Nortel Networks
Passport 1000
Routing Switch Series

Passport 1000 Series Features and Benefits

- Turbocharged IP and IPX Networks

- Hardware-Based Routing and Switching

- Gigabit Performance with Layer 2, Layer 3, and Layer 4 Control

- Business Critical Resilience

- Application-Level Prioritization

- Distributed Access Security

The new economics of networking: gigabit switching and wire-speed routing at traditional switch prices.

The Nortel Networks* Passport* 1000 Routing Switch series delivers the performance of ultra high-speed packet forwarding combined with the control of Internet Protocol (IP) and Internet Packet Exchange (IPX) routing. By delivering extensive bandwidth and intelligence to minimize the impact of broadcast traffic, and support for low-latency, time-sensitive multimedia applications, the Passport 1000 Routing Switch series provides a foundation for future network needs.

In addition to supporting 1000 Mbps Gigabit Ethernet technology, the Passport 1000 Routing Switch series supports conventional 10 Megabits per second (Mbps) Ethernet and 100 Mbps Fast Ethernet connectivity. By offering support at all three speeds, the Passport 1000 Routing Switch series provides a smooth migration path to 1000 Mbps, while continuing to support existing Ethernet and Fast Ethernet environments.

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The Passport 1000 Routing Switch series delivers:

- 7 million packets per second (pps) capacity to aggregate large switched networks

- Wire-speed IP and IPX routing to accommodate new application requirements

- Policy-based application priority and access security at wire speed

The Passport 1000 Routing Switch series provides seamless, standards-based interoperation with all Nortel Networks Ethernet and Fast Ethernet hubs and routers without adding new protocols or complex schemes. Nortel Networks offers a solution that's right for you. Choose from among three flexible designs:

- Passport 1200 (8-slot chassis)

- Passport 1100 (16-port 10/100BASE-TX standalone configuration with two expansion module slots)

- Passport 1150 (4-port 1000BASE-SX Gigabit Ethernet standalone configuration with two expansion module slots)

Benefits

Gigabit Performance with Layer 3 and Layer 4 Control

The Passport 1000 Routing Switch series handles packet forwarding decisions in hardware-based Application-Specific Integrate Circuits (ASICs) instead of assigning them to a Centralized Processor Unit (CPU) as with traditional switches and routers whose performance suffers under heavy network loads. Using a distributed ASICs-based architecture enables wire-speed switching and routing on any port.

Wire-speed filtering is another innovative ASICs feature. Unlike other routing switches, the Passport 1000 Routing Switch series is able to filter at wire speed. Layer 4 TCP/UDP information can be examined on a packet-by-packet basis, providing advanced "application-based" prioritization and filtering.

Application Intelligence

The Passport 1000 Routing Switch series delivers application intelligence without the complexity of routing. IP flow filters enable the Passport 1000 Routing Switch series to make application prioritization and network access decisions based on application, user, department or any combination of the three.

Application-level prioritization gives priority to mission-critical applications such as SAP and ensures that less time-sensitive applications such as email don't congest the network.

Access lists can be used to filter traffic by controlling whether packets are forwarded or dropped based on policy specified within the access list. With distributed access security, a network administrator can control access to sensitive information such as SAP or other confidential servers.

High-Speed Intranet Support

The Passport 1000 Routing Switch series provides aggregate forwarding capacity up to 7 million pps. This high-throughput architecture delivers ample capacity for supporting a high-performance multiprotocol infrastructure in enterprise networking environments. Passport routing switches deliver wire-speed IP and IPX routing in hardware. Passport, in conjunction with an existing multiprotocol router, supports all protocols including AppleTalk, NetBIOS, System Network Architecture (SNA) and DECnet.

The Passport 1000 Routing Switch series provides a low-latency path through the network for "streaming" applications such as voice and video. Though traditional routers can prioritize traffic, they still introduce unacceptable latency for many real-time applications, particularly when the stream must endure multiple router hops. The Passport 1000 Routing Switch series eliminates concerns about router hop latency.

Passport 1000 Routing Switch series supports multiple Quality of Service (QoS) levels to deliver extremely low latency for priority traffic, even when switching or routing millions of packets per second. Multiple QoS levels enable the switches

Figure 1:   Passport 1000 Routing Switch series.

Modular
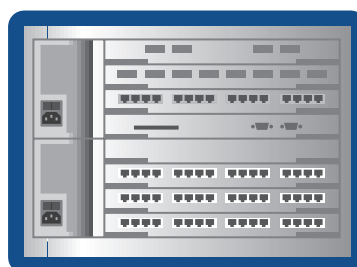
Passport 1200

Standalone with Expansion Slots

Passport 1100

Passport 1150

to support the most demanding multimedia requirements. In addition, separate queuing and priority for business applications such as SAP and IP telephony eliminates the typical brownouts introduced by bursty traffic.

Cost-Effective Flexible Design

The Passport 1000 Routing Switch series features three cost-effective configurations (see Figure 1).

Passport 1200 Routing Switch (8-slot modular chassis)

The Passport 1200 Routing Switch can be configured with up to 12 Gigabit Ethernet ports, up to 96 autosensing 10/100BASE-TX Ethernet ports, or 96 100BASE-FX ports for fiber connectivity, or with a combination of all three port speeds. For enhanced reliability, the Passport 1200 Routing Switch can be equipped with redundant power, redundant gigabit links (LinkSafe), and redundant switch fabric modules. All modules are hot-swappable. The Passport 1200 Routing Switch is ideal for small-to-medium campus backbones and server farm applications.

Passport 1100 Routing Switch (Standalone unit)

Supporting Gigabit Ethernet, 100BASE-FX, or additional 10/100 Mbps Ethernet ports, the Passport 1100 Routing Switch includes 16 autosensing 10/100 Mbps Ethernet ports with two built-in expansion slots for field-installable modules. The Passport 1100 Routing Switch can be equipped with redundant power and LinkSafe. All modules are hot-swappable. The Passport 1100 Routing Switch is ideal for the backbone switch of medium-size businesses, power workgroups, and server farms.
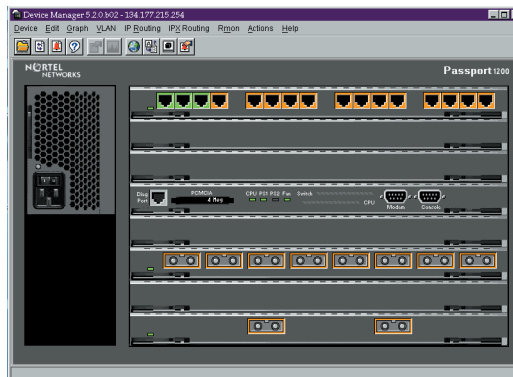
Passport 1150 Routing Switch (Standalone unit)

Supporting 10/100 Mbps Ethernet, 100BASE-FX, or Gigabit Ethernet additional ports, the Passport 1150 Routing Switch includes four Gigabit Ethernet ports with two built-in expansion slots for field-installable modules. The 1150 Routing Switch can be equipped with redundant power and LinkSafe. All modules are hot-swappable. The Passport 1150 Routing Switch is ideal for the backbone switch of medium-size businesses and server farms.

Management

Designed for ease of management on both UNIX and personal computer (PC) platforms, the Passport 1000 Routing Switch series includes Device Manager software (see Figure 2), an easy-to-use graphical interface that provides integrated switching and routing configuration services that support simultaneous configuration of multiple switches.

Management is also supported by Optivity Switch Manager, a real-time SNMP tool that allows network administrators to rapidly configure networking devices either remotely or onsite using a stand-alone client. This point-and-click graphical tool allows network administrators to import, export or modify individual port settings, default gateways, SNMP traps and VLAN configuration, which simplifies the set-up of multiple devices.

Optivity Switch Manager comprises "sub manager" applications for managing Virtual Local Area Networks (VLANs), Multi-Link Trunks, log files and switch configurations. This easy-to-use tool provides a system-level view of the network, showing physical connectivity between devices and network outages.

The Passport 1000 Routing Switch series features Web-based configuration management. This allows network managers to easily access the routing switch using port-based out-of-band management, as well as any browser.

The Passport 1000 Routing Switch series supports four remote monitoring (RMON) groups on each port: statistics, history, alarm, and events. In addition, port mirroring enables network managers to unobtrusively monitor traffic from a single port, two ports, or matching defined Media Access Control (MAC) addresses. Network managers can use a network analyzer or an RMON probe to further analyze traffic flows.

Configuration Flexibility

The Passport 1000 Routing Switch series can be initially deployed as high-capacity Layer 2 switches, with IP and IPX routing activated when needed. Eliminating the performance penalty previously associated with Layer 3 traffic greatly simplifies network design and delivers enormous benefits to the network manager. The Passport 1000 Routing Switch series supports up to 24,000 addresses per switch to provide capacity for large network configurations.

A wide range of interconnect modules is available for the Passport 1000 Routing Switch series.

Long-Distance Gigabit

The Passport 1000 Routing Switch series Long-Distance Gigabit modules take advantage of high-performance optical transceivers that permit the extension of gigabit up to 50 km. Nortel Networks has extended gigabit with Long-Distance Gigabit modules for both the Passport modular and standalone products. These modules are an ideal solution for customers seeking to interconnect multiple high-performance campus networks across a metropolitan area network (MAN) over dark fiber.

Multiple Priority Queues

In high-traffic networks, independent switch fabric queuing prevents head-of-line blocking, maintaining performance even under heavy loads. In addition, four priority queues provide low-latency delivery even during times of network congestion, protecting time-sensitive multimedia traffic and business-critical data traffic.

Fail-Safe Resiliency

In mission-critical environments, the Passport 1200 Routing Switch offers several features designed to provide high levels of reliability. To protect against switch or processor faults, users can install a second Silicon Switch Fabric (SSF) CPU module. This feature enables the Passport 1200 Routing Switch to continue operation in the event of a primary CPU failure. To provide increased reliability, the Passport 1000 Routing Switch series accepts redundant power. To guard against cable faults, optional LinkSafe redundant Gigabit link modules can be installed in Passport 1000 Routing Switch series. LinkSafe provides physical layer redundancy and automatic switch-over on Gigabit Ethernet ports.

Multi-Link Trunking

Multi-Link Trunking (MLT) enables backbone trunks, wiring closet risers, and server connections to scale from 100 Mbps to 8 Gbps. MLT flexibly delivers added bandwidth by aggregating multiple physical ports, enabling them to act like a logical single port. This gives customers an option to aggregate 2 to 4 Passport ports into a single logical connection with up to 4 times the bandwidth.

Redundant Multi-Link Trunking

Redundant MLT allows each port of the trunk group to reside on a different Passport routing switch module or on a Nortel Networks BayStack* 450 unit. This provides all the scalability advantages of MLT with significantly higher resiliency for risers, backbone trunks, and server connections. Communication continues following the unlikely event of a failure because each physical port of the trunk group resides on a separate Passport module or BayStack 450 unit.

In addition, the Passport 1000 Routing Switch series supports the Virtual Router Redundancy Protocol (VRRP), which provides redundancy for the default routing path without requiring reconfiguration of dynamic routing or router discovery protocols on every host. Designed to eliminate the single point of failure inherent in the static default routed environment, VRRP provides an alternate default gateway, which is transparent to applications and workstations.

Robust VLAN Support

The Passport 1000 Routing Switch series allows network managers to create up to 127 port-based or policy-based VLANs. VLANs can be based on switch port or by protocol. Protocols supported include IP, IP-subnet, IPX, NetBIOS, DECnet and SNA. Membership in workgroup segments can be determined logically instead of by user location, and adds, moves, and changes can be easily configured as the network evolves. Unlike typical Layer 2 switches, the Passport 1000 Routing Switch series examines each packet for Layer 2 or Layer 3 policies, resulting in more secure and robust VLANs. Standards-based VLAN trunking (802.1Q) on all ports allows multiple logical links on a single interface between switches, or between the switch and multiple servers.

More specifically, IP subnet-based VLANs allow network managers to create VLANs based on IP address prefixes. The creation of subnet-based VLANs enables multinetting support, by permitting multiple subnets on a single Passport interface.

Multinetting and IP subnet-based VLANs allow the number of host addresses to be expanded beyond the subnet limitation. For example, a physical location, like a floor of a building, is no longer limited to the number of hosts within a single subnet. A second subnet can be added to enable end-user growth.

Lastly, the Passport supernetting feature permits the grouping of smaller subnet address spaces to make one larger supernet. Supernetting overcomes the small address space limitation associated with class C addressing and allows IP addresses to be used in the most efficient way. Supernetting accomplishes this by enabling the aggregation of contiguous IP network numbers beyond the class boundary. Classless Inter-Domain Routing (CIDR) allows supernetting and, in general, makes all IP addressing combinations legal. CIDR also allows an IP subnet structure that ignores the normal position dependencies associated with standard IP addressing.

MAC-based VLANs

Passport products support MAC-based VLANs. MAC-based VLANs offer the network manager the capability of defining a VLAN composed of specific end stations. MAC-based VLANs are primarily used for security.

In a MAC-based VLAN, members are associated only if the end station MAC address is contained in a predefined list of allowed MAC addresses. By combining MAC-based VLANs with other policy-based VLANs, certain users can be permitted to access specific services that may be granted or denied to other users. This is true even when multiple users are connected to a single Passport 1000 Routing Switch port via a shared media hub or another switch.

One example of the use of MAC-based VLANs is in an educational environment where instructors are granted access to certain file servers and applications, while students are not. A MAC-based VLAN can be defined for instructors, which grants restricted access to resources such as administrative file servers. The network manager can also define a different MAC-based VLAN for students, which blocks access to administrative file servers. In this example, the MAC-based VLAN for the instructor can be combined with other policy-based features to grant or deny access across the entire campus, allowing instructors to "roam" through the campus while retaining all security and access rights. Passport routing switches allow the two MAC-based VLANs, instructor and student, to overlap on the same switch ports.

Advanced Routing Functionality: IPX Routing

The Passport 1000 Routing Switch series now delivers all the advantages of routing switch technology to Novell NetWare and the IPX protocol. Passport routing switches offer scalable and resilient, wire-speed, hardware-based IPX routing support. IPX routing, when combined with existing Passport support for hardware-based, wire-speed IP routing and Layer 2 switching, offers customers high performance, multiprotocol switching and routing across an entire campus.

IPX routing is fully integrated into ASICs distributed onto Passport 10/100/1000 line cards. ASIC technology delivers low-latency, wire-speed performance, application priority, and distributed access security to end users and applications utilizing the IPX protocol.

IPX support can be enabled or disabled for each Passport interface, ensuring that the IPX protocol is supplied only to those portions of a network that require IPX support.

Support is included for the IPX Service Advertisement Protocol (SAP) and the IPX Routing Information Protocol (RIP). Support is also included for both default and static routes.

Default and Static Routes Pointing to an Indirectly Connected Address

The Passport 1000 Routing Switch series simplifies the network manager's task of defining the default route to routers or routing switches that connect to other networks. A default route is used to direct packets to the address of another router or routing switch that contains routing table entries not maintained in the routing table of the current router or routing switch. For example, a default route might point to an address on another router in a network that attaches to the Internet. Many routers allow the default route to point only to a router directly connected to the current router (the "next hop" router).

Passport products allow the default route to be defined for an address on a router that is not directly connected to the current router and that might, in fact, be several router hops away from the current router.

The network manager can define the default route on the current Passport switch to point to the address of a default router or routing switch that may be several hops away from the current Passport switch. During operation, the Passport switch determines the next hop for a packet destined for the default router based upon a static or dynamic routing entry in its routing table.

This saves the network manager the added effort of having to define the default router address hop by hop through each router in the path to the actual default router. Another benefit of this feature is that the network manager can define the same default router address for multiple routing switches in the network.

UDP Broadcast Forwarding

The Passport 1000 Routing Switch series supports a rich set of Uniform Datagram Protocol (UDP) broadcast forwarding capabilities, simplifying the challenges that network managers face. UDP broadcast forwarding enables the centralization of network services by allowing the network manager to convert UDP broadcast messages to IP unicast messages, and control how and where the UDP broadcasts are sent for processing.

UDP broadcast forwarding is particularly useful for networks containing centralized configuration, security, file management, and name management, such as IP address and end system name management. Certain IP applications rely on UDP broadcasts to request information or network services, or to locate applications and servers on a network. If a host needing a service resides on a subnet that does not have a locally attached server, UDP broadcasts from an end station are, by default, dropped instead of being forwarded.

Passport routing switches use the UDP broadcast forwarding facility to convert UDP broadcasts to unicast messages, which identify a specific host and can be sent anywhere in the network for processing. The converted unicast packet contains the specific IP address of the server that is able to process the request, enabling the message to be sent to the appropriate server on a different subnet.

UDP broadcast forwarding is implemented through profiles, which offer the network manager great flexibility in configuring UDP broadcast destinations and paths. The network manager creates profiles, as appropriate, to direct each type of UDP broadcast to an appropriate server. The network manager also uses the profile to choose the routing interface or interfaces that will forward each type of UDP broadcast.

UDP broadcast services supported by Passport routing switches include:

- Time Service
- Terminal Access Controller Access Control System (TACACS) Service
- Domain Naming System
- Trivial File Transfer Protocol (TFTP)
- NetBIOS Name Server
- NetBIOS Datagram Server

Combined Routing and Bridging on Individual Ports

The Passport 1000 Routing Switch series supports simultaneous routing of IP and bridging of other protocols on a single interface, preventing OSPF and RIP convergence from being dependent upon Spanning Tree convergence. Network managers can now design mesh-based, scalable, resilient campus networks, with multiple active links without the limitations of Spanning Tree on IP traffic. Multiple active links in the backbone add capacity for carrying traffic between switches. Resilience in the backbone improves because the time to reroute IP traffic around a network failure decreases by removing the dependence on Spanning Tree.

For example, switches A, B, and C are connected together in a mesh and transmit IP, IPX, and AppleTalk across the backbone. Spanning Tree will force one of the links, perhaps the link between A and C into a stand-by status even though routing is enabled. This precludes the standby link from passing any traffic under normal circumstances and restricts the reaction time to network failures for IP and non-IP protocols to that of Spanning Tree. Reaction to link failures must first deal with the downtime associated with Spanning Tree convergence, then the convergence of OSPF or RIP.

Conversely, with simultaneous bridging and routing, switches A, B, and C are configured to simultaneously route IP and bridge the other protocols. This allows all links to remain active under normal circumstances — greatly increasing the capacity of the backbone.

In addition, it speeds the reaction to network failures, because IP traffic is routed around the failure according to the fast convergence times of OSPF or RIP. This feature removes the convergence time of Spanning Tree for IP traffic. Non-IP traffic would still be subject to the longer convergence times of Spanning Tree.

System Architecture

Traditional multiprotocol routers rely on software-based forwarding, making wire-speed routing impossible. Even with today's powerful CPUs, processor intervention in packet forwarding limits performance to about 1 million pps. To deliver additional performance, the Passport 1000 Routing Switch series removes the processor from forwarding decisions and uses hardware-based ASIC technology for packet forwarding. This enables traffic, such as business-critical data, compressed video, or other multimedia applications, to cross subnets without suffering performance degradation.

Passport 1000 routing switches contain two main hardware components: the Silicon Switch Fabric (SSF) CPU module and the I/O modules (see Figure 3).

Figure 3: Passport 1000 Series System Architecture.
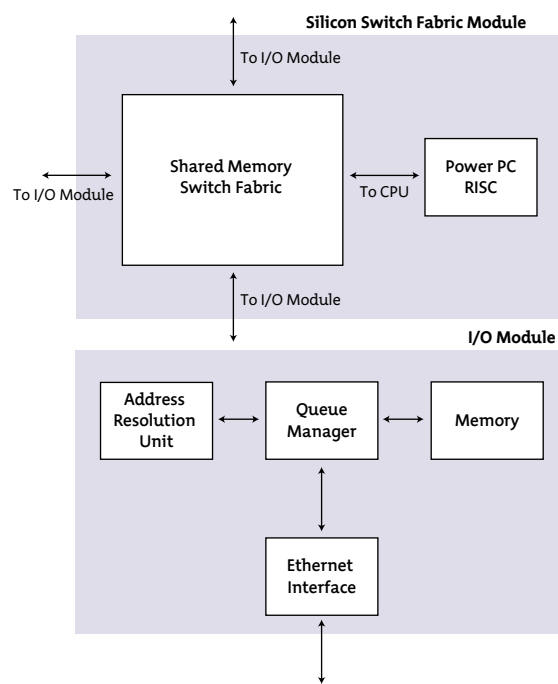
Silicon Switch Fabric

The SSF is the core of the switch and is where the actual packet forwarding occurs. This CPU module performs all protocol functions, including support for Spanning Tree, bridge learning functions, and standard routing protocols; these include RIP, RIPv2, OSPF, IPX RIP, and SAP. Routing and bridging tables computed by the CPU are stored in 32 MB of main memory and are distributed automatically to each I/O card for distributed address lookup. Packet forwarding information is derived from these distributed routing tables and forwarded by the Address Resolution Unit (ARU) ASICs on the I/O modules.

I/O Modules

Packet forwarding decisions are made independently on the I/O modules through ARUs. In addition, the I/O modules provide the interface to the network and buffering.

The ARU maintains its own address table for both routed and switched traffic, and can contain up to 24,000 entries. Local routing and address switching enable the ARU to resolve addresses and forward packets through the switch fabric, independent of the CPU. The forwarding engine also checks each packet against current network policies, and, if appropriate, delivers priority service. Priority policies can be based on physical port, VLAN ID, multicast destination, Resource Reservation Protocol (RSVP) flow, or deep packet filtering. Deep packet filtering enables Passport routing switches to look up any bit or byte in the Layer 2, Layer 3, or Layer 4 header, and delivers an intelligent service like priority or access security. Dual priority queues are provided: one for high-priority, business-critical traffic, and one for lower-priority traffic. Each Gigabit Ethernet port, or set of four Fast Ethernet ports, is equipped with 1 MB of output queue memory, ensuring timely delivery of data across the network.

Figure 4:   *Passport 1000 Routing Switch series in the Enterprise Networking Environment.*
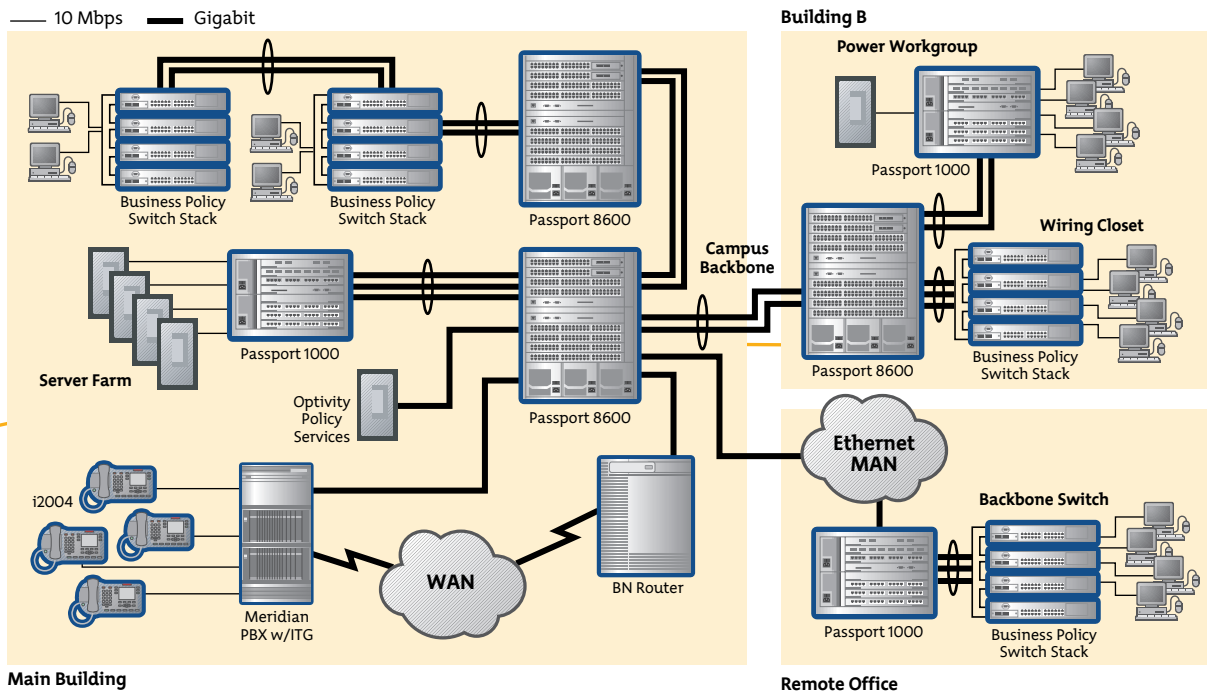
Applications

The Passport 1000 Routing Switch series can be successfully deployed across the enterprise network, creating numerous topologies (see Figure 4).

- For campus backbones burdened with unpredictable intranet traffic flows, the routing switches provide extensive Gigabit Ethernet bandwidth to support policy-based traffic prioritization and graphical VLAN configuration.

- For riser connectivity to the network center, multiple high-density 10/100 Mbps segments can be aggregated into single or multiple Gigabit Ethernet links.

- For central server farms, the routing switches provide maximum throughput with no modification needed in protocol stacks or applications.

- Power workgroups gain high-bandwidth Gigabit Ethernet paths to local servers, while wire-speed routing virtually eliminates latency for remote intersubnet sessions.

- Wiring closet Layer 2 (data link layer) 10/100 switches can be aggregated into any one of three Passport models, running gigabit, 100BASE-TX or 100BASE-FX from the wiring closet to the data center.

Technical Specifications

Table 1:   Passport 1000 Series Technical Specifications.

Performance Throughput	
Model Passport 1200	7.0 Gbps
Model Passport 1100	4.5 Gbps
Model Passport 1150	7.0 Gbps

Routing/Switching Forwarding Rates	
Model Passport 1200	7.0 million pps
Model Passport 1100	6.5 million pps
Model Passport 1150	7.0 million pps

Prioritized Output Buffering	
Model Passport 1200	96 MB, 1 MB per port (fully loaded chassis)
Model Passport 1100	32 MB, 1 MB per port (fully loaded chassis)
Model Passport 1150	20 MB, 1 MB per port (fully loaded chassis)

Gigabit Ethernet Specifications	Fiber Type	Diameter (microns)	Modal Bandwidth (Mhz*km)	Minimum range (meters)
1000BASE-SX	MM	62.5	160	2 to 220
	MM	62.5	200	2 to 275
	MM	50.0	400	2 to 500
	MM	50.0	500	2 to 550
1000BASE-LX	MM	62.5	500	2 to 550
	MM	50.0	400	2 to 550
	MM	50.0	500	2 to 550
	SM	9.0	NA	2 to 5000

Shared Memory Switch Fabric	2 MB (with prioritization)

IP Routing and Switching Speeds	Wire speed for 10/100/1000 Mbps Ethernet ports

Latency	Less than 10 microseconds (LIFO)

Routing Protocols	RIP, RIP2, OSPF, IPX RIP, IPX SAP

Bridging and VLAN Protocols	Up to 127 VLANs defined by port or policy (IP subnet or protocol)
	802.1Q trunking
	802.1d multiple Spanning Tree group support

Prioritization	Policy-based by port, IP flow, and deep packet filtering

Address Support	24,000 table entries

Physical Dimensions

Model Passport 1200	(H) 10.5 in. x (W) 17.5 in. x (D) 16 in. [(H) 26 cm x (W) 44 cm x (D) 41 cm]
Model Passport 1100	(H) 3.5 in. x (W) 17.5 in. x (D) 16 in. [(H) 9 cm x (W) 44 cm x (D) 41 cm]
Model Passport 1150	(H) 3.5 in. x (W) 17.5 in. x (D) 16 in. [(H) 9 cm x (W) 44 cm x (D) 41 cm]

Weight (fully loaded)

Model Passport 1200	70 lb (31 kg)
Model Passport 1100	25 lb (11 kg)
Model Passport 1150	25 lb (11 kg)

Power Requirements

Line Frequency	50 to 60 Hz
Input Voltage	100 to 240 VAC

Power Consumption

Model Passport 1200	284 W max
Model Passport 1100	120 W max
Model Passport 1150	120 W max

Environmental Specifications

Operating Temperature	0° to 40° C (32° to 104° F)
Operating Humidity	10 to 85%, noncondensing
Operating Altitude	8,000 ft max
Storage Temperature	-25° to 70° C (77° to 158° F)
Storage Humidity	95% maximum humidity, noncondensing
Free Fall/Drop	ISO 4180-s, NTSA 1A
Vibration	IEC 68-2-6/34
Shock/Bump	IEC 68-2-27-29

Electromagenetic Emissions and Susceptibility

	FCC Part 15, Subpart B, Class A
	EN 55022 Class A
	VCCI Class 1 ITE
	AS/NZS 3548 Class A
	EN 50082-1

Safety Agency Approvals

	UL 1950 (UL listed)
	CUL C22.2 No. 950
	IEC 950/EN 60 950
	CB report
	NOM-019-SCFI 1994

Warranty

	One year

Product Information

Table 2:   Passport 1000 Routing Switch series.

Product Name	Description
Passport 1200 Modular Chassis, CPU and Power Supplies	
Passport 1200	Chassis (8-slot)
Passport 1298PS	Power supply (at least one required)
Passport 1296PS	48V DC power supply
Passport 1298SF	Silicon Switch Fabric Module[1] (at least one required)
Passport 1200 I/O Modules	
Passport 1202SX	2-port 1000BASE-SX Gigabit Ethernet Module
Passport 1202SR	2-port 1000BASE-SX Gigabit Ethernet Module with LinkSafe redundant physical connections
Passport 1202LX	2-port 1000BASE-LX Gigabit Ethernet Module
Passport 1202LR	2-port 1000BASE-LX Gigabit Ethernet Module with LinkSafe redundant physical connections
Passport 1202XD	2-port Long-Distance Gigabit Module, SC single mode fiber connectors
Passport 1216TX	16-port Autosensing 10/100BASE-TX Ethernet Module
Passport 1208FX	8-port 100BASE-FX Ethernet Module
Passport 1216FX	16-port 100BASE-FX Module, MT-RJ connectors
Passport 1216TF	14-port 10/100BASE-TX with RJ-45, 2-port 100BASE-FX with MT-RJ connectors
Passport 1208FL	8-port 10BASE-FL Ethernet Module
Passport 1100 and 1150 Base Units	
Passport 1100	Base unit with sixteen 10/100BASE-TX Ethernet ports and single power supply[1]
Passport 1100R	Base unit with sixteen 10/100BASE-TX Ethernet ports and redundant power[1]
Passport 1150	Base unit with four 1000BASE-SX Gigabit Ethernet ports and single power supply[1]
Passport 1150R	Base unit with four 1000BASE-SX Gigabit Ethernet ports and redundant power supply[1]
Passport 1100 and 1150 I/O Modules	
Passport 1102SX	2-port 1000BASE-SX Gigabit Ethernet Module
Passport 1102SR	2-port 1000BASE-SX Gigabit Ethernet Module with LinkSafe redundant physical connections
Passport 1102LX	2-port 1000BASE-LX Gigabit Ethernet Module
Passport 1102LR	2-port 1000BASE-LX Gigabit Ethernet Module with LinkSafe redundant physical connections
Passport 1102XD	2-port Long-Distance Gigabit Module, SC single mode fiber connectors
Passport 1108TX	8-port Autosensing 10/100BASE-TX Ethernet Module
Passport 1104FX	4-port 100BASE-FX Ethernet Module
Passport 1108FX	8-port 100BASE-FX module1, with MT-RJ connectors
Passport 1000 Series Accessories	
Passport 1299PC	PCMCIA Flash Memory Module

[1]Device Manager application software is included in Passport 1298SF module, the Passport 1100, Passport 1100R, Passport 1150 and the Passport 1150R base units.

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For more information, contact your Nortel Networks representative or call 1-800-4-NORTEL (1-800-466-7835), or 1-506-674-5470 outside of North America.

www.nortelnetworks.com

United States
Nortel Networks
4401 Great America Parkway
Santa Clara, CA 95054
1-877-655-2ASK

Canada
Nortel Networks
8200 Dixie Road, Suite 100
Brampton, Ontario
L6T 5P6 Canada
1-800-466-7835

Europe, Middle East, and Africa
Nortel Networks EMEA, S.A.
Les Cyclades-Immeuble Naxos
25 Allee Pierre Ziller
Valbonne, 06560 France
+33-4-92-96-69-66

Asia Pacific
Nortel Networks
27/F City Plaza One
1111 King's Road
Quarry Bay
Hong Kong
852-2100 2888

Caribbean and Latin America
Nortel Networks CALA Inc
1500 Concord Terrace
Sunrise, FL 33323-2815
954-851-8000