Key Points

- Provides an option for customers who do not want to change out all equipment on their network.
- Allows enterprises to retain legacy equipment, improving the business case to implement VoIP
- Highly cost effective on a per port basis versus IP phones
- PSTN-quality voice over IP networks
- Standards compliant
- Deployable in SIP and MGCP
- Remotely manageable and upgradeable¹
- Fax over IP support, including T.38
- Multiple codec support
- QoS Support
- Up to 24 simultaneous calls supported² regardless of codec used
- FXS and FXO units available
- PSTN Fallback on power outage or network failure

Features and Benefits

Features	Mediatix Analog Units
IP Telephony Protocols	SIP (1100 Series and 1204 only), MGCP/NCS (1100 Series only)
Telephony Features Supported	- Caller ID, Call Waiting, Caller ID on Call Waiting, Call on Hold, Call Forward, Call Forward on Busy or on No Answer, Call Transfer with or without Consultation, 3-Way Conferencing Call Transfer with 3-Way Conferencing Consultation, Dynamic De-Jitter Buffer Manager, Voice Activity Detection - in MGCP, over 280 telephony features/services supported
Vocoders	G.711 (A-law, μ -law), G.723.1, G.729a,ab
Echo Cancellation	G.168
Silence Suppression	Silence detection / suppression and Comfort Noise, Generation level software adjustable
Network Management Protocols	SNMPv3, TFTP, DHCP
Real-Time Transport Protocols	RTP/RTCP per RFC 1889 and RFC 1890, RFC 2833, RFC 3389
Ethernet Connection	1102: 2 RJ-45 connectors, 10/100 BaseT Ethernet access 1104, 1124 and 1204: 1 RJ-45 connector, 10/100 BaseT Ethernet access
Analog Connection	1102, 1104 and 2102: 2 or 4 RJ-11 connectors, analog phone/fax (FXS) interface 1124: 1 RJ-21X TELCO 25 pairs connector, analog phone/fax (FXS) interface 1204: 4 RJ-11 connectors, analog line (FXO) interface
Bypass Connection (1104, 1124)	1 RJ-11 connector, PSTN bypass
QoS	ToS, DiffServ, 802.1p, 802.1Q
Real-Time Fax	Group 3/Super G3 Fax real-time FoIP over clear channel (G.711) or T.38

Ordering Information

For further information, please contact the Nortel Select Product Program at (615) 432-4995 or select@nortel.com.

1. Using the Mediatix element manager the UMN. The UMN can be purchased through Nortel.
2. Number of calls supported depends on model

Mertek's JCS Cable Assembly



Overview

The JCS Cable Assembly is a fully sheathed, pre-labeled wiring system designed specifically for the Meridian 1 PBX IPE shelf. This cabling system completely and effectively replaces the standard cabling used by installers today. There are no screws to remove and no individual cables to dress; and, one JCS Cable replaces eight standard 25-pair cables for the Meridian 1 PBX 61C-81C. Mertek also offers a JCS Cable for the Meridian 1 PBX 11C. Because of its unique design, only one JCS Cable assembly per Meridian 1 PBX 11C cabinet is required, not ten, just one.

Ideal For

The JCS Cable Assembly is ideal for any Meridian 1 PBX installation, existing or new. The most immediate benefit is realized in new installations, but is also invaluable in PBX expansion or relocation.

Business Challenges

- Do you want to save time and money on your installation?
- Do you want a more professional, enhanced overall appearance for your Meridian 1 PBX?

Typical Applications

JCS CABLE ASSEMBLY MERIDIAN 1 PBX 61-81C

This cable is designed to fit both the right and left side of the Meridian IPE module. Each cable is marked with the corresponding letters from the back of the IPE template. Each 25 pair binder is individually separated using standard color code markings.

JCS CABLE ASSEMBLY MERIDIAN 1 PBX 11C

The Meridian 1 PBX 11 cable is designed to slide directly onto the base of the Meridian 1 PBX 11C cabinet. Before installing onto the cabinet, the installer must determine if the cable should run to the left or right. Simply remove the four screws on the back of the assembly and remove the small cover. Route the cable to the direction of your choice and replace the cover. Once this is complete, the installer is ready to install the JCS Cable. Each 25-pair binder is individually separated using standard color code markings.

Network Diagram of Typical Deployment



Key Points

- 1 JCS Cable replaces eight standard 25-pair cables for the Meridian 1 PBX 61C-81C
- 1 JCS Cable replaces the standard 10 cables required per Meridian 1 PBX 11C

Features and Benefits

- Will save you 50% or more on labor and materials costs.
- Will enhance the overall appearance of your Meridian 1 PBX.

Ordering Information

For further information, please contact the Nortel Select Product Program at (615) 432-4995 or select@nortel.com.

Opware Network Automation System (NAS)

Overview

Opsware Network Automation System (NAS) (f/k/a Rendition Networks TrueControl) is a network configuration control solution, providing organizations with an enterprise-class solution designed to both decrease the number and duration of downtime incidents through increased visibility to changes and awareness of how those changes impact the entire network. TrueControl enhances internal network security as it relates to infrastructure configuration control. Additionally, TrueControl, by serving as the enforcement arm for change control policies and procedures, can enable an unprecedented level of change control conformity and regulatory compliance.

Opsware Network Automation System enables organizations to get the most out of their current IT infrastructure by dramatically decreasing the management overhead associated with controlling the configuration for each network device: both centralizing and automating a wide variety of time-consuming and repetitive management tasks. These capabilities have the end result of decreasing both the potential for error that is associated with repetitive tasks, as well as increasing the amount of time available to skilled network professionals for more mission critical tasks.

Opware is a leading provider of Network Configuration Control, enabling enterprises to increase network uptime and ROI.

Ideal For

Target markets for Opsware NAS include Fortune 2000 businesses in all vertical markets and federal, state, and local governments.

Any organization with more than 150 network devices (routers, switches, managed hubs, firewalls, load balancers, etc.) are excellent candidates to receive value from Opsware NAS. Ideally, these businesses would be researching network configuration control solutions, although the education process for this solution is minimal.

Opsware NAS enhances Nortel solutions by providing a central location to manage the configurations of your network devices, by creating a central point of access to network devices that enforces and supports corporate workflow and access policies, and by enabling compliance efforts through leading audit trail capabilities.

Business Challenges

- Do you need a reliable performance monitoring and management solution?
- Is a secure and available network important to your business?
- Is Quality of Service (QoS) important to your business?

Typical Applications

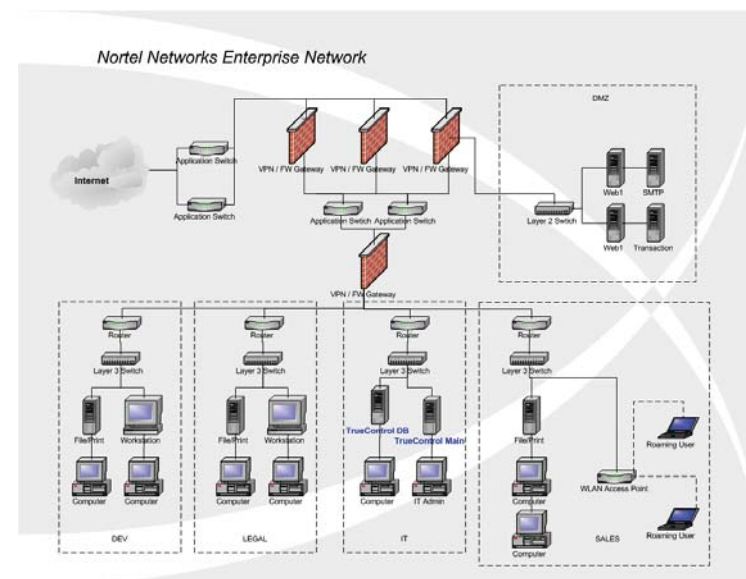
Nortel, as a networking infrastructure vendor, provides customers with a large variety of equipment for converged networks, including both data and voice equipment. Data equipment includes products such as Firewalls, VPN gateways, core layer 3 switches, routers, layer 2 devices, WLAN equipment, and more. Voice related equipment includes call center systems, multimedia gateways and more. Hence, it is important for customers to be able to control the configuration of such a diverse and complex network. Opware NAS was

developed with the goal to provide network administrators a centralized tool for network administration and configuration control in such diverse and complex environments.

Opware NAS can provide an effective solution for management issues that occur in complex networks by reducing the number of downtime

incidents, decreasing the time it takes to repair outages that do occur, enabling compliance, and increasing operational efficiencies. Opsware NAS provides these benefits through advanced capabilities that include: real-time change detection, configuration audit trails, policy management, template-based device provisioning, and robust device software patch management.

Network Diagram of Typical Deployment



Key Points

- Real-time and historical network performance monitoring
- Multicast real-time performance monitoring
- Centralized network access management
- Enterprise-wide security policy management and device configuration integrity
- Centralized OoS provisioning

Features and Benefits

Opsware NAS delivers features that improve root cause analysis and reduce mean time to repair (MTTR). Features include:

- A simple Web-based graphical user interface to

manage devices from multiple vendors, as well as a text-based command line interface that provides Telnet or SSH access.

- Real-time change detection that enables administrators to quickly pinpoint incorrect configurations and easily roll back the network to a known stable state with one mouse click.
- Proactive policy enforcement that ensures network devices are only configured in accordance with approved policies, reducing the chance that an incorrectly configured device could adversely impact your network.
- Automation of time-consuming configuration changes, such as password changes, across network devices.

- Advanced template capabilities that provide the capability to add new devices quickly and maintain existing devices easily, minimizing time on repetitive tasks and reducing security risks.
- Enhanced policy compliance that delivers detailed audit trails for device changes, historical configuration archives, and the ability to enforce management processes.
- Effective integration with other network management systems to eliminate data duplication and synchronization problems.
- Real time data, including search and reporting capabilities and email notification, for IT decision-making.

Ordering Information

For further information, please contact the Nortel Select Product Program at (615) 432-4995 or select@nortel.com.

Powerware Network Energy Source (NES)



Overview

The Powerware Network Energy Source (NES) is an easily installed, highly reliable, battery-backed DC power supply for IT data networks connected to the Nortel Ethernet Switch 460-24T-PWR. It is the cost-effective way to provide 48V DC power, with up to 4 hours battery reserve capability, to keep data network equipment operating in blackouts and other emergencies.

Ideal For

The Powerware Network Energy Source (NES) is the only battery-backed 48V DC power system designed specifically for IT environments. It is easy to size, easy to install and operate, and has web-enabled monitoring features with email alerts if attention is required.

The Powerware NES is available in three standard sizes that can be expanded using extra battery modules. This allows systems to be configured to suit the amount of network equipment to be powered and whatever battery backup time is required.

Business Challenges

- Do you use or want to implement power-over Ethernet?
- Do you want the same reliability as your PBX?
- Is a UPS good enough for your telephony system?
- Is it important that your IP office phone system continues to operate during an extended power blackout?
- Do you have critical data or communications equipment that must continue to operate during an extended power blackout?

Typical Applications

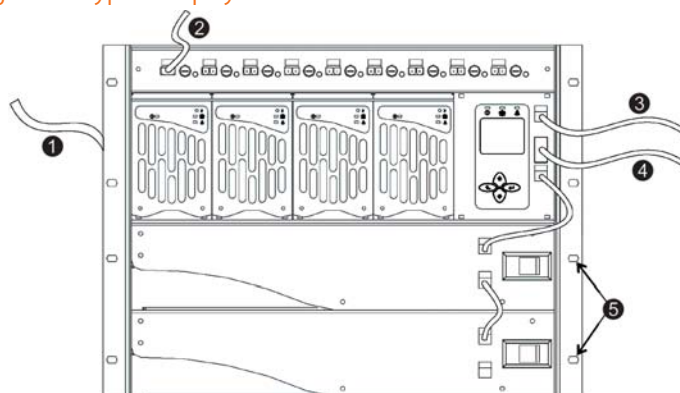
The NES is designed to power the Nortel Ethernet Switch 460-24T-PWR or any data communications equipment that accepts 48 V DC input. This includes servers and routers providing VoIP, e-commerce or other mission critical services.

The system is modular and has inbuilt batteries so that it can be correctly sized for the amount of equipment to be powered and the back-up time required.

The Powerware NES fits into a standard 19-inch equipment rack and is designed to install into a typical wiring closet or server room environment.

Connection from the NES to the Nortel Ethernet Switch 460-24T-PWR or other network equipment is via simple patch cables using standard Molex connectors compatible with Nortel data communications equipment. Each connection is individually fused and alarmed for added safety.

Diagram of Typical Deployment



- ① AC power lead (one or two depending on model).
- ② DC output power leads (plug type: Molex 44441-2002).
- ③ Ethernet 10BaseT connection (plug type: RJ45).
- ④ RS-232 serial connection (plug type: D9F).
- ⑤ Mounting holes to suit standard 19-inch equipment rack.

Key Points

- Suits all 48V powered data communications equipment

Features and Benefits

Designed for use in IT environments	Can be easily installed with data communications equipment using standard 19" rack mount.
Easy to install and operate	Does not require any specialist expertise or tools. Competent IT personnel are able to install, operate and manage the system.
Telecom grade standby power	Standby power reliability that is provided to PABXs can now be made available to PoE devices using the NES.
4 hours or more battery reserve	Will continue to power critical data communications equipment during prolonged power outages avoiding costly loss of service.
System diagnostics	The built-in intelligence of the NES provides full system diagnostics including battery charge indicators to show the state of health of the battery packs. The patented smart battery monitoring system shows vital battery system data including accurate battery capacity measurement and reserve time remaining. All in real-time.

Ordering Information

For further information, please contact the Nortel Select Product Program at (615) 432-4995 or select@nortel.com.

Symon Communications Symon Enterprise Server

Overview

Symon Enterprise Server' (SES) is a real-time middleware application providing high impact visual messaging, reporting, and alerting solutions for unifying Nortel contact center data and other Key Performance Indicators (KPIs). SES collects, distributes, and reports enterprise real-time and historical data for all major platforms used by today's contact centers. SES brings technology, information and communication together, eliminating data silos and reducing operating costs while increasing productivity and performance.

SES Highlights:

- Wide Array of Pre-Built Input 'Collectors'** – Easy point and click integration to SCCS and SECC
- 'Snap-In' Data Interfaces** for rapid deployment using toolkits including on-demand drill down views of pre-defined Symposium canvasses
- Multi-Site, Multi-Vendor, Multi-Platform and Multi-Database Consolidation for Call Centers** – Reporting for ACDs, dialers, CRM, IVRs and HelpDesk applications and more
- Scalable** – Start small and grow the Enterprise Real-time Data Fabric. Expand to an unlimited number of data sources and Display Media End Points.
- Use graphics & full-motion video** for corporate and employee communications and in-seat agent training.

Display Options:

- Agent Scorecards** – Deskview offers pop to top, threshold agent alerting and statistics
- Business Dashboards** – Vista Web Pages, an application for creating custom templates and pre-defined SCCS and SECC canvasses for real-time and historical web-based reporting
- IP Wallboards** – with 802.11 Wireless Options
- Large Plasma and LCD Screens & TV monitors** – through Design Studio software
- Other outputs** – PDAs, Email, and more

Ideal For

Contact Centers

With Symon's suite of products, call center managers can now get an up-to-the-second status of call queues, wait times, stations manned and available and average call times - information that was previously unavailable or hard to access. Symon solves problems for organizations that need:

Visual alerting and messaging

Symon's wireless, IP-enabled NetLite II™ wallboards can be used in conjunction with our DeskView product to enable messaging and alerting onto public visual displays such as our wallboards and

monitors or onto the desktop. Symon TargetVision provides a rich video-based solution for displaying real-time information to plasma and television displays.

Reporting

Many contact centers find themselves trapped into using products from many different vendors to achieve one goal. Typically, point solution products provide reports only for data generated within their own product, so it lacks context in regard to other key metrics on which their department is judged. Managers can quickly find themselves having to coalesce and make sense of data from

multiple reporting packages, none of which can deliver a unified and coherent view of their contact center. Symon Vista™ can be used to achieve that capability.

Agent Scorecards and Business Performance Management

Standard reports, while useful, are not enough for many users. The next generation of reporting requires more than just platform specific reporting. It requires the creation of enterprise-wide views of technical and business data. For example, agent data such as calls handled and time in wrap-up is very useful. Agent data and how much revenue they generated today is even better. Vista can deliver this functionality.

Executive Dashboards

Symon enables you to align activity with strategic goals because you now have access to all the right data and a standard presentation platform called Vista for all users. The major benefit is that key decision makers now have complete vision into all operations across the enterprise and potentially even into suppliers and customers.

Workforce Management and Scorecards

Workforce Management (or WFM) is a key component in successfully managing a contact center. It directly addresses the largest cost component, staff, which is approximately 70% of a contact center budget. In addition, it indirectly impacts the second largest component, which is quality of service (e.g., queue times increase long distance charges). Community™ is a 100% browser-based product for WFM. Its award winning power and ease of use has an installed-base of users with anywhere from 15-600 agents and up. Call Center Magazine calls it "an A+ buy."

Historical Data Management

Symon DataStore enables users to collect, consolidate and transform data when existing systems don't give an enterprise the exact data that is needed. With DataStore, real-time data

can be collected, normalized across disparate platforms, and stored for more accurate and convenient historical reporting.

Employee Communications

With Symon's acquisition of TargetVision, SES is the only solution with integrated "shrink wrapped" real-time data collection capabilities, streaming video, news feeds and customizable corporate and employee communications. Multiple formats are available for the presentation layer including LED displays, plasmas and television, PDAs and cell phones as well as desktop viewing. Symon is a world leader in corporate visual performance and productivity management, alerting, messaging, and crisis communication.

Use TargetVision to:

- Increase productivity through instant employee awareness.
- Empower employees to make timely, informed decisions.
- Communicate consistently to all shifts and locations.
- Recognize top individual and team performers.
- Communicate critical performance data.
- Fortify crisis communications strategies.

Manufacturing

Manufacturing is the lifeblood of many companies. Symon is a manufacturer itself so we understand the critical nature of what happens in your manufacturing plants, distribution facilities and warehouses. Information, good or bad, has to travel fast so that immediate corrections can be made or potentially massive costs can be incurred. The production line that runs on creating defective parts or the distribution center that wasn't immediately notified of the changes in the large order to be shipped can create operations nightmares. Symon specializes in real-time communications so we have a complete set of solutions that can help you minimize your costs, avoid miscommunication and improve productivity.

Business Challenges

- Do you have difficulty seeing a complete view of your single or multi-site contact center?
- Would you like to view your contact center from a Line of Business perspective rather than queues or skillsets?
- Do you need to be able to see information from different database types on one screen to run your business effectively?
- Would you like to incorporate different media types such as video, Power Point and real-time data on a plasma or LCD?
- Do you need to be able to communicate with employees in multiple ways such as instant

messages to desktops, corporate updates to TVs in break rooms and lobbies, and threshold alerts to PDAs and cell phones?

- Would you like to utilize new venues for employee enrichment such as "In-Seat" Agent Training?

Typical Applications

Symon solutions are found most often in Network Operation Centers (NOC), Call Centers, Help Desks, and Manufacturing plants where real-time information is displayed on wallboards, plasmas, LCDs or desktops.

Network Diagram of Typical Deployment



Key Points

- Advanced data manipulation and distribution capabilities
- Wide array of end points supported (including applications, mobile communications devices, desktops and enterprise data display devices)
- Extensive set of pre-built data collectors (including SCCS and SECC)
- Open XML interface enables integration of unique or proprietary applications into the real-time infrastructure
- Flexible data output with either a messaging approach or publish/subscribe interface
- Event interface can initiate workflows or scripts in your CTI and workflow software
- High-performance in-line memory database

Features and Benefits

Utilizing Symon's open standards and pre-built integrated solutions leads to:

- Reduced complexity
- Faster time to operation
- Lower total cost of ownership
- Flexibility to incorporate custom applications
- Reliability/scalability
- Investment protection
- Rapid return on investment

Market Information

- Symon Enterprise Server (SES) received its second Call Center Magazine Product of the Year Award. This award, presented at the Call Center and Demo Conference in Dallas, Texas for 2004.
- Symon Enterprise Server (SES) received the prestigious Best of Show Award for Reporting Tools at the 2004 International Call Center Management Conference (ICCM) in Chicago.
- Symon TargetVision Enterprise 3.0 visual communications system received Media & Methods Magazine 2004 Awards Portfolio Product of the Year.
- Installed in more than 6,000 organizations worldwide, more than four million clients view Symon products daily. Symon has provided award-winning products since 1981.

Ordering Information

For further information, please contact the Nortel Select Product Program at (615) 432-4995 or select@nortel.com.

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