



Product Brief

Nortel Ethernet Routing Switch 8600 Release 5.0

A resilient, flexible and scalable solution that delivers network virtualization, exceptional value per port and one of the industry's highest 10G densities per module/rack.

Increasingly, companies are turning to technology to help boost their bottom line and increase employee productivity. Advances in technology, however, have led to some very real challenges, particularly how to efficiently and cost-effectively connect a myriad of different devices, disparate systems and multiple locations. The answer to addressing these challenges lies in virtualization of the network.

Virtualization can transform your IT infrastructure and your business by providing a clear path to advanced applications that create a unified communications environment for your organization. Among other things, virtualization provides for network simplicity, flexibility and scalability, and enables faster time-to-market in the data center and core campus. It works by virtualizing servers, and centralizing services, management and security — without compromising the high-availability, security and performance on which you've come to rely. As a result, virtualization delivers many benefits

to your business, including simplified management, accelerated decision-making, decreased recurring costs and increased employee productivity through unified communications.

By offering advanced virtualization features and one of the industry's highest 10G densities per module/rack, the Nortel Ethernet Routing Switch 8600 can turn your network into a highly reliable, efficient and cost-effective infrastructure that drives unified communications.

Unified communications enables the collaborative technologies required to share resources within your entire organization, improve day-to-day operational processes and communicate more cost-effectively with customers, partners and suppliers.



With the latest release of Ethernet Routing Switch 8600, Nortel is the only vendor to offer multiple options that enable Virtual Private Network solutions across the entire campus. Nortel's Layer 3 virtualization is simple, flexible and easy to deploy — and doesn't require adjustments to your existing core infrastructure, which means no additional capital equipment expenditures.

And, since the solution is based on IP technologies, training is minimal compared to requirements for MPLS, resulting in operational cost savings.

Ethernet Routing Switch 8600 highlights

Previous releases of Ethernet Routing Switch 8600 included:

- IP Flow Information eXport (IPFIX) IETF RFC 3917 – Benchmarks network traffic and identify anomalous day-zero behavior
- Integrated Service Delivery Module 8660 – Uses Check Point's Firewall-1NG and SourceFire's Snort-based TPS for deep packet inspection to identify attacks that appear as normal traffic
- IPv6 – Increases scalability for even the most demanding networks
- Split Multi-Link Trunking – Increases resiliency for the most demanding applications and networks

New! As of Release 5.0, Ethernet Routing Switch 8600 now:

- Enables VPN services across the campus for departments and users through existing IP infrastructure — without the need for additional equipment investment or complex setup and management
- Includes virtualized Layer 3 with device and network solutions (e.g., VRF-lite, MPLS and IP VPN-Lite)
- Delivers high performance to fastpath-enabled MPLS and IP VPN solutions on an R/RS module port
- Provides a highly reliable solution for the enterprise core at a competitive price per port
- Offers high-density 10G, high-density Gigabit and 10/100/1000 Ethernet
- Includes sophisticated mirroring capabilities (i.e., many-to-one, one-to-many, and many-to-many) to enable traffic analysis and IDS/TPS clustering
- Offers increased value per slot by delivering a combo module with copper 10/100/1000, 100/1000 SFP and 10GE XFP interfaces
- Offers unique best-in-class resiliency with SMLT for VMware server virtualization in an iSCSI environment*
- Available with optional security and applications awareness modules
- Supports large-scale convergence deployments

*For additional details, visit www.nortel.com/datacenter.

Resiliency, intelligence and security — without the design complexity

The Ethernet Routing Switch 8600 is a proven and tested resilient, secure and intelligent network solution that can deliver many hundreds of gigabits per second (Gbps) and hundreds of millions of packets per second (Mpps) performance to the network core. This powerful and flexible switch combines resilient high performance with intelligence and security, while taking the complexity out of network design.

Ideal for medium to large enterprise campuses and data centers, the Ethernet Routing Switch 8600 leverages technology from industry-leading products to create an integrated intelligence with the Web Switch Module, SSL Acceleration Module and the Service Delivery Module.

The Ethernet Routing Switch 8600 is:

- Available in a 3-, 6- and 10-slot chassis, supporting dedicated 1G and 10G pluggable modules, and 10/100 and 10/100/1000 copper and fibre modules
- A highly redundant solution with optional redundant, high-availability Switch Fabrics, N+1 Power Supplies and dual AC input 1500 Watt to enhance redundancy by connecting two separate AC inputs
- The flagship product for Nortel's "Switch Cluster" technology, delivering non-stop end-to-end application availability

The high-density and high-speed server connectivity in large deployments is matched by a suitably high-performance switching architecture that is based on NPU rather than ASIC technology. This RSP delivers fastpath flexibility and investment protection due to software-upgradeable data path technology — while still providing 10-Gbps line rate switching/routing capabilities. This results in a balanced solution without the constraints or bottlenecks imposed by inferior designs.

In addition to establishing a solid foundation for unified communications, Ethernet Routing Switch 8600 provides enterprises with the basic network building blocks to grow their business operations and evolve their network as future applications and technologies emerge.

Resiliency to ensure business continues

Network resiliency is the most basic requirement when implementing a converged network. The Ethernet Routing Switch 8600 supports redundant connectivity for virtualized solutions such as VRF-lite, VPN-Lite for edge/core and MPLS LER IP-VPN for edge networks. With Nortel's VRF-lite, organizations can use the same hardware platform to create multiple Layer 3 routing domains to support multiple customers. Nortel VPN-Lite makes it possible for these same organizations to also deploy VPN over the existing

IP infrastructure (campus or metro) without incurring additional capital or operational expense.

The Ethernet Routing Switch 8600 addresses resiliency at multiple levels for maximum coverage. At the hardware level, the switch provides hot swappable modules including fan trays and N+1 power supplies, and dual AC input power supplies. The Ethernet Routing Switch 8600 software ensures resiliency for the network core with industry-leading features, including Split Multi-Link Trunking (SMLT), VRRP Active/Active and Switch Clustering (Routed Split Multi-Link Trunking, R-SMLT).

Additionally, organizations can effectively dual-connect to servers, desktops and switch clustering with minimum investment, maximum flexibility and sub-second failover.

Intelligence for a smarter way to do business

Network devices need to be keenly aware of traffic types and be able to handle specific types of traffic differently. This sense or awareness of differing traffic types, combined with the ability to process each type differently, is what sets intelligent networks apart from typical LANs. The Ethernet Routing Switch 8600 combines intelligence and performance to create a next-generation intelligent network solution.

The Ethernet Routing Switch 8600 meets enterprises' increasing demands for scalability, simplification, maximized application uptime, value and security. The platform takes the complexity out of network design by simplifying the network architecture and increasing value per port per slot with advanced features on high-density modules.

Security to keep information safe

All devices on the network need to ensure network element security as well as data integrity. The Ethernet Routing Switch 8600 employs several layers of built-in security for both switch access and network data. Nortel Secure Network Access v1.5 offers seamless secure access for internal end users (i.e., wired or wireless LAN networks) or external users. Firewalls, passwords, access policies, secure protocols, address and port filtering, routing policies and DoS prevention mechanisms help ensure that the network and its data stay secure.

Figure 1. Nortel Ethernet Routing Switch 8600



Key new features in Release 5.0

The latest release of Ethernet Routing Switch 8600 includes advanced software features and new hardware that address network virtualization, reduce complexity, and enhance scalability and security.

Software

- Virtual Routing and Forwarding (VRF-Lite)**
- IP VPN (RFC 2547/4364) with MP-iBGP**
- IP VPN-Lite w/MP-iBGP (without MPLS) (IP-in-IP VPN)**
- Port Mirror enhancements (one-to-many, many-to-one, many-to-many)†
- MPLS LER, LSR, LDP, RSVP**
- Nortel Secure Network Access v1.5†
- Nortel Networks Command Line Interface
- Multicast scaling enhancements (4,000 S,G)†
- VLAN scaling enhancements (4k VLANs)†
- High Availability (HA) Enhancements (HA-CPU configuration w/VRF-Lite in hot standby and with L3 IP Multicast and BGP; and MPLS in warm standby)
- Routed SMLT Edge/Access support
- Customized Auto-Negotiation Advertisements†
- Software licensing framework

Hardware

- 8612XLRS 12-port 10GBASE-X XFP Ethernet Interface Module
- 8634XGRS "Combo" Ethernet Interface Module: 2 ports for 10GBASE-X XFP; 24 ports for 1000 BASE-X SFP; 8 ports for 10/100/1000BASE-TX
- 8648GBRS 48-port 1000BASE-X SFP Ethernet Interface Module
- 8648GTRS 48-port 10/100/1000BASE-TX Ethernet Interface Module
- Dual AC Input 1500W Power Supply Unit
- 10GBASE-LRM XFP Pluggable; 1000BASE-X 120km SFP Pluggable; DDI SFPs
- High-speed fan trays

* Indicates features that are categorized as non-Base and therefore require additional Licensing: Advanced or Premier

† Indicates features that require use of the R or RS-Series Interface Modules

Innovative module options to meet any requirement

Simple, scalable and stackable

The Ethernet Routing Switch 8600 takes the complexity out of network design by simplifying the network architecture and increasing value per port with advanced features on high-density modules for modular products and high-density ports for stacking. High-density ports, combined with the rich capabilities and applications and the leading reliability technologies offered by the Ethernet Routing Switch 8600, result in exceptionally high value for enterprises. The Nortel RSP, which is based on NPU technology, offers an investment protection path for future software upgrades.

Additions to the existing high-performance I/O module options offer a number of practical business benefits. These include a high-density 10G Ethernet (12 ports per module and up to 96 ports per chassis) and a higher-density 1000BASE-X 48-port module that complements the existing 30-port model.

One module; many flavors

The Ethernet Routing Switch 8600 also offers an innovative new hybrid combination module that supports 10G Ethernet, 1000BASE-X and 10/100/1000BASE-TX ports. Economical, flexible and an industry first, this 'combo' module includes copper 10/100/1000, SFP and XFP interfaces to meet the demand of smaller aggregation sites. It is an affordable solution that provides all the functionality many organizations need — all in one convenient and affordably priced module.

Applications: New capabilities and more choice to optimize communications

By offering advanced capabilities such as IP VPN-Lite, VRF-lite and IP VPN MPLS based all on one platform, the Ethernet Routing Switch 8600 enables virtual services across campus and metro environments to address new and additional business requirements and applications. For example, a university seeking a solution to connect several of its campuses can choose industry-standard MPLS or Nortel's IP VPN-Lite technology.

Virtual Private Networking through IP VPN-Lite

Nortel IP VPN-Lite is an innovative IP-in-IP capability that leverages Nortel's flexible forwarding ASICs (RSP) — making it easier to implement, deploy and manage VPN services across campuses. With IP VPN-Lite, enterprises can build private connections between local or geographically dispersed sites using any IP infrastructure (i.e., private or through a public IP service provider).

IP VPNs are typically used for inter-office connectivity and also to create trusted connections to partner organizations; they leverage IP as the common carriage, and remove a dependency on specific wide area technologies (e.g., frame relay or ATM) or service providers. Nortel's IP VPN-Lite solution has the additional benefit of being inherently less complex and therefore more cost-effective than using MPLS. Managing IP VPN-Lite versus MPLS is much simpler and doesn't require costly MPLS IT training or special resources.

IP VPN-Lite's set-up is based on the flexible RFC4364/2547 configuration model, and requires no MPLS core infrastructure. As a result, the solution can scale as high as an MPLS-based IP VPN. Additionally, both MPLS and IP VPN-Lite can coexist and operate in parallel.

Virtual Routing and Forwarding (VRF-lite)

Through VRF-lite on Ethernet Routing Switch 8600, enterprises can use the same hardware platform to create multiple Layer 3 routing domains to support multiple customers and keep traffic separated.

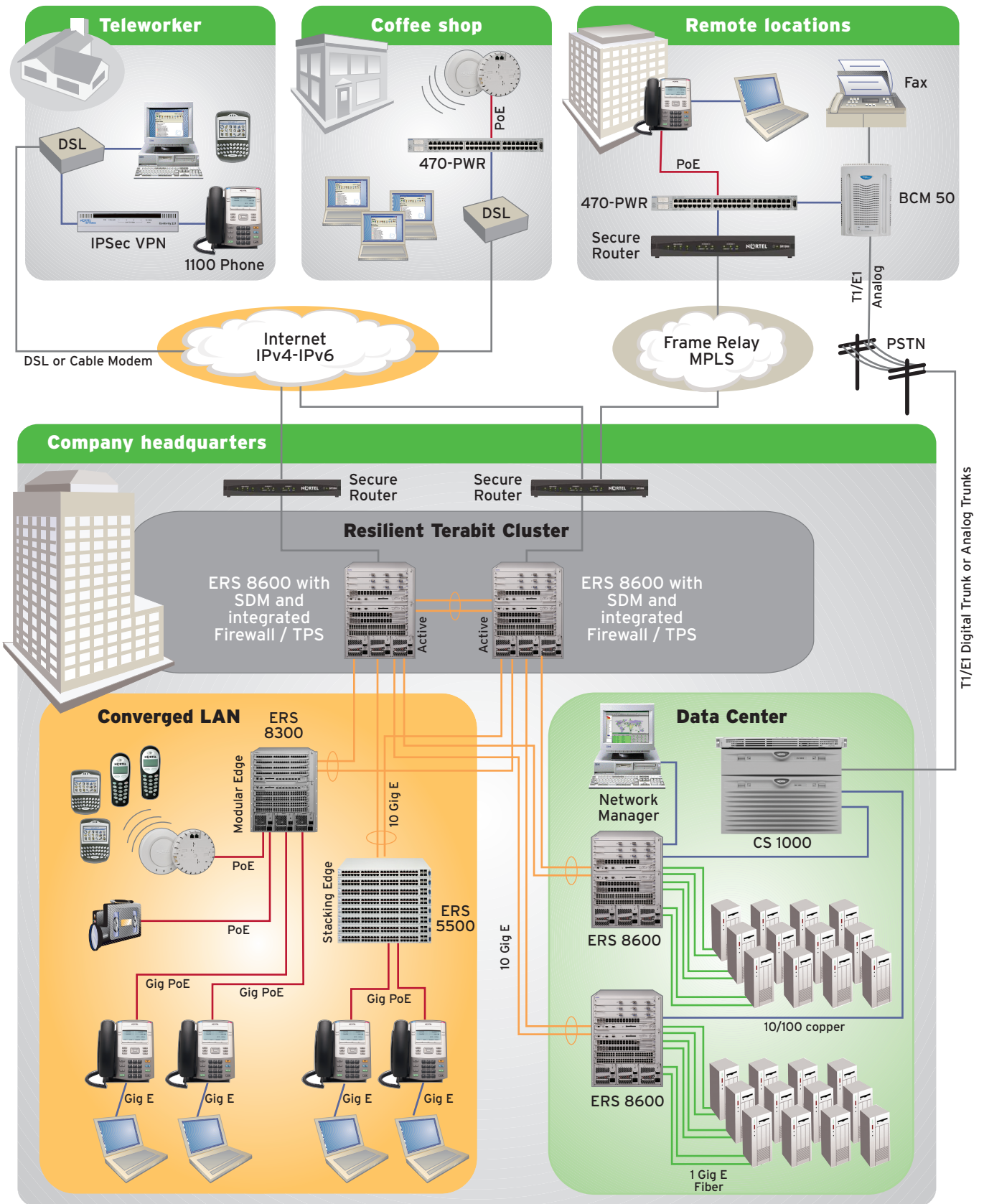
The VRF-lite capability virtualizes routing within the switch, enabling enterprises to facilitate business and networking challenges such as mergers and acquisitions, Data Center consolidation and sharing, departmental or business unit segmentation, and general audit and compliant requirements. By allowing the switch to have two or more routing instances, more sophisticated connections are made possible, in addition to supporting overlapping IP Address spaces. Complete traffic separation on Layers 2 and 3 is usually a key requirement. However, if necessary, the system can be configured to provide inter-VRF forwarding capabilities to allow access to common resources.

Multi-Protocol Label Switching (MPLS)

When delivered on a LAN Switch such as the Ethernet Routing Switch 8600, MPLS complements the majority of today's wide area networking solutions. MPLS provides sophisticated connectivity and traffic engineering techniques, and is often used as the basis for VPNs. Through this capability, users can create MPLS environments based on the Ethernet Routing Switch 8600, and increase the overall level of transparency and interoperability.

A new set of hardware provides the necessary flexibility as enterprises proceed with the transition to 10G Ethernet in the Core and the Riser, and with server consolidation in the Data Center.

Figure 2. Nortel Ethernet Routing Switch 8600 Network diagram



Software enhancements

Multi-port Mirroring

The Ethernet Routing Switch 8600 includes RS line cards for enhanced mirroring capabilities, including enabling one-to-many, many-to-one and many-to-many mirroring for traffic analysis and IDS/TPS clustering.

Nortel Secure Network Access

Through Nortel Secure Network Access (NSNA) v1.5, the Ethernet Routing Switch 8600 offers ubiquitous and seamless secure access for internal end users (i.e., wired or wireless LAN networks) or outside users (i.e., remote access, including SSL/IPsec/WAN networks).

Nortel (Networks) Command Line Interface

The NNCLI (Nortel Networks Command Line Interface) is a common interface that follows the de facto industry standard, ensuring a short learning curve for engineers installing the Ethernet Routing Switch 8600. NNCLI is also supported by other Nortel products, including the current Nortel Ethernet Switching portfolio. A common CLI for all devices simplifies management and results in reduced ROI.

Scalability

The emergence of new technology combined with a highly competitive landscape means organizations must move

quickly when adding new functionality — a strong case for scalability. The Ethernet Routing Switch 8600 offers many scalability capabilities, including 4k IP Multicast S,Gs and 4k VLAN.

RSMLT-edge

The RSMLT-edge functionality supports the use of RSMLT as a VRRP replacement in highly-scaled networks that have hundreds of end-station aggregation switches. Since RSMLT does not depend on a hello protocol for each virtual router instance, the solution is more scalable and resilient.

Why choose Nortel?

Nortel is the only vendor in the industry to offer multiple options that enable VPN solutions across the campus. These options include standard solutions of MPLS IP-VPN and Nortel's IP VPN-Lite, which offers the added benefit by running over existing IP infrastructure without the need for additional capital investment or operational expense.

Nortel is also the only vendor that delivers increased value per slot by introducing a combo module with copper 10/100/1000, SFP and XFP interfaces to meet the demand of smaller aggregation sites. Finally, Nortel has the distinction of offering one of the industry's highest 10G densities per module/rack, and the only solution vendor to offer best-in-class

resiliency with SMLT for VMware server virtualization in an iSCSI environment.¹

Summary

The Ethernet Routing Switch 8600 is a resilient, intelligent, secure solution that allows corporate networks to provide a truly unified communications network. Enabling a Resilient Terabit Switch Cluster solution, the Ethernet Routing Switch 8600 allows you to scale converged and web applications network-wide. Resiliency helps ensure that network resources are always available. Intelligence delivers bandwidth and performance for those applications that need it the most when they need it. Security helps ensure that the information traveling across your network remains secure and unaltered. Resiliency, intelligence and security are the basic network building blocks that allow an enterprise to use their network to grow their business and provide a solid foundation for their future network growth.

The Ethernet Routing Switch 8600 offers a high-performance architecture that combines with rich, advanced services for convergence applications to enhance, protect and simplify network service and operations. Customers seeking to make strategic investments in their campus LAN infrastructure can now create solutions that will support business growth for years to come. As a provider of end-to-end solutions that span voice, data, applications and network management, Nortel has the necessary expertise to increase your opportunities for profitability, streamline your business operations, increase productivity and help you gain competitive advantage.

A real-world scenario: Virtual Routing and Forwarding

An international airport, which handles a large amount of traffic from multiple national and global airlines and other local on-campus businesses, is looking for a networking solution that will maximize application uptime, safeguard information, while providing excellent business value. By employing Ethernet Routing Switch 8600 and VRF-lite capabilities, the airport can keep airlines and their respective traffic separate — all from one economical, simple-to-implement and easy-to-manage hardware platform.

¹ Note that, where multiple iSCSI targets are used, VMware recommends using ESX NIC teams in "IP Hashing" mode to balance traffic across NIC teams and take advantage of multiple switch redundancy.

Performance specifications

- System architecture bandwidth: 720 Gbps
- Sub100ms failover (requires 8692SF with SuperMezz)
- Frame length: 64 to 1,518 bytes (IEEE 802.1Q Untagged), 64 to 1,522 bytes (IEEE 802.1Q Tagged)
- Jumbo frame support: Up to 9.6k bytes (IEEE 802.1Q Tagged)
- Multi-Link Trunks: Up to 128 trunks with 8 links per group with 8692SF + R/RS-Modules/Mode
- VLANs: Up to 4,000 port- or protocol-based; per VLAN Tagging option
- IP Multicast: Up to 4,000 S,G
- Multiple spanning tree groups: Up to 64 (STGs)
- SMLT and RSMLT (Routed Split Multi-Link Trunking)
- Single Port Split Multi-Link Trunking

Network protocol and standards compatibility

IEEE

- IEEE 802.1D MAC Bridges/Spanning Tree Protocol
- IEEE 802.1p Prioritizing
- IEEE 802.1Q VLAN Tagging
- IEEE 802.1s Multiple Spanning Tree Protocol (MSTP)
- IEEE 802.1w Rapid Spanning Tree Protocol (RSTP)
- IEEE 802.1x EAPOL
- IEEE 802.3 CSMA/CD Ethernet (ISO/IEC 8802-3)
- IEEE 802.3ab Gigabit Ethernet 1000BaseT
- IEEE 802.3ad Link Aggregation Control Protocol (LACP)
- IEEE 802.3ae 10 Gigabit Ethernet
- IEEE 802.3i 10BaseT – Autonegotiation
- IEEE 802.3u 100BaseTX – Autonegotiation
- IEEE 802.3x Flow Control on the Gigabit Uplink port
- IEEE 802.3z Gigabit Ethernet 1000BaseSX and LX

IETF RFCs

Layer 2 features ATM / POS

- RFC 1332 IPCP (POS module)
- RFC 1471 LCP (POS module)
- RFC 1473 NCP (POS module)
- RFC 1474 Bridge NCP (POS module)
- RFC 1552 IPXCP (POS module)
- RFC 1638 BCP (POS module)
- RFC 1661 PPP (POS module)
- RFC 1989 PPP Link Quality Monitoring (POS module)
- RFC 2558 Sonet / SDH (POS module)
- RFC 2615 PPP over SONET / SDH (POS module)

IPv4 Layer 3 / Layer 4 Intelligence

- RFC 768 UDP Protocol
- RFC 783 TFTP Protocol
- RFC 791 IP Protocol
- RFC 792 ICMP Protocol
- RFC 793 TCP Protocol
- RFC 826 ARP Protocol
- RFC 854 Telnet Protocol
- RFC 903 Reverse ARP Protocol
- RFC 951 / RFC 2131 BootP / DHCP
- RFC 1058 RIPv1 Protocol
- RFC 1112 IGMPv1 for snooping
- RFC 1213 TCP/IP Management Information Base
- RFC 1253 OSPF
- RFC 1256 ICMP Router Discovery
- RFC 1583 OSPFv2
- RFC 1591 DNS Client
- RFC 1745, obs RFC 1703 BGP / OSPF Interaction
- RFC 1771 / RFC 1772 BGP-4
- RFC 1812 Router Requirements
- RFC 1866 HTMLv2 Protocol
- RFC 1965 BGP-4 Confederations
- RFC 1966 BGP-4 Route Reflectors
- RFC 1997 BGP-4 Community Attributes
- RFC 2068 Hypertext Transfer Protocol
- RFC 2131 Dynamic Host Control Protocol (DHCP)
- RFC 2138 RADIUS Authentication
- RFC 2139 RADIUS Accounting
- RFC 2178 OSPF MD5 cryptographic authentication / OSPFv2
- RFC 2205
- RFC 2210
- RFC 2211
- RFC 2236 IGMPv2 for snooping
- RFC 2270 BGP-4 Dedicated AS for sites/single provide
- RFC 2328 OSPFv2
- RFC 2338 VRRP: Virtual Redundancy Router Protocol
- RFC 2362 PIM-SM
- RFC 2385 BGP-4 MD5 authentication
- RFC 2439 BGP-4 Route Flap Dampening
- RFC 2453 RIPv2 Protocol
- RFC 2702
- RFC 2819 Remote Monitoring (RMON)
- RFC 2961
- RFC 3031
- RFC 3032
- RFC 3036
- RFC 3037
- RFC 3210
- RFC 3215
- RFC 3270 (partial)
- RFC 3376 IGMPv3 partial compliancy
- RFC 3443
- RFC 3569 PIM-SSM
- RFC 3917 / RFC 3995 IPFIF
- RFC 4364
- RFC 4379
- NAT (Network Address Translation) — only with WSM

IPv4 Multicast

- RFC 1075 DVMRP Protocol
- RFC 1112 IGMP v1 for routing / snooping
- RFC 2236 IGMP v2 for routing / snooping

- RFC 2362 + some PIM-SM v2 extensions (PIM-SM)

IPv6

- IPv6 requires 8692SF and SuperMezz Daughter card and R-Modules
- RFC 1981 IPv6 path MTU discovery
- RFC 2375 IPv6 Multicast Address Assignments
- RFC 2460 IPv6 specifications
- RFC 2461 Neighbor Discovery
- RFC 2462 Stateless Auto Configuration
- RFC 2463 ICMPv6
- RFC 2710 MLDv1 / MLDv2
- RFC 2740 OSPFv3
- RFC 2893 Configured Tunnels and Dual Stack Routing per port
- RFC 3484 Default Address Selection for IPv6
- RFC 3513 IPv6 addressing architecture
- RFC 3587 Global Unicast Address Format
- RFC 3596 DNS Extensions to support
- RFC 3810 IPv6 Multicast capabilities
- SSH/SCP, Telnet, Ping, CLI, JDM support for IPv6

Platform

- RFC 1305 (NTP client / unicast mode only)

Quality of Service (QoS)

- RFC 2474 / RFC 2475 DiffServ Support
- RFC 2597 / RFC 2598 DiffServ per Hop Behavior

Network management

- RFC 1155 SMI
- RFC 1157 SNMP
- RFC 1215 Traps
- RFC 1757 / RFC 2819 RMON
- RFC 1907 SNMPv2
- RFC 2571, 2572, 2573, 2574, 2575 and 2576 SNMPv3

MIBs

- RFC 1213 MIB II
- RFC 1389 / RFC 1724 RIPv2 MIB extensions
- RFC 1493 Bridge MIB
- RFC 1573 Interface MIB
- RFC 1643 Ethernet MIB
- RFC 1657 BGP-4 MIB using SMIv2
- RFC 1850 OSPF MIB
- RFC 2021 RMON MIB using SMIv2
- RFC 2096 IP Forwarding Table MIB
- RFC 2233 Interfaces Group MIB using SMIv2
- RFC 2452 IPv6 MIB: TCP MIB
- RFC 2454 IPv6 MIB: UDP MIB
- RFC 2465 IPv6 MIB: IPv6 General group and textual conventions
- RFC 2466 IPv6 MIB: ICMPv6 Group
- RFC 2674 Bridges with Traffic MIB
- RFC 2863 Interface Group MIB
- RFC 2925 Remote Ping, Traceroute & Lookup Operations MIB
- RFC 2932 Mroute MIB
- RFC 2933 IGMP MIB
- RFC 2934 PIM MIB
- RFC 3019 IPv6 MIB: MLD Protocol
- RFC 4022 TCP MIB
- RFC 4113 UDP MIB

Physical specifications

Ethernet Routing Switch 8606

- 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 trays: 1 per chassis
 - Fans: 6 per fan tray
 - Thermal sensors: 1 per fan tray
- Operating altitude: 3,024 m (10,000 ft)

Ethernet Routing Switch 8610

- 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)

Ordering information

Chassis, power supply and software

Order code	Description
DS1402001	8010 10 slot chassis. Includes chassis, dual backplane, two fan trays, RS232 cable for management console, rack mount kit and cable guide kit. Requires at least one power supply, up to three power supplies supported.
DS1402002	8006 6 slot chassis. Includes chassis, dual backplane, fan tray, RS232 cable for management console, rack mount kit and cable guide kit. Requires at least one power supply, up to three power supplies supported.
DS1405012-ES	8005AC 100-240 VAC 1140W/1462W Power Supply. At least one power supply required per 8006, 8010 or 8010co chassis. Lower output at 110VAC. Cannot mix with 8004 series supplies. Power cord ordered separately-use AA00200xx series cords.
DS1405011	8005DC 1462W Power Supply. At least one power supply required per 8006, 8010 or 8010co chassis. Cannot mix with 8004 series supplies.
DS1410003-5.0	ERS 8600 Routing Switch Base Software Kit (Includes v5.0 base SW license, Device Manager, and complete SW documentation set). One license kit required per chassis. (Support contracts must be purchased separately.)
DS1410005-6.2	Enterprise Switch Manager version 6.2
DS1405018-E6	Ethernet Routing Switch 8005 Dual Input AC Power Supply

Switch fabrics and RS Modules

Order code	Description
DS1404065	Ethernet Routing Switch 8692SF Switch Fabric/CPU to enable redundant terabit core configurations. One required with R Modules, second for load-sharing and redundancy. Operable with pre-E, E and M modules. Includes 256MB SDRAM and 64MB PCMCIA.
DS1404066	8692SF Switch Fabric/CPU with factory-installed Enterprise Enhanced CPU Daughter Card (SuperMezz). SuperMezz is a mandatory requirement for IPv6 or Sub-100msec failover. Both 8692SF must have the SuperMezz installed; no mixed configurations.
DS1411025	Enhanced CPU Daughter Card (SuperMezz) for 8692SF. Includes dual 1GHz processors. SuperMezz is a mandatory requirement for IPv6 or Sub-100msec failover. Both 8692SF must have the SuperMezz installed; no mixed configurations.
DS1404097-E6	8612XLRS - 12 port 10GBase-X LAN XFP Routing Switch Module baseboard (XFPs sold separately). Requires the use of the 8692SF.
DS1404102-E6	8648GBRS - 48 port SFP Routing Switch Module baseboard (SFPs sold separately). Requires the use of the 8692SF.
DS1404109-E6	8634XGRS Combo 2 port 10GBase-X XFP, 24 port SFP (with 100FX support) and 8 port auto sensing 10/100/1000TX Routing Switch Module baseboard (XFPs and SFPs sold separately). Requires the use of the 8692SF.
DS1404110-E6	8648GTRS - 48 port auto sensing 10/100/1000TX Routing Switch Module baseboard. Requires the use of the 8692SF.

Service Delivery Modules

Order code	Description
DS1404080	8660 Service Delivery Module with 4 Firewall iSD Modules for the Ethernet Routing Switch 8600
DS1404081	8660 Service Delivery Module with 2 Firewall iSD Modules for the Ethernet Routing Switch 8600
DS1404104	8660 Service Delivery Module with 1 Firewall iSD Modules for the Ethernet Routing Switch 8600
DS1404082	8660 Service Delivery Module with 4 Intrusion Sensor iSD Modules for the Ethernet Routing Switch 8600
DS1404086	8660 Service Delivery Module with 2 Firewall / 2 Intrusion Sensor iSD Modules for the Ethernet Routing Switch 8600
DS1404087	8660 Service Delivery Module with 1 Firewall / 1 Intrusion Sensor iSD Module for the Ethernet Routing Switch 8600

- Cooling system:
 - Fan trays: 2 per chassis
 - Fans: 8 per fan tray
 - Thermal sensors: 1 per fan tray
- Operating altitude: 3,024 m (10,000 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)

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, noncondensing

- Storage humidity: 95% maximum relative humidity, noncondensing
- Operating altitude: 3024 m (10,000 ft) maximum
- Storage altitude: 3024 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
- Australia/New Zealand: NZS 3548:1995, Class A
- Canada: ICES-003, Issue 2, Class A
- Japan: V-3/97.04:1997, Class A
- Taiwan: CNS 13438, Class A
- EN 55022:1995, Class A
- EN 61000-3-2:1995
- EN 61000-3-3:1994
- Electromagnetic immunity: Meets the EN 50082-1:1997 standard

Licensing

Order code	Description
DS1410003-5.0	ERS 8600 Routing Switch Base Software Kit (Includes v5.0 base SW license, Device Manager, and complete SW documentation set). One license kit required per chassis. (Support contracts must be purchased separately.)
DS1410021	Ethernet Routing Switch 8600 Advanced License Kit, for 1 chassis. Enabled features: BGP4, IPv6 Management, IPv6 Routing, IPFIX, PCAP and Ping Snoop. (One license required per chassis.)
DS1410022	Ethernet Routing Switch 8600 Advanced License Kit, for up to 10 chassis. Enabled features: BGP4, IPv6 Management, IPv6 Routing, IPFIX, PCAP and Ping Snoop. (One license required per chassis.)
DS1410023	Ethernet Routing Switch 8600 Advanced License Kit, for up to 50 chassis. Enabled features: BGP4, IPv6 Management, IPv6 Routing, IPFIX, PCAP and Ping Snoop. (One license required per chassis.)
DS1410024	Ethernet Routing Switch 8600 Advanced License Kit, for up to 100 chassis. Enabled features: BGP4, IPv6 Management, IPv6 Routing, IPFIX, PCAP and Ping Snoop. (One license required per chassis.)
DS1410026	Ethernet Routing Switch 8600 Premier License Kit, for 1 chassis. Enabled features: Advanced License features, plus, VRF-Lite, MP-BGP, IP-VPN MPLS RFC2547 and IP-VPN-Lite (IP-in-IP). (One license required per chassis.)
DS1410027	Ethernet Routing Switch 8600 Premier License Kit, for up to 10 chassis. Enabled features: Advanced License features, plus, VRF-Lite, MP-BGP, IP-VPN MPLS RFC2547 and IP-VPN-Lite (IP-in-IP). (One license required per chassis.)
DS1410028	Ethernet Routing Switch 8600 Premier License Kit, for up to 50 chassis. Enabled features: Advanced License features, plus, VRF-Lite, MP-BGP, IP-VPN MPLS RFC2547 and IP-VPN-Lite (IP-in-IP). (One license required per chassis.)
DS1410029	Ethernet Routing Switch 8600 Premier License Kit, for up to 100 chassis. Enabled features: Advanced License features, plus, VRF-Lite, MP-BGP, IP-VPN MPLS RFC2547 and IP-VPN-Lite (IP-in-IP). (One license required per chassis.)

Miscellaneous parts

Order code	Description
DS1402003	8003 3 slot chassis
DS1304008	8672 ATME 2 Slot MDA Baseboard
DS1404060	Ethernet Routing Switch 8683 POSM 3 Slot Baseboard
DS1404090	Ethernet Routing Switch 8691SF Switch Fabric/ CPU Module
DS1404070	8661 SSL Acceleration Module (SAM)
DS1404045	8600 Web Switching Module (WSM)
DS1404011	Ethernet Routing Switch 8616SXE
DS1404024	Ethernet Routing Switch 8632TXE
DS1404034	Ethernet Routing Switch 8616GTE
DS1404035	Ethernet Routing Switch 8648TXE
DS1404036	Ethernet Routing Switch 8608SXE
DS1404037	Ethernet Routing Switch 8624FXE
DS1404038	Ethernet Routing Switch 8608GBE
DS1404044	Ethernet Routing Switch 8608GTE
DS1404052	Ethernet Routing Switch 8681XLW
DS1404053	Ethernet Routing Switch 8681XLR
DS1411018-E6	8006CM HS - Cooling Module High Speed - Fan Tray for 8006. Required for RS-Modules. One per chassis.
DS1411017-E6	8010CM HS - Cooling Module High Speed - Fan Tray for 8010. Required for RS-Modules. Two per chassis.

* 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

E5 suffix will be added in 2006 to indicate EUED WEEE and RoHS 5/6 Compliance

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