QLOGIC®
The Ultimate in Performance

DATA SHEET

QLogic 9000 Stackable Chassis Switch

The Benefits of Modular Blades—at an Edge Switch Price

Overview

Changing business requirements at many of today's best companies are driving the need for the scalability, resiliency, and manageability provided by modular, chassis-based SAN switches. As new and unpredictable demands spring up every quarter, these companies require the flexibility to modify and expand their server/storage infrastructure frequently without affecting production environments. In addition, as the mission-critical role of data continues to grow, more businesses than ever must guarantee iron-clad security while providing a high degree of control and monitoring in their data centers.

Until now, the robust performance, rapid deployment potential, and "pay-as-you-grow" budgeting advantages of Fibre Channel chassis Switches have been available only in the form of expensive Director appliances targeted primarily at mainframe customers. IT managers with high-port-count open systems SANs, who are unwilling to pay a premium for unused director features (such as FICON support), have been forced to purchase complicated meshes of smaller switches or very large fixed-port units—both of which offer high port counts, but much less flexibility, fault tolerance, and overall system control.

QLogic now provides a new class of core switch, representing a sane alternative to one-quarter-million-dollar directors and large, less resilient fixed-port switches.

The QLogic 9000 Series is *Designed to the Core* for cost-sensitive, business-critical, open systems environments that require high-port density, best-in-class performance, and 99.999% availability.

Highlights

Scalability

- 16–128 ports in a single 4U chassis
- 256 ports in a dual-chassis, 8U HyperStack™
- Mix 4Gb, 8Gb, and 10Gb Fibre Channel I/O blades
- Intelligent Storage Router modules: iSCSI for connecting low-cost servers and FCIP for replicating data across a WAN

Fault Tolerance

- Dual CPU option
- Hot-swappable I/O blades—nondisruptive expansion
- Redundant, hot-swappable power supplies and fans

Low Cost of Ownership

- Pricing begins well under $100K
- 16-port entry point
- More standard features at no charge and fewer software licenses
- Customer replaceable units (CRUs) ensure simplicity and economy
- Lower power consumption

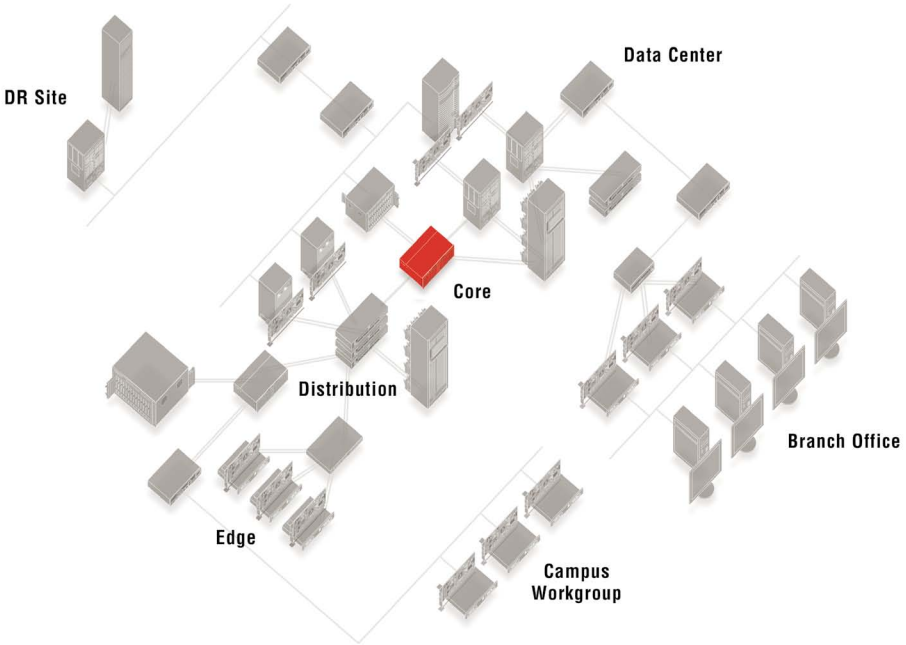
Powerful Software Included

- QuickTools™ Web applet gets you up and running in minutes
- Enterprise Fabric Suite™ management application helps you set up, monitor, tune, troubleshoot, and service an unlimited number of large fabrics
- Adaptive trunking, RSCN suppression, Drag-and-Drop Zoning Wizard, extended distance, and more at no extra charge
- Advanced fabric security

Blazing Performance

- 800Gbps backplane capacity for a single chassis; 1.6Tbps for a dual-chassis HyperStack
- More than 2.17Tbps total bandwidth with 4Gb blades; 4.35Tbps with 8Gb blades
- The industry's lowest latency plus "No-Wait" routing for maximum transaction performance. Powerful embedded CPU and I/O blade ASICs.
- Enables High Performance Computing, video, and satellite capture data streaming applications

Open Systems Enterprise



With hundreds of ports, support for solutions that require 99.999 percent availability, and 1.6Tb of bandwidth, the QLogic 9000 is Designed to the Core for the open systems enterprise.

Designed to the Core for Open Systems

Data center managers in *mainframe* environments are responsible for connecting large numbers of servers and storage systems. They pay a premium for servers, storage, and Director switches that support proprietary mainframe protocols.

Data center managers in *open systems* environments also want high availability, high performance, and scalability. However, they expect products built on open standards to be substantially more cost-effective, less complex, more flexible, and easier to use.

Reliable, fast, modular, and incredibly cost-effective, the QLogic line of core-to-edge fabric switch modules and Intelligent Storage Router modules are *Designed to the Core* for the open enterprise.

QLogic Fabric Product Family

The QLogic 9000 is the flagship in the line of fabric switches and Intelligent Storage Router platforms. Every QLogic component delivers the advantages of a best-in-class, standalone product solution. Working together as an intelligent, integrated network solution under the Enterprise Fabric Suite (EFS) software umbrella, they are easy to deploy and administer. Enterprise Fabric Suite makes your SAN perform better, too. That's why the entire QLogic Fibre Channel Switch product line won the Windows® IT Pro "Readers Choice" award. For your switched Fibre Channel fabric, you can count on QLogic for exactly the right switch—from the core, to the distribution layer, to the edge. For low-cost local and remote server IP network connectivity, QLogic Intelligent Storage Routers boost performance while driving down cost and complexity. Most importantly, the router ensures an open environment that can transparently accommodate multiple vendors, new solutions, and future flexibility.

The new look for powerful, easy-to-manage fabrics:

- QLogic 9000 Series Stackable Chassis Switch
- QLogic 6000 Intelligent Storage Router
- QLogic 5000 Series Stackable Fibre Channel Switch

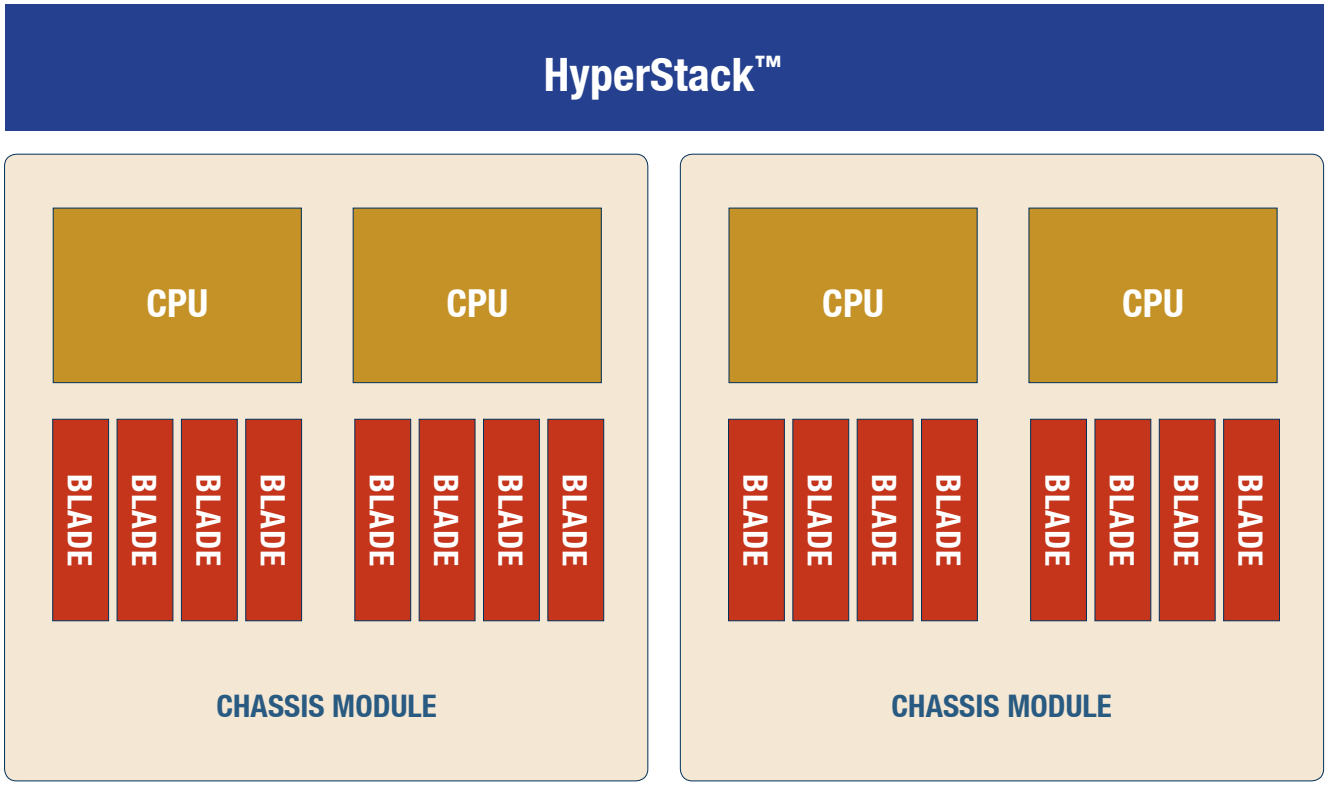
QLogic 9000 Product Overview

HyperStack Architecture

The QLogic 9000 Series Stackable Chassis Switch is a new class of core switch that enables solutions with the 99.999 percent availability, blazing performance, and the easy scalability of a Director—but without the large footprint and high TCO.

What makes it all possible is the QLogic 9000 architecture that features:

- HyperStack: Four 200Gb dedicated backplane-to-backplane interconnects between chassis modules
- High Bandwidth Chassis: 1.6Tb of backplane bandwidth for a dual-chassis HyperStack configuration
- Redundancy: Redundant CPU, power supply, and fan blades, including the ability to hot-swap replace by a customer
- Compact: Up to 128 ports in only 4U of rack space, 256 ports in an 8U HyperStack
- Ultra-High Availability: Optional fault tolerant transparent CPU failover feature for any SB9200 module

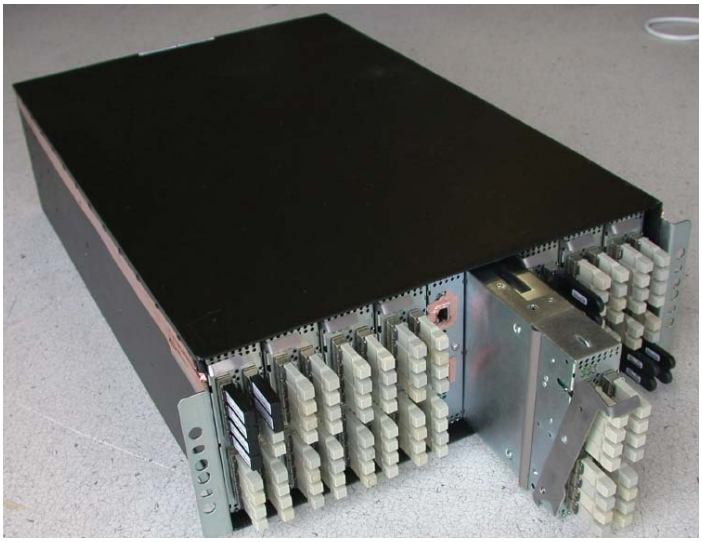


The QLogic 9000 architecture is redundant for high availability, delivers 1.6 terabits of total system bandwidth, and allows chassis modules to scale via innovative HyperStack technology.

QLogic 9000 Stackable Chassis Switch Features

For unprecedented scalability, the eight-slot QLogic 9000 chassis is uniquely modular in two ways. Like a director switch, I/O blades can be added as needed. Unlike a director, the QLogic 9000 chassis is itself a module. Using the HyperStack technology pioneered by QLogic, a second chassis can be interconnected when needed and managed as a single switch.

For high availability, the QLogic 9000 features redundant, hot-swappable CRUs, including CPU, power supply, and fan blades. For ultra-high availability, any QLogic 9200 dual-CPU module can optionally include the fault-tolerant transparent CPU failover feature.

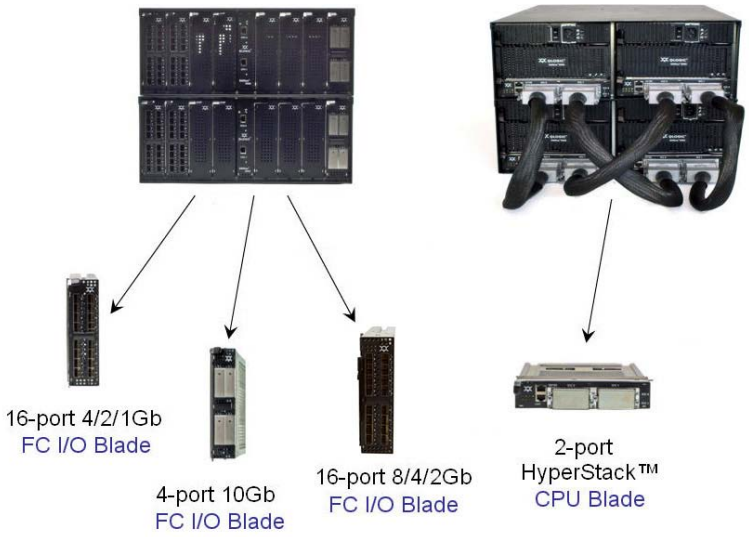


From the front of the QLogic 9000 chassis, up to eight customer serviceable I/O blades can be added or replaced non-disruptively without tools.

From the rear of the QLogic 9000 chassis, customer replaceable CPU blades, power supply blades, and fan blades are hot-swappable.

I/O Blades

Each modular QLogic 9000 chassis features eight slots for any mix of 4Gb, 8Gb, or 10Gb Fibre Channel I/O blades.



Multiple Technologies—One Modular Architecture

The QLogic 9000 Stackable Chassis Switch gives customers ultimate flexibility to deploy the bandwidth and connectivity configurations that make sense for their environments.

I/O Blades

Each QLogic 9000 chassis features eight slots for any mix of 4Gb, 8Gb, or 10Gb Fibre Channel I/O blades.

4Gb I/O Blade—16 Ports x 4Gb Fibre Channel

The 4Gb I/O blade has sixteen 4Gb/2Gb/1Gb auto-sensing Fibre Channel ports. Install up to eight 4Gb I/O blades to provide a maximum of 128 ports in a single chassis—or 256 ports in a dual-chassis HyperStack.

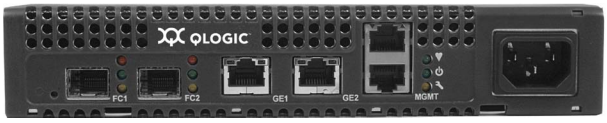
8Gb I/O Blade—16 Ports × 8Gb Fibre Channel

The 8Gb I/O blade comprises sixteen 8Gb/4Gb/2Gb auto-sensing Fibre Channel ports. Install up to eight 4Gb I/O blades to provide a maximum of 128 ports in a single chassis—or 256 ports in a dual-chassis HyperStack.

10Gb I/O Blade—Four Ports × 10Gb Fibre Channel

The 10Gb I/O blade comprises four 10Gb Fibre Channel ports. Install 10Gb I/O blades for high-speed ISL connectivity from the core to the distribution or to edge tiers of QLogic 5000 Series Stackable Switches.

iSCSI and FCIP I/O Modules



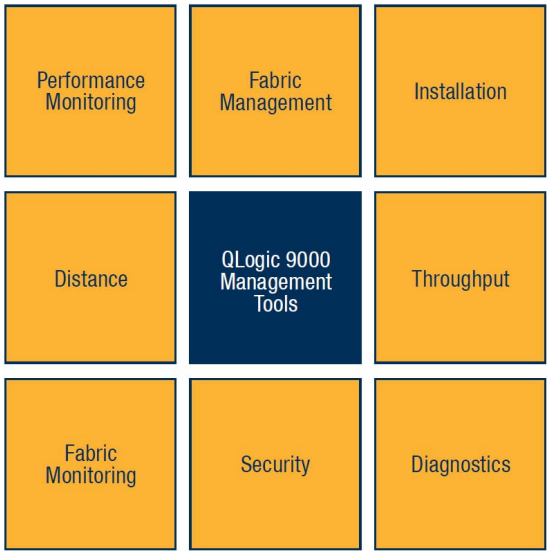
iSCSI and FCIP I/O Modules—2 Ports x 1Gb Ethernet + 2 Ports x 2Gb Fibre Channel

QLogic has chosen not to sacrifice valuable high-density Fibre Channel I/O Blade slots for IP support. Instead, external, half-wide, 1U QLogic 6000 Series iSR modules are used for low-density and low-cost iSCSI and FCIP ports. Even at 4 + 1 = 5U, the QLogic 9000 Stackable Chassis Switch is still the most rack-efficient and rack-mount flexible multi-protocol solution in the industry.

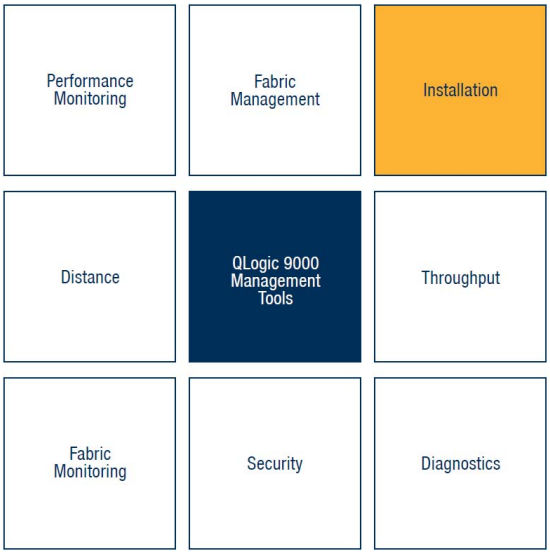
Fabric Management Software

With wizard-based installation and configuration tools, the QLogic 9000 Stackable Chassis Switch is extremely easy to install and manage. For large fabrics where management becomes complex, the QLogic 9000 switch includes a comprehensive and powerful suite of management tools.

For point-and-click management, the tools are accessible from a user-friendly graphical user interface. For more experienced SAN administrators, a comprehensive CLI is available. Integration with your favorite third-party applications is made easy with QLogic APIs or the industry-compliant SMI-S agent.



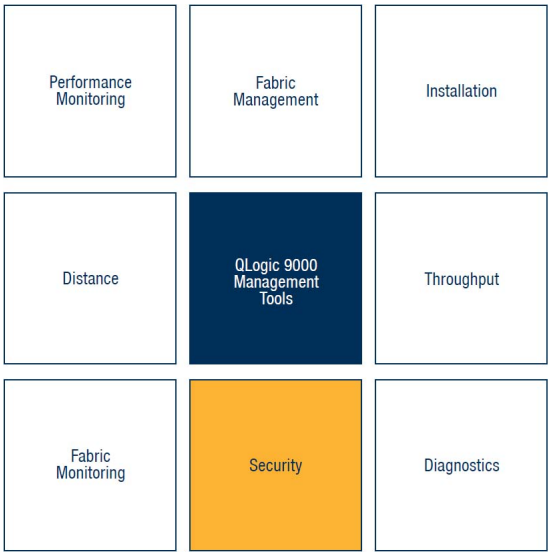
QuickTools is an embedded Java® Web applet for device discovery, device management, zoning, and fabric management. A configuration wizard walks you through switch setup and configuration. A zoning wizard provides simple drag-and-drop zoning with fast activation to ready the switch for immediate use.



Enterprise Fabric Suite is a suite of tools for setup, configuration, zoning, fabric management, fabric monitoring, performance monitoring, and configuring extended distance data traffic. Enterprise Fabric Suite can manage an unlimited number of switches and fabrics from a single console.

Adaptive Trunking provides extremely high performance while eliminating the need to manually configure and maintain ISL aggregation groups. Effective ISL routing and usage is essential to achieving return on investment (ROI) in mid-to-large-scale SANs. QLogic's Adaptive Trunking comes standard with all QLogic 9000 Series Switches.

Fabric Security offers the right mix of protection features for user security, connection security, and device security. Remote authentication dial-in service (RADIUS) is supported so that user names and passwords do not have to be managed separately. The data path for switch management communication is encrypted using SSH for the CLI, and SSL for Enterprise Fabric Suite, QuickTools, and SMI-S. You can configure device connection security to define which devices have access to the switch. ISLs and ports are authenticated according to the Fibre Channel-Security Protocol (FC-SP) and DH-CHAP. Devices are authenticated according to FC-GS-4 CT.



Diagnostic tools are available for troubleshooting fabric problems. Fibre Channel Ping verifies that there is a data path between two ports. Fibre Channel Trace Route displays path information between a source and a destination. Digital diagnostics monitoring (DDM) displays SFP, X2, and XPAK transceiver operational data that reveals transceiver health and performance.

Extended Distance Donor Buffer Credit Allocation

The following table shows the transmission distances for SFP and X2 ports. Each SFP and X2 port is supported by a data buffer with a 16-credit capacity; that is, 16 maximum-sized frames. For fibre optic cables, this enables full bandwidth over the distances shown in the table for zero donor ports. Longer distances can be spanned at full bandwidth by extending additional credits to G_Ports, F_Ports, and E_Ports as shown in the table. Each port can donate 15 credits to a pool from which a recipient port on the same I/O blade can borrow. The recipient port also loses a credit.

Regardless of how many credits are borrowed, extending credits requires a minimum cable length that is dependent on transmission speed. Extending credits over short cables can result in excessive port resets. Minimum cable lengths for a recipient port with 30 credits are as follows:

- 3km minimum cable length at 1Gbps
- 1.5km minimum cable length at 2Gbps
- 750m minimum cable length at 4Gbps
- 370m minimum cable length at 8Gbps
- 250m minimum cable length at 10Gbps

Number of Donor Ports	Recipient Port Credits		Transmission Distance (km)				
	SFP Ports	X2 Ports	At 1Gbps	At 2Gbps	At 4Gbps	At 8Gbps	At 10Gbps
0	16	16	26	13.0	6.00	3.000	2.00
1	30	30	50	25.0	12.50	6.250	4.17
2	45	45	75	37.5	18.75	9.375	6.25
3	60	60	100	50.0	25.00	12.500	8.34
4	75	—	125	62.5	31.25	15.625	—
5	90	—	150	75.0	37.50	18.750	—
6	105	—	175	87.5	43.75	21.875	—
7	120	—	200	100.0	50.00	25.000	—
8	135	—	225	112.5	56.35	28.175	—
9	150	—	250	125.0	62.50	31.250	—
10	165	—	275	137.5	68.75	34.375	—
11	180	—	300	150.0	75.00	37.500	—
12	195	—	325	162.5	81.25	40.625	—
13	210	—	350	175.0	87.50	43.750	—
14	225	—	375	187.5	93.75	46.875	—
15	240	—	400	200.0	100.00	50.000	—

SB9000 Series Minimum Configuration						
	CPU Blades	16-Port 4/2/1Gb Fibre Channel I/O Blades	4-Port 10Gb Fibre Channel I/O Blades	Power Supply Blades	Fan Blades	HyperStack Cables
SB9100 ENTRY Model	1	1	0	2	2	0
SB9200 BASE Model	2	2	0	2	2	0

16-port 8Gb blades may be ordered separately to supplement the minimum configuration.

Fabric Specifications

Fibre Channel protocols

- Physical Interface (FC-PI-3)
- Line Services (FC-LS)
- Framing and Signaling (FC-FS-2)
- Generic Services (FC-GS, FC-GS-2, FC-GS-3, FC-GS-4, FC-GS-5)
- Switch Fabric (FC-SW-2, FC-SW-3, FC-SW-4), except for enhanced zoning
- Arbitrated Loop, Revision 4.6 (FC-AL)
- Arbitrated Loop-2, Revision 7.0 (FC-AL-2)
- Fibre Loop Attachment (FC-FLA)
- Tape Technical Report (FC-Tape)
- Virtual Interface Architecture Mapping (FC-VI)
- Fabric Element MIB Specification (RFC 2837)
- Fibre Alliance MIB Specification (version 4.0)
- Methodologies for Interconnects (FC-MI-2)
- Device Attach (FC-DA)
- Security Protocols (FC-SP)

Fibre Channel classes of service

- Class 2, Class 3, and Class F (inter-switch frames) connectionless Fibre Channel protocol support

Modes of operation

- Fabric
- Public loop
- Broadcast

Performance Features

Fabric port speed

- 4Gb I/O blade (SB9004-4G) at 1.0625, 2.125, and 4.250Gbps
  - Auto-configures ports for 1, 2, or 4Gbps
  - Optionally programmable to fixed port speed
- 8Gb I/O blade (SB9004-8G) at 1.0625, 2.125, 4.250, and 8.50Gbps
  - Auto configures ports for 1, 2, 4 and 8Gbps
  - Optionally programmable to fixed port speed
- 10Gb I/O blades (FC10G4) at 12.75Gbps

Fibre Channel fabric latency (best case)

- 4Gb I/O blade (SB9004-4G): <0.3µsec at 4Gbps
- 8Gb I/O blade (SB9008-8G): <0.2µsec at 8Gbps
- 10Gb I/O blade (SB9010-10G): <0.2µsec at 10Gbps

Fibre Channel fabric point-to-point bandwidth

- 212MBps full-duplex on 1Gb ports
- 424MBps full-duplex on 2Gb ports
- 850MBps full-duplex on 4Gb ports
- 1700MBps full-duplex on 8Gb ports
- 2550MBps full-duplex on 10Gb ports

System bandwidth

- Backplane switching capacity
  - SB9100: 408Gbps, full-duplex
  - SB9200: 816Gbps, full-duplex
  - SB9200 HyperStack: 1,632Gbps, full-duplex
- Nonblocking HyperStack architecture
- Local switching capacity
  - SB9100 with 4Gb blades: 1,088Gbps
  - SB9100 with 8Gb blades: 2,176Gbps
  - SB9200 with 4Gb blades: 2,176Gbps
  - SB9200 with 8Gb blades: 4,352Gbps

Maximum frame sizes

- 2148 bytes (2112 byte payload)
- In-order delivery assured within OX-ID

Per-port buffering

- ASIC-embedded memory (nonshared)
- Guaranteed 16-credit, zero-wait-state buffer for full performance up to 13km at 2Gb, and 2km at 10Gb
- Buffer credit donor support using Enterprise Fabric Suite to extend transmission distance

ISL trunking

- Supports aggregation of up to 128 ISLs in one or more trunks between multiple switches in any port speed combination across multiple I/O blades
  - 10Gb is recommended to maximize number of usable SFP server/storage ports on QLogic 5000 and 9000 Series Switches
- Switch-on-exchange (SOE) mode for dynamic ISL trunk load balancing to maximize throughput
  - Assured in-order delivery of frames in all multi-switch and multi-ISL trunked configurations
  - Adaptive trunking improves efficiency through optimal routing across multiple trunk groups
  - Intelligent path selection (IPS) on all XPAK and SFP ISL trunk ports
- Automatic configuration of ISL trunks, including multihop paths between multiple switches
  - Supports all multi-switch fabric topologies including stack, cascade, cascaded loop, and mesh
  - Adaptive Trunking improves efficiency through optimal routing across multiple trunk groups
  - Connect up to 239 switches depending on the configuration
- Nondisruptive dynamic addition of ISLs to an existing trunk
- High availability with automatic path failover

System processor

- 800MHz Power PC® processor

I/O blade processor

- 400MHz Power PC processor

Modular Scalability

Ports per chassis module

- 16 – 128 Fibre Channel 8/4/2/1Gbps SFP ports
- 4 – 32 Fibre Channel 10Gbps X2 ports
- Full blade intermix support with a maximum of eight blades; all I/O blades are hot-pluggable
- >475,000 user ports depending on configuration

Ports per rack

- Up to 1,280 ports per 42U rack

Chassis module HyperStack

- Two BASE model SB9200 chassis modules with four proprietary HyperStack cables
  - Two domains
  - Up to 256 Fibre Channel 8/4/2/1Gbps SFP ports

Multi-switch fabrics

- Supports all topologies including stack, cascade, cascaded loop, and mesh
- Maximum of 239 switches (domain IDs) depending on the configuration

Fabric port types

- All ports are universal, auto-discovering, self-configuring and can assume the following states:
  - F_Port: Fabric
  - FL_Port: Fabric loop (public loop)
  - E_Port: Switch-to-switch

Administrative port types

- G_Port: Generic
- GL_Port: Generic loop

Port security

- Port binding secures a port through the use of an access list of up to 32 WWNs
- ISLs and ports are authenticated according to FC-SP and DH-CHAP

Port statistics

- Configuration and operational data
- Transmitted and received frame counts
- Transmitted and received error counts

Media type (ordered separately)

- 8Gb I/O blade (SB9008-8G): Hot-pluggable, industry standard 3.3V SFP+ transceivers for 8Gbps or SFP transceivers for 4/2Gbps
- 4Gb I/O blade (SB9004-4G): Hot-pluggable, industry-standard 3.3V SFPs for 4/2/1Gbps
- 10Gb I/O blade (SB9010-10G): Hot-pluggable, industry-standard 10Gb X2 optical transceivers or 10Gb X2 copper ISL cables

Supported SFP transceiver types

- Short wave (optical)
- Long wave (optical)
- Active/passive copper (8/4/2Gb)

Modular Scalability (continued)

Supported X2 transceiver types

- Short wave (optical)
- Long wave (optical)

Media transmission ranges (10Gbps)

- Optical media
  - Short wave: 300m (984ft)
  - Long wave: 8.34km (5.18 miles)

Optical cable types (4Gb, 8Gb, and 10Gb)

- 50/62.5 micron multimode fiber optic
- 9 micron single-mode fiber optic

Interoperability/Certifications

- Fully interoperable with all QLogic Fibre Channel Switch products
- Compatible with FC-SW-2 compliant switches, including Brocade®, Cisco®, and McDATA®
- Management interoperability with leading SAN management applications
- FCIA SANmark and SNIA SMI-S certified
  - SCD-3001v2a1 (E_Port)
  - SCD-3002v2 (FL_Port)
  - SCD-3010v1 (Registered state change notification)
  - SCD-3020v1 (zoning)
- Certified with leading SAN hardware and software vendors. Visit www.qlogic.com for more information about storage networking interoperability.

Fabric Services

Software releases

- QuickTools, version 7.08.*xx* or later
- Enterprise Fabric Suite, version 7.08.*xx* or later
- Switch firmware, version 7.8.*xx* or later

N_Port ID Virtualization (NPIV)

- Automatically enabled with up to 255 virtual N_Ports per port

Ethernet connections

- RJ-45 Ethernet connector on each CPU blade (chassis back)
- Two alternate RJ-45 Ethernet connectors on maintenance panel (chassis front)
- IPv6 support

Management methods

- Enterprise Fabric Suite application
- QuickTools Web applet
- API
- CLI
- GS-4 Management Server (including FDMI)
- SNMP
- RADIUS
- FTP
- TFTP
- SMI-S

Fabric security

- Fabric binding through a list of allowed domain IDs and switch WWNs
- Inter-switch management communication data path encryption
  - SSH for CLI
  - SSL for QuickTools, Enterprise Fabric Suite, and SMI-S
- Device, host, and switch authentication
  - Local security database configuration
  - Remote authentication using a RADIUS server
  - Additional management server requests are authenticated according to FC-GS4 CT
  - Enable/disable switch in-band management

Registered State Change Notification

- RSCNs are generated per standard (FC-GS, FC-FS, FC-SW)
- Delayed to allow consolidation into single RSCN
- I/O StreamGuard™ suppresses RSCNs between initiators

Call Home

- Switch-initiated problem message notification to multiple e-mail addresses
- Message content can be selected by severity level (fault, alarm, critical, warning)
- Up to 25 profiles; up to 10 e-mail addresses per profile
- Message queue, status, and history statistics can be queried
- Ability to test a new/changed Call Home profile and view log failures
- Operates an SMTP client to transfer e-mail messages to designated SMTP servers over a TCP/IP interconnect

Maintainability

Maintenance strategy

- Hot-pluggable CRUs per chassis module
  - SFP and X2 transceivers
  - I/O blades (eight maximum, 4Gb, 8Gb, and 10Gb)
  - CPU blades (model SB9100 has one; model SB9200 has two)
  - Power supply blades (two)
  - Fan blades (two)
- Enhanced data integrity on all data paths
- Fabric shortest path first (FSPF) rerouting around failed links
- Integration with SNMP managers
- NDCLA firmware
- Easy configuration, save, and restore
- E-mail Call Home system-initiated alarm/fault notification

Maintenance access methods

- Single-point in-band management with auto-discovery across multiple switches with Enterprise Fabric Suite
- One out-of-band Ethernet 10/100Mb BaseT RJ-45 management port per CPU blade; two alternative RJ-45 ports on the maintenance panel
- One RJ-45 serial port per CPU blade (RJ-45 to DB-9 conversion dongle included)
- FC-GS4 management server

Diagnostics

- Power-on self test (POST) tests all functional components except SFP and X2 transceivers
- Fabric diagnostics software
  - Fibre Channel Ping verifies functional path existence between two ports
  - Fibre Channel Trace Route displays path information between a source and destination
  - Digital diagnostics monitoring displays real-time SFP, X2, and XPAK transceiver data

Visual user interface

- LED indicators on the maintenance panel, I/O blades, CPU blade(s), power supply blades, and fan blades

Maintenance Panel (MP)

- Dual redundant maintenance panel EPROMs maintain chassis-specific information (such as WWN, SNMP system object ID, serial number, and part number), alternate Ethernet management interface ports, and LED summary status information for the switch

Global services

- Standard one-year hardware/firmware warranty
- SAN Pro Service and Support Programs
  - Exchange service standard on BASE Model SB9200 and ENTRY Model SB9100 including next business day (NBD) advanced delivery spares and 24×7 technical phone support
  - Optional: Upgrades to Choice (NBD Onsite Replacement) and Prime (4-hour onsite replacement) available for a fee

Physical Characteristics

Enclosure chassis module/blade packaging

- Standard rack-mountable chassis includes adjustable forward and reverse mounting rail kit and dual power cords
- Standard and optional I/O blades do **not** include SFPs, X2 transceivers, or copper/optical cables (order separately)
- Hardware and software license field upgrades:
  - SB9100 ENTRY model to SB9200 BASE model
  - SB9200 model to SB9200 Fault Tolerant model
  - One SB9200 BASE model to Dual-HyperStack model
  - Two SB9200 BASE models to Dual-HyperStack model

Dimensions (chassis module)

- Width: 431mm (17.0in), 19-inch rack-mountable
- Height: 179mm (7.0in) (4U)
- Depth: 673mm (26.5in)

Weight (SB9200 chassis module maximum)

- 40.82kg (90lbs)

Power supply/cooling (SB9100 and SB9200)

- Hot-pluggable/dual-redundant power supply blades with integrated cooling fans
  - Dual 7.5ft, 3-wire 16AWG power cables with IEC320 input connector
  - Popular international country dual-power cable/ connector kit options available
- Hot-pluggable/dual-redundant fan blades
- Back-to-front or front-to-back airflow
- 150cfm airflow
- 1,000W (3,414BTU/hr) per power supply

Heat output (SB9200 maximum data traffic)

- 2,046 BTU/hr for 128 ports, 4Gb Fibre Channel (including SFPs and local switching)
- 4,228 BTU/hr for 256 ports, 4Gb Fibre Channel HyperStack (including SFPs and local switching)

Electrical Requirements

Operating voltage/frequency

- 100 – 240VAC auto-sensing, single phase
- 47 – 63Hz

Power source loading (SB9200 maximum power)

- 10A at 100VAC
- 4.2A at 240VAC

Operating load (SB9200 with no data traffic)

- 550W for 128 ports at 4Gb (including SFPs)
- 1,120W for 256 ports at 4Gb with HyperStack (including SFPs)

Operating load (SB9200 with maximum data traffic)

- 600W for 128 ports, 4Gb Fibre Channel (including SFPs and local switching)
- 1,240W for 256 ports, 4Gb Fibre Channel HyperStack (including SFPs and local switching)

Circuit protection

- Internally fused

Environmental Factors

Operating

- Temperature: 0°C – 40°C (32°F – 104°F)
- Humidity: 15 – 80 percent, noncondensing
- Altitude: 0 – 3048m (0 – 10,000ft)
- Vibration: IEC 68-2, 5 – 500Hz, random, 0.21g RMS, 10 minutes
- Shock: IEC 68-2: 4g, 11ms, 20 repetitions

Non-operating

- Temperature: –40°C – 70°C (–40°F – 158°F)
- Humidity: 5 – 90 percent, noncondensing
- Altitude: 0 – 15, 240m (0 – 50,000ft)
- Vibration: IEC 68-2: 5 – 500Hz, random, 2.1g RMS, 10 minutes
- Shock: IEC 68-2: 30g, 13msec, trapezoidal pulse

Regulatory Certifications

Safety standards

- UL 60950-1, UL listed (United States)
- CAN/CSA C22.2 No. 60950-1, cUL listed (Canada)
- EN60950-1 (EC)
- CB Scheme-IEC 60950-1 (international)
- GOST R (Russia)

Emissions standards

- FCC Part 15B Class A (USA)
- VCCI Class A ITE (Japan)
- ICES-003 Class A ITE (Canada)
- EN 55022 Level A (EC)
- CISPR 22, Class A (international)
- AS/NZS CISPR 22:2002 Class A (AUS/NZ)
- GOST R (Russia)
- KN22—Class A (Korea)

Environmental standards

- RoHS-5/WEEE (EU and Japan)

Voltage fluctuations

- EN 61000-3-3

Harmonics

- EN 61000-3-2

Immunity

- EN 55024

Marking

- FCC Part 15, UL (United States)
- cUL, CUE, TUV (Canada)
- TUV, CUE, CE (EC)
- VCCI-A (Japan)
- C-Tick (AUS/NZ)
- GOST R (Russia)
- MIC (Korea)
- Exempt (Taiwan)
- UL AR/S-Mark (Argentina)
- CCC—Field replaceable unit (FRU) power supply blades (China)


QLOGIC®

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