

cost-effective switching

Small and medium businesses (SMBs) are faced with different challenges to larger enterprises. When it comes to networking equipment, you are looking for:

- Minimal time for set-up
- Plug-and-play capability
- Opportunities to improve employee productivity
- Potential for gaining competitive advantage
- Ability to save money

Nortel Networks BayStack* 325 Switches are designed to address the needs of small and medium customers. 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 provide 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 customers significant time in setting up the switches. Also, the switches' ease of use features require minimal technical expertise to configure them.

BayStack 325 Switches are standalone 10/100 Mbps Layer 2 Ethernet switches featuring easy configuration, high-speed uplinks, and Web-based management from your Web browser. The BayStack 325 Switches have been architected to be Layer 3 and DiffServ capable via a software upgrade in the future.

Product Brief

Nortel Networks BayStack 325 Switches

- 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



Figure 1. BayStack 325-24T Switch



Figure 2. BayStack 325-24G Switch

Combining small rack space with low per-port pricing for a cost-effective switching solution, the BayStack 325 Switches are designed for the requirements of small to medium-sized businesses and branch offices that consider price to be a predominant decision factor when acquiring networking functionality such as:

- Desktop switching
- Ease of management
- Easy set-up

The BayStack 325 Switches are available in two standalone, compact 1 rack-unit (1U) size models—the BayStack 325-24T Switch (Figure 1) and the BayStack 325-24G Switch (Figure 2).

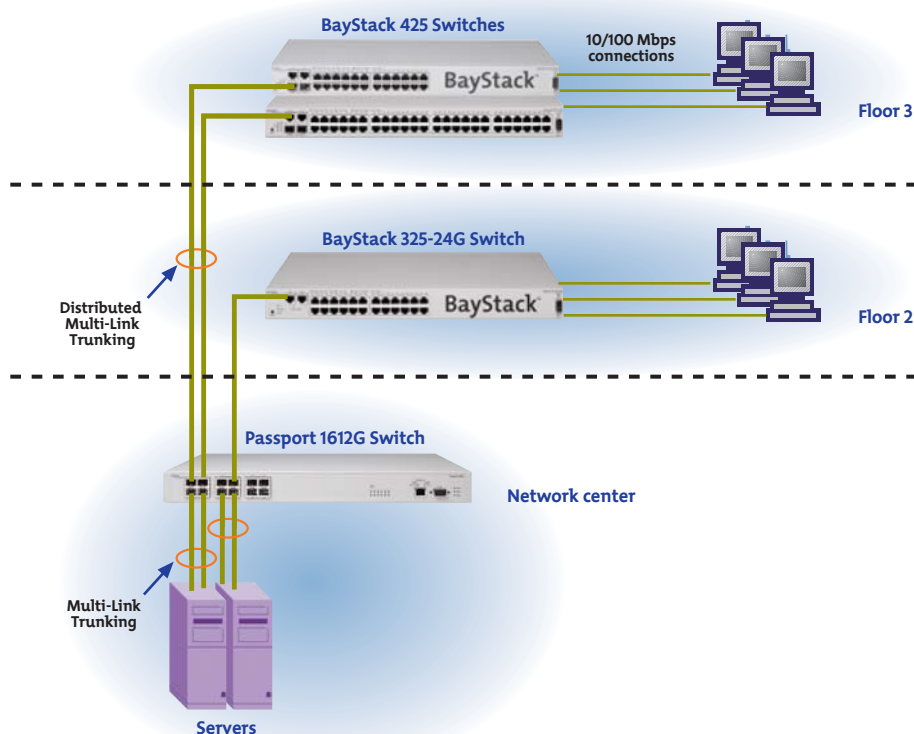
The BayStack 325-24T Switch has 24 10BASE-T/100BASE-TX auto-sensing ports. The BayStack 325-24G Switch has 24 10BASE-T/100BASE-TX auto-sensing ports plus 2 10/100/1000BASE-T ports for uplink connectivity to servers or backbone switches. Advanced features such as Multi-Link Trunking (MLT), IGMP Snooping, VLAN Trunking, and flexible management tools help you to efficiently manage your network traffic (Figure 3).

Features and benefits

Full auto-sensing on every port

Every UTP port on the BayStack 325 Switches is equipped with auto-sensing technology to automatically detect and support the speed and mode of a connected device. The ports determine whether a connected device is operating at 10 Mbps or 100 Mbps, and automatically adjust to the optimal speed. Each of the switched ports can also automatically detect and support full-duplex connections to servers, power-user end stations or other switches, as well as half-duplex connections to legacy network interface cards (NICs) or hubs.

Figure 3. Small/medium business solution



High-speed uplink ports

The BayStack 325-24G Switch provides two 10/100/1000BASE-T ports in the front of the unit that provides high-speed connections to backbone switches or servers.

Wire-speed throughput

A 16-Gigabit per second (Gbps) switching fabric and ASICs support full 802.1d-compliant MAC Layer frame forwarding and filtering across all ports at wire-speed performance. The BayStack 325-24T Switch has a peak forwarding rate of 3.6 million packets per second and the BayStack 325-24G Switch has a peak forwarding rate of 6.6 million packets per second.

BoSS (BayStack operating system Switching Software)

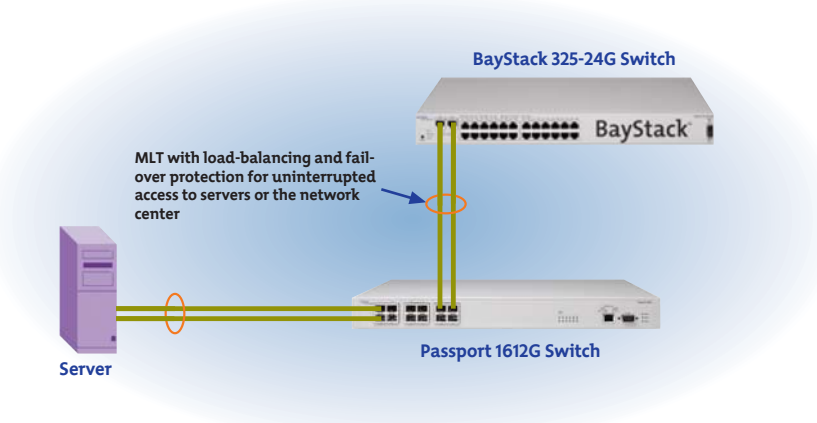
BoSS for BayStack 325 Switches is a single software image that is used for both BayStack 325 Switch models. The software image provides new features and will be available for free for the lifetime of the switches. Only a single image needs to be downloaded

from the Nortel Networks Web site for either the BayStack 325-24T Switch or BayStack 325-24G Switch. This saves network administrators time in downloading images if both models of BayStack 325 Switches are present in the network.

Other BayStack switches support a different version of BoSS.

BoSS version 3.0 is currently shipping with the BayStack 325 Switches. In the future, a single image will be available that can be used for BayStack 325, 425, and 420 Switches.

Figure 4. Multi-Link Trunking (MLT)



Multi-Link Trunking

Multi-Link Trunking (MLT) enables grouping of links between a BayStack 325 Switch and another switch or a server to provide greater bandwidth with active redundant links (Figure 4). The BayStack 325 Switches support up to six MLTs per switch with up to four ports per MLT.

VLAN support

Up to 32 port-based VLANs can be established on a BayStack 325 Switch, to extend the broadcast domain and segment network traffic for higher network efficiency. IEEE 802.1Q VLAN Trunking is supported on every port of the switch, allowing efficient means of transporting broadcast domains. VLANs reduce administration costs by simplifying network moves, adds, and changes. BayStack 325 Switches have been architected to support 255 VLANs in the future.

Enterprise-sized MAC address table

BayStack 325 Switches support up to 8,000 MAC addresses, providing ample scalability for growing networks wishing to connect many devices and workgroups to each switch.

IGMP snooping

BayStack 325 Switches feature IP Multicast support by examining ('snooping') all Internet Group Multicast Protocol (IGMP) traffic in hardware at line rate, and filtering out multicast streams not of interest to particular end-stations, thereby enabling peak computer performance.

Nortel Networks Command Line Interface (NNCLI)

The NNCLI is used to automate general management and configuration of BayStack 325 Switches. The NNCLI is used through a Telnet session or through the serial port on the console.

ASCII configuration file

BayStack 325 Switches can download a user-editable ASCII configuration file from a TFTP (Trivial File Transfer Protocol) server. The ASCII configuration file can be loaded automatically at boot time or on-demand using the management systems (console menus or CLI). Once downloaded, the configuration file automatically configures the switch according to the NNCLI commands in the file. This feature allows the flexibility of creating command configuration files that can be used on the switches with minor modifications.

ASCII configuration file generator

This feature works by reading the current configuration on the switch and generating the appropriate NNCLI commands to recreate that configuration. Basically, it provides the ability to view and store the switch configuration in a text, editable format. The generated file can be stored on an external server and also used to restore the switch configuration.

IEEE 802.1p priority queuing

802.1p priority queuing is standards-based and enables priority to the order in which the switch forwards packets, on a per-port basis. For example, if messages from a specific segment are crucial to the network, the switch port connected to that segment can be set to a higher priority level. Up to four queues can be set on a BayStack 325 Switch with IEEE 802.1p.

Supports Spanning Tree protocol

Built-in support for Spanning Tree protocol (IEEE 802.1D) detects and eliminates logical loops in the network. When multiple paths exist, the switch will automatically place some ports on standby to form a network with the most efficient traffic pathways, avoiding the continual looping of frames.

Custom Auto Negotiation Advertisements (CANAs)

This feature enables the network manager to tune the capabilities that a particular Ethernet port can advertise via autonegotiation. The capabilities include half-duplex and full-duplex modes with speeds of 10, 100, and 1000 Mbps. Autonegotiated Ethernet ports establish a connection based upon the highest common capabilities. This feature is implemented by using CLI commands and saves the network manager from having to go to each workstation and switch to configure a “fixed” speed.

Network management

Web-based management

Web-based network management makes managing BayStack 325 Switches easy with a Web browser. Summary, configuration, fault, statistics, application, administration, and support pages can be provided. Real-time sampling provides up-to-date LED statistical information. The Web interface also allows for static configuration of numerous parameters of the device.

On-box management

Network management begins with the device. BayStack 325 Switches support four groups of Remote Monitoring (RMON) on all ports and are SNMPv3 compliant. The four groups of RMON are Alarms, Events, History, and Statistics. RMON2 support is achievable via port mirroring and the use of an external probe. The SNMP agent software resides in the switch and uses the information it collects to provide management for all ports providing comprehensive network monitoring capabilities.

Configuration management

The process of configuration begins with a single device but finishes across multiple devices. Java™ Device Manager is the device configuration tool for those functions that require communicating with a single device. It uses a common user interface and workflow that supports many Nortel Networks Ethernet switches. This commonality allows the network manager to become familiar with one tool instead of multiple tools. Nortel Networks Optivity* Switch Manager† (OSM) is a Java-based, real-time, configuration management application for Nortel Networks Ethernet products, including BayStack 325 Switches. It enables network managers to discover, view, and configure more than 500 network devices and their physical links on a topology map. Configuration is stored in NVRAM (Non-Volatile Random Access Memory).

Fault management and resolution

With Nortel Networks Optivity Network Management System† (ONMS), the network manager has quick access to the information required to manage and isolate all network events on BayStack 325 switches. Tools, such as Physical Topology View, inform the network

manager of how a particular event is affecting the physical connectivity within the network. The 'End Node Locate' tool provides the ability to locate a failing end node and, with one mouse click, provide access to the RMON statistics for the failing Ethernet port supporting that end node. These solutions provide visual and statistical tools necessary to quickly resolve any network event or to manage performance in real-time. The BayStack 325 Switches support "syslog" capability that helps in troubleshooting network issues.

Advanced management features

BootP and TFTP support allows centralized switch IP address assignment, software upgrades, and SNMP agent updates over the network. The RADIUS-based (Remote Authentication Dial-In User Services) security feature uses the RADIUS protocol to authenticate local console and Telnet logins.

Enhanced security

BayStack 325 Switches offer the highest level of security with features including Secure Shell (SSH) version 2, IEEE 802.1x based security, (also known as Extensible Authentication Protocol [EAP]), assignment of proper VLAN and priority, Simple Network Management Protocol (SNMPv3), MAC-address based security, and RADIUS authentication.

SSHv2 supports strong authentication and encrypted communications. It allows you to log into the switch from an SSH client and perform a secure Telnet session using CLI commands. This feature is ideal for security-conscious customers such as federal governments.

For added security, BayStack 325 Switches support the 802.1x-based security feature EAP. Based on the IEEE 802.1x standard, EAP limits access to the network based on user credentials. A user is required to "login" to the network using a username/password; the user database is maintained on the authentication server (not the switch).

EAP prevents network connectivity without password authorization for added security and control in physically non-secure areas. It is used where the network is not 100 percent physically secure or where physical security needs enhancement—for example, banks, trading rooms, or classroom training facilities. EAP supports client access to the network and inter-operates with Microsoft Windows XP and other compliant 802.1x clients.

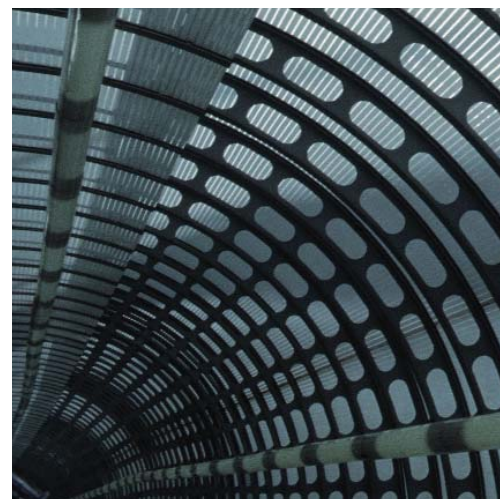
SNMPv3 provides user authentication and data encryption for higher security. It also offers secure configuration and monitoring.

BaySecure* MAC-address based security allows authentication of all access, not only to the switches for management and configurations, but also access to the infrastructure through these switches. This software feature limits access to only network-authorized and trusted personnel, including full tracking of network connections. With BaySecure, network access is granted or denied via proper MAC address identification (up to a maximum of 448).

The RADIUS-based security feature allows you to set up network access control, using the RADIUS security protocol to authenticate local console and Telnet logins.

Port mirroring

The port mirroring feature (sometimes referred to as 'conversation steering') allows the network administrator to designate a single switch port as a traffic monitor for a specified port. Port mirroring copies packets flowing into a specified port and sends the replicated data to the mirrored port for in-depth analysis of switched traffic patterns to troubleshoot problems and optimize network configurations. Additionally, an external probe device can be attached to the designated monitor port.



User Interface push-button

The User Interface push-button on the front panel is provided for ease of use in configuring the unit. It can be used for the purpose of resetting the unit.

Common look and feel

All BayStack switches, including BayStack 325, have a common “look and feel” which reduces training costs. This allows the switches to be managed in a similar fashion via a broad set of management tools. These tools include Web, Java-based Device Manager (JDM), Command Line Interface (CLI), menus, Optivity Network Management System† (ONMS), and Optivity Switch Manager† (OSM).

Auto MDI/MDI-X

BayStack 325 Switches can be connected to a hub or another switch quickly and cost-effectively. Normally, you need a crossover cable for this purpose. Crossover cables are not that readily found when you need one. However, with the BayStack 325 Switch you can use either a straight-through or crossover cable. When a cable is connected to one of the 10/100 ports on the switch, the switch port automatically can detect the signal on the cable and configures itself. This feature eliminates the need for an MDI/MDI-X port; any port may be used for connection to a hub or switch.

Recovery configuration file support

The configuration file feature allows for storing of switch configuration parameters on a TFTP server. Configuration parameters can be retrieved automatically to configure a replacement switch with the same configuration. For new installations or when a switch has failed, this feature saves time in reconfiguring another switch.

Power and space savings

Low power consumption results in lower operating costs. Compact one-rack unit high design allows for significant space and cost savings in the wiring closet.

LED indicators

The LED indicators on the front panel make it easy to monitor the switch and port status and help in isolating and diagnosing switch problems.

Port naming alias

This feature gives the ability to name, or specify a text string for, each port. It basically provides easy identification of the connected users.

Destination Address (DA) filtering

DA filtering allows the use of the MAC address-based security feature (BaySecure) to configure the switch to drop all packets with specified MAC DAs. You can enter up to 10 specific MAC DAs you want filtered.

Summary

With more than 100 years in telecommunications, Nortel Networks is uniquely positioned to help your business reduce cost by combining voice and data into an integrated system. Why take a chance on a vendor that only understands part of the equation? Let us show you how the BayStack 325 Switches, along with other Nortel Networks products, can increase your profitability, streamline your business operations, increase productivity, and help you gain the competitive edge.

Technical specifications

Physical specifications

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)

Performance

Switch fabric bandwidth	16 Gbps
Frame forwarding rate	
BayStack 325-24T	3.6 million packets per second (Mpps)
BayStack 325-24G	6.6 million packets per second (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

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 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*

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)

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, noncondensing
Storage humidity: 10 to 95% maximum relative humidity, noncondensing
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

Technical specifications (continued)

Electrical

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

Safety agency approvals

- 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-V1 flammability requirements for PC board
- NOM-019

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

Electromagnetic immunity

BayStack 325 Switches meet the EN55024:1998/A1:2001 standard.

Ordering information

Order number Description

AL2012?45**	BayStack 325-24T Switch with 24 10BASE-T/100BASE-TX ports (includes rack mount kit)
AL2012?46**	BayStack 325-24G Switch with 24 10BASE-T/100BASE-TX ports plus 2 10BASE-T/100BASE-TX/1000BASE-T ports (includes rack mount kit)
AL2011013	Console Cable for use with BayStack switches

** The seventh character (?) of the switch order number must be replaced with the proper code to indicate desired product nationalization:

"A" – No power cord included

"B" – Includes European "Schuko" power cord common in Austria, Belgium, Finland, France, Germany, The Netherlands, Norway, and Sweden

"C" – Includes power cord commonly used in the United Kingdom and Ireland

"D" – Includes power cord commonly used in Japan

"E" – Includes North American power cord

"F" – Includes Australian power cord, also commonly used in New Zealand and the People's Republic of China

† Future software release

In the United States:
Nortel Networks
35 Davis Drive
Research Triangle Park, NC 27709 USA

In Canada:
Nortel Networks
8200 Dixie Road
Suite 100
Brampton, Ontario L6T 5P6 Canada

In Caribbean and Latin America:
Nortel Networks
1500 Concorde Terrace
Sunrise, FL 33323 USA

In Europe:
Nortel Networks
Maidenhead Office Park
Westacott Way
Maidenhead Berkshire SL6 3QH UK

In Asia:
Nortel Networks Asia
Level 5, 495 Victoria Avenue
Chatswood, NSW, 2067, Australia
Phone: +61 2 8870 5200

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www.nortelnetworks.com

For more information, contact your Nortel Networks representative, or call 1-800-4 NORTEL or 1-800-466-7835 from anywhere in North America.

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NN108820-060904

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