RackSwitch G8000

Product Guide (withdrawn product)

The RackSwitch™ G8000 (Figure 1) is a top-of-rack (TOR) switch that delivers unmatched line-rate Layer 2/3 performance at a very attractive price. The G8000 is prepared for network virtualization, airflow to match server racks, and low power consumption, making it an ideal choice for the next-generation data centers. It has forty-four 1 GbE RJ-45 ports, four 1 Gb SFP ports, and standard redundant power supplies along with up to four optional 10 GbE SFP+ or CX4 ports. Unlike most rack equipment that cools from side to side, the RackSwitch G8000 has rear-to-front airflow or front-to-rear that matches server airflow.

Figure 1. RackSwitch G8000

Did you know?

The RackSwitch G8000 comes standard with redundant power supplies and 2-post rail kit.

The RackSwitch G8000 is designed specifically for the data center environment: airflow, high-availability hardware and software features, rich layer 2/3 functionality, and ease of management.

VMready® switch-resident software reduces the complexity of configuring and managing virtual machines throughout the network.

Networking Operating System (Networking OS) software features deliver seamless, standards-based integration into existing upstream switches.

The RackSwitch G8000 supports stacking for up to six switches using a single switch image and configuration file that shares one IP address and one management interface.

Part number information

The part numbers to order the switch and additional options are shown in Table 1.

Note: *None* in the Feature code column in Table 1 means that the feature is not available/not supported.

Table 1. Part numbers and feature codes for ordering

Description	Part number	Feature code for MTM 0446-HC3	Feature code for MTM 7309-HCC
Switch			
RackSwitch G8000 (Rear to Front)	0446013	2637	None
RackSwitch G8000 (Front to Rear)	7309CFC	None	A1QC
Miscellaneous options			
Console Cable Kit Spare	90Y9462	A2MG	A2MG
Adjustable 19" 4 Post Rail Kit	00D6185	A3KP	A3KP
Recessed 19" 4 Post Rail Kit	00CG089	None	A51M
Switch Seal Kit	00Y3001	None	A4WX
iDataPlex Rail Kit	90Y3535	None	A1SZ
Air Inlet Duct for 382 mm RackSwitch	00D6062	A3HG	None

The part numbers for the G8000 switches include the following items:

- One RackSwitch G8000 (rear-to-front airflow or front-to-rear airflow)
- Generic Rack Mount Kit (2-post)
- Mini-USB to DB-9 serial cable (3 m)
- Console Cable Kit that includes:
    - RJ-45 (plug) to RJ-45 (plug) serial cable (1 m)
    - Mini-USB to RJ-45 (jack) adapter cable (0.2 m) with retention clip
    - DB-9 to RJ-45 (jack) adapter
- Warranty Flyer
- Important Notices Flyer
- Documentation CD-ROM

The G8000 switch comes standard with the Console Cable Kit for management through a serial interface. Spare serial management cables can be ordered, if required. The Console Cable Kit Spare option (90Y9462) contains the following items:

- RJ-45 (plug) to RJ-45 (plug) serial cable (1 m)
- Mini-USB to RJ-45 (jack) adapter cable (0.2 m) with retention clip
- DB-9 to RJ-45 (jack) adapter

The G8000 switch supports optional adjustable 19-inch, 4-post rack installation kit, part number 00D6185. Optionally, Air Inlet Duct, part number 00D6062, can be ordered for the G8000 (rear-to-front airflow) switch for 4-post rack installations with the Adjustable 4-post Rail Kit (00D6185).

The G8000 (front-to-rear airflow) switch optionally supports Recessed 19-inch 4-Post Rail Kit (00CG089) and Switch Seal Kit (00Y3001) that are used when the switch is installed in the Intelligent Cluster® Rack (MT 1410), Enterprise Rack (MT 9363), or PureFlex® System Rack (MT 9363) with NeXtScale™ System. The G8000 (front-to-rear airflow) switch also supports 4-post iDataPlex® rack kit (90Y3535) which is used when the switch is installed in the iDataPlex Rack.

The RackSwitch G8000 switch comes with two redundant fixed 150 W AC power supplies. Each internal power supply has an individual IEC 320-C14 power connector on the rear panel. Power cables are not included and must be ordered separately (see Table 2 for details). Two power cables are required per switch.

Table 2. Power cables

Description	**Part number**	**Feature code for MTM 0446-HC3 and 7309-HCC**
Rack power cables		
1.5m, 10A/100-250V, C13 to IEC 320-C14 Rack Power Cable	39Y7937	6201
2.8m, 10A/100-250V, C13 to IEC 320-C20 Rack Power Cable	39Y7938*	6204*
4.3m, 10A/100-250V, C13 to IEC 320-C14 Rack Power Cable	39Y7932	6263
Line cords		
European 10A line C13 to CEE 7/7 (2.8M)	39Y7917	6212
Denmark 10A line C13 to DK2-5A (2.8M)	39Y7918	6213
Switzerland 10A line C13 to SEV 1011 (2.8M)	39Y7919	6216
Israel 10A line C13 to SI 32 (2.8M)	39Y7920	6218
South Africa 10A line C13 to SABS 164/1 (2.8M)	39Y7922	6214
United Kingdom 10A line C13 to BS 1363 (2.8M)	39Y7923	6215
Australia/NZ 10A line C13 to SAA-AS C112 (2.8M)	39Y7924	6211
Korea 7A line C13 to KETI 15A/250V (2.8M)	39Y7925	6219
India 6A line C13 to Fig 68 (2.8M)	39Y7927	6269
China 6A line C13 to GB 2099.1 (2.8M)	39Y7928	6210
Brazil 10A line C13 to NBR 6147 (2.8M)	39Y7929	6223
Argentina 10A line C13 to IRAM 2063 (2.8M)	39Y7930	6222
10A/250V C13 to NEMA 6-15P 2.8m power cord	46M2592*	A1RF*
Japan 10A/100V C13 to JIS C-8303 2.8m power cord	46M2593*	A1RE*
Line cord - 4.3M, 10A/125V, C13 to NEMA 5-15P (US)	39Y7931**	6207**
Japan 7A line C13 to JIS C-8303-1983 Denan (4.3M)	39Y7926**	6335**

* The option is not available for MTM 0446-HC3.
** The option is not available for MTM 7309-HCC.

Supported cables and transceivers

With the flexibility of the G8000 switch, clients can take advantage of the technologies that they require for multiple environments:

- For 1 GbE links, clients can use RJ-45 UTP cables up to 100 m. Clients that need longer distances can

leverage the SFP ports by using a 1000BASE-SX transceiver, which can drive distances up to 220 meters by using 62.5 µ multi-mode fiber and up to 550 meters with 50 µ multi-mode fiber or the 1000BASE-LX transceivers that support distances up to 10 kilometers using single-mode fiber (1310 nm).

- For 10 GbE links (supported with optional uplink modules), clients can choose SFP+ or 10GBASE-CX4 connectivity. With SFP+ ports, clients can use direct-attached copper (DAC) SFP+ cables for in-rack cabling for distances up to 7 m. These DAC cables have SFP+ connectors on each end, and they do not need separate transceivers. For longer distances, the 10GBASE-SR transceiver can support distances up to 300 meters over OM3 multimode fiber or up to 400 meters over OM4 multimode fiber with LC connectors. The 10GBASE-LR transceivers can support distances up to 10 kilometers on single mode fiber with LC connectors. For extended distances, the 10GBASE-ER transceivers can support distances up to 40 kilometers on single mode fiber with LC connectors. With CX4 ports, client can use InfiniBand 4X copper cables for distances up to 15 m.

The RackSwitch G8000 switch supports 10 GbE links with the optional dual-port SFP+ or CX4 uplink modules (see Table 3). Up to two uplink modules can be installed per switch (one on the front panel and one on the rear panel).

Table 3 lists the supported cables and transceivers.

Table 3. Supported transceivers and direct-attach cables

Description	**Part number**	**Feature code (MTM 0446-HC3 / 7309-HCC)**	**Maximum quantity supported**
SFP transceivers - 1 GbE			
Lenovo 1000BASE-T SFP Transceiver (does not support 10/100 Mbps)	00FE333	A5DL*	8
Lenovo 1000BASE-SX SFP Transceiver	81Y1622	3269	8
Lenovo 1000BASE-LX SFP Transceiver	90Y9424	A1PN	8
Uplink modules - 10 GbE			
RackSwitch 10Gb Dual-Port SFP+ Uplink Module	46C3417	1463	2
RackSwitch 10Gb Dual-Port CX4 Uplink Module	46C3421	1464	2
SFP+ transceivers - 10 GbE (require SFP+ Uplink Module)			
Lenovo 10GBASE-SR SFP+ Transceiver	46C3447	5053	4
Lenovo 10GBASE-LR SFP+ Transceiver	90Y9412	A1PM	4
Lenovo 10GBASE-ER SFP+ Transceiver	90Y9415	A1PP	4

Optical cables for 1 GbE SFP SX and 10 GbE SR SFP+ transceivers			
Lenovo 0.5m LC-LC OM3 MMF Cable	00MN499	ASR5	8
Lenovo 1m LC-LC OM3 MMF Cable	00MN502	ASR6	8
Lenovo 3m LC-LC OM3 MMF Cable	00MN505	ASR7	8
Lenovo 5m LC-LC OM3 MMF Cable	00MN508	ASR8	8
Lenovo 10m LC-LC OM3 MMF Cable	00MN511	ASR9	8
Lenovo 15m LC-LC OM3 MMF Cable	00MN514	ASRA	8
Lenovo 25m LC-LC OM3 MMF Cable	00MN517	ASRB	8
Lenovo 30m LC-LC OM3 MMF Cable	00MN520	ASRC	8
SFP+ passive direct-attach cables - 10 GbE (require SFP+ Uplink Module)			
Lenovo 0.5m Passive SFP+ DAC Cable	00D6288	A3RG	4
Lenovo 1m Passive SFP+ DAC Cable	90Y9427	A1PH	4
Lenovo 1.5m Passive SFP+ DAC Cable	00AY764	A51N	4
Lenovo 2m Passive SFP+ DAC Cable	00AY765	A51P	4
Lenovo 3m Passive SFP+ DAC Cable	90Y9430	A1PJ	4
Lenovo 5m Passive SFP+ DAC Cable	90Y9433	A1PK	4
Lenovo 7m Passive SFP+ DAC Cable	00D6151	A3RH	4
SFP+ active direct-attach cables - 10 GbE (require SFP+ Uplink Module)			
Lenovo 1m Active SFP+ DAC Cable	95Y0323	A25A	4
Lenovo 3m Active SFP+ DAC Cable	95Y0326	A25B	4
Lenovo 5m Active SFP+ DAC Cable	95Y0329	A25C	4
Lenovo 1m Active DAC SFP+ Cable (replaces 95Y0323)	00VX111	AT2R	4
Lenovo 3m Active DAC SFP+ Cable (replaces 95Y0326)	00VX114	AT2S	4
Lenovo 5m Active DAC SFP+ Cable (replaces 95Y0329)	00VX117	AT2T	4

* The option is not available for MTM 0446-HC3.

Benefits

The RackSwitch G8000 switch is considered particularly suited for these clients:

- Clients who want to leverage GbE in their infrastructure (both servers and networking)
- Clients who are implementing a virtualized environment and require multiple GbE ports
- Clients who require investment protection for 10 GbE ports
- Clients who want to reduce TCO and improve performance while maintaining high levels of availability and security
- Clients who want to avoid or minimize oversubscription, which can result in congestion and loss of performance
- Clients who want to implement a converged infrastructure with NAS or iSCSI

The RackSwitch G8000 offers the following benefits:

- **High performance:** The G8000 provides up to 176 Gbps throughput and supports up to four 10 GbE uplink ports for a very low oversubscription ratio.
- **Lower power and better cooling:** The G8000 uses approximately 120 W, which is a fraction of the power consumption of most competitive offerings. Unlike side-cooled switches, which can cause heat recirculation and reliability concerns, the G8000 rear-to-front/front-to-rear cooling design reduces data center air conditioning costs by matching airflow to the server's configuration in the rack. Variable speed fans assist in automatically reducing power consumption.
- **VM-aware network virtualization:** VMready software on the switch reduces configuration complexity while significantly improving security levels in virtualized environments. VMready automatically detects virtual machine movement from one physical server to another, and instantly reconfigures each VM's network policies across VLANs to keep the network up and running without interrupting traffic or impacting performance. VMready works with all leading hypervisors, such as VMware, Citrix Xen, RedHat KVM, Microsoft Hyper-V, and IBM PowerVM hypervisor.
- **Layer 3 functionality:** The switch includes Layer 3 functionality, which provides security and performance benefits, plus static and dynamic routing protocols including Open Shortest Path First (OSPF) and Border Gateway Protocol (BGP) for enterprise customers.
- **Fault tolerance:** These switches learn alternate routes automatically and perform faster convergence in the unlikely case of a link, switch, or power failure. The switch uses proven technologies such as L2 trunk failover, advanced VLAN-based failover, VRRP, Hot Links, IGMP V3 snooping, and OSPF.
- **Seamless interoperability:** RackSwitch switches interoperate seamlessly with other vendors' upstream switches. See the following resources:
    - Tolly Functionality and Certification: RackSwitch G8000, G8100, and G8124 and Cisco Catalyst Interoperability Evaluation: http://www-01.ibm.com/common/ssi/cgi-bin/ssialias?infotype=SA&subtype=WH&htmlfid=QCL12370USEN#loaded
- **Stacking:** Cluster virtualization, single IP, and stacking of up to six virtual switches allow configuration of multiple switches as one, saving valuable time, IP addresses, and resources.

Features and specifications

Note: Features and specifications listed in this section are based on Networking OS 6.8.

The G8000 switch has the following features and specifications:

- Form factor: 1U rack mount switch
    - RackSwitch G8000 Rear-to-Front version for ports located in the rear of the rack matching System x®,

BladeCenter® and Flex System® designs
    - RackSwitch G8000 Front-to-Rear version for ports located in the front of the rack matching airflow of iDataPlex and NeXtScale System designs
- Ports
    - 44 auto-sensing 10/100/1000 Mb Ethernet ports with RJ-45 connectors
    - Four SFP ports for 1 GbE transceivers (support for 1000BASE-SX, 1000BASE-LX, or 1000BASE-T). SFP modules are not included and must be purchased separately (See Table 3).
    - Up to four additional ports per switch for 1 Gb or 10 Gb Ethernet with optional uplink modules
        - Up to four SFP/SFP+ ports for 1 Gb or 10 Gb Ethernet SFP/SFP+ transceivers (support for 1000BASE-SX, 1000BASE-LX, 1000BASE-T, 10GBASE-SR, 10GBASE-LR, or 10GBASE-ER) or SFP+ direct-attach copper (DAC) cables. SFP+ modules or DAC cables are not included and must be purchased separately (See Table 3).
        - Up to four CX4 ports for 10 Gb Ethernet with InfiniBand 4X copper cables (support for 10GBASE-CX4). InfiniBand 4X cables are not included and must be purchased separately (Lenovo does not supply these cables).
    - One RS-232 serial port (Mini-USB connector) that provides an additional means to configure the switch module
- Scalability and performance
    - 1 Gb and 10 Gb Ethernet ports for bandwidth optimization and performance
    - Non-blocking architecture with wire-speed forwarding of traffic; up to 176 Gbps of full duplex switching throughput
    - 100% line rate performance with switching latency of less than 3 microseconds
    - Media access control (MAC) address learning: Automatic update, support of up to 16,000 MAC addresses
    - Static and LACP (IEEE 802.3ad) link aggregation, up to 52 trunk groups, up to 8 member ports per trunk group
    - Support for jumbo frames (up to 9,216 bytes)
    - Broadcast/multicast storm control
    - IGMP snooping for limit flooding of IP multicast traffic
    - IGMP filtering to control multicast traffic for hosts participating in multicast groups
    - Configurable traffic distribution schemes over trunk links based on source/destination IP or MAC addresses or both
    - Fast port forwarding for rapid STP convergence
- Availability and redundancy
    - IEEE 802.1D STP for providing L2 redundancy
    - IEEE 802.1s Multiple STP (MSTP) for topology optimization, up to 32 STP instances are supported by single switch
    - IEEE 802.1w Rapid STP (RSTP) (provides rapid STP convergence for critical delay-sensitive traffic such as voice or video)
    - Per-VLAN Rapid STP (PVRST) enhancements
    - Layer 2 Trunk Failover to support active/standby configurations of network adapter teaming on compute nodes
    - Hot Links provides basic link redundancy with fast recovery for network topologies that require Spanning Tree to be turned off
- VLAN support
    - Port-based and protocol-based VLANs
    - Up to 1024 VLANs supported per switch with VLAN numbers ranging from 1 to 4094
    - 802.1Q VLAN tagging support
    - 802.1x with dynamic guest VLAN assignment
    - Private VLANs support
- Virtualization
    - Virtual Link Aggregation (vLAG) support
    - VMready support
        - Up to 1,024 virtual entities (VEs)
        - Automatic VE discovery
        - Up to 32 local or distributed VM groups for VEs
        - NMotion™ feature for automatic network configuration migration
- Stacking of up to six G8000 switches

- Security
  - VLAN-based, MAC-based, and IP-based access control lists (ACLs)
  - 802.1x port-based authentication
  - Multiple user IDs and passwords
  - User access control
  - Radius, TACACS+ and LDAP authentication and authorization
- Quality of Service (QoS)
  - Support for IEEE 802.1p, IP ToS/DSCP, and ACL-based (MAC/IP source and destination addresses, VLANs) traffic classification and processing
  - Traffic shaping and re-marking based on defined policies
  - Eight priority queues per port for processing qualified traffic
  - IPv4 ACL metering
- IP v4 Layer 3 functions
  - Host management
  - IP forwarding
  - IP filtering with ACLs, up to 512 IPv4 ACLs supported
  - VRRP for router redundancy
  - Support for up to 128 IPv4 static routes
  - Routing protocol support (RIP v1, RIP v2, OSPF v2, BGP)
  - Support for DHCP Relay
  - Support for IGMP snooping and IGMP relay
- IP v6 Layer 3 functions
  - IPv6 host management
  - IPv6 forwarding
  - Support for OSPF v3 routing protocol
  - IPv6 filtering with ACLs, up to 128 IPv6 ACLs supported
- Manageability
  - Industry-standard command line interface (isCLI)
  - Simple Network Management Protocol (SNMP V1, V2 and V3)
  - HTTP/HTTPS browser GUI
  - Telnet interface for CLI
  - Secure Shell (SSH) v1 and v2 for CLI
  - Secure Copy (SCP) for uploading and downloading the switch configuration via secure channels
  - Link Layer Discovery Protocol (LLDP) for discovering network devices
  - Serial interface for CLI
  - Scriptable CLI
  - Dual software images
  - Firmware image update via TFTP and FTP
  - Network Time Protocol (NTP) for switch clock synchronization
  - Switch Center management application
- Monitoring
  - Switch LEDs for port status and switch module status indication
  - Remote Monitoring (RMON) agent to collect statistics and proactively monitor switch performance
  - Port mirroring for analyzing network traffic passing through the switch
  - Change tracking and remote logging with the syslog feature
  - Support for sFLOW agent for monitoring traffic in data networks (separate sFLOW analyzer required elsewhere)

The following features are not supported with IPv6:

- Bootstrap Protocol (BOOTP) and DHCP
- RADIUS, TACACS+ and LDAP
- QoS metering and re-marking ACLs
- Stacking

- VMware Virtual Center (vCenter) for VMready
- Routing Information Protocol (RIP)
- Internet Group Management Protocol (IGMP)
- Border Gateway Protocol (BGP)
- Virtual Router Redundancy Protocol (VRRP)
- sFLOW

Standards supported

The G8000 switch supports the following IEEE standards:

- IEEE 802.1D Spanning Tree Protocol (STP)
- IEEE 802.1s Multiple STP (MSTP)
- IEEE 802.1w Rapid STP (RSTP)
- IEEE 802.1p Class of Service (CoS) prioritization
- IEEE 802.1Q Tagged VLAN (frame tagging on all ports when VLANs are enabled)
- IEEE 802.1x port-based authentication
- IEEE 802.3 10BASE-T Ethernet
- IEEE 802.3u 100BASE-TX Fast Ethernet
- IEEE 802.3ab 1000BASE-T copper twisted-pair Gigabit Ethernet
- IEEE 802.3z 1000BASE-SX short range fiber optics Gigabit Ethernet
- IEEE 802.3z 1000BASE-LX long range fiber optics Gigabit Ethernet
- IEEE 802.3ad Link Aggregation Control Protocol
- IEEE 802.3x Full-duplex Flow Control
- IEEE 802.3ae 10GBASE-SR short range fiber optics 10 Gb Ethernet
- IEEE 802.3ae 10GBASE-LR long range fiber optics 10 Gb Ethernet
- IEEE 802.3ae 10GBASE-ER extended range fiber optics 10 Gb Ethernet
- IEEE 802.3ak 10GBASE-CX4 copper twinax 10 Gb Ethernet
- 10GSFP+Cu SFP+ Direct Attach copper

Connectors and LEDs

Figure 2 shows the front panel of the RackSwitch G8000.

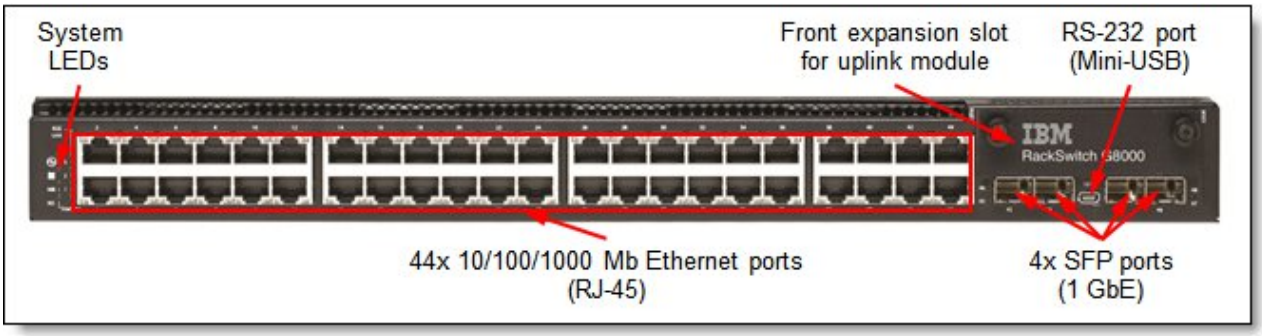

Figure 2. Front panel of the RackSwitch G8000

The front panel of the G8000 contains the following components:

- LEDs that display the status of the switch and the network.
- One Mini-USB RS-232 console port that provides an additional means to configure the switch module.
- Forty-four 1000BASE-T Ethernet ports for 10/100/1000 Mbps connections.
- Four SFP port connectors to attach SFP transceivers for 1 Gb connections.
- Front expansion slot for an uplink module.
- An Ethernet link OK LED and an Ethernet Tx/Rx LED for each Ethernet port on the switch.

Figure 3 shows the rear panel of the RackSwitch G8000.

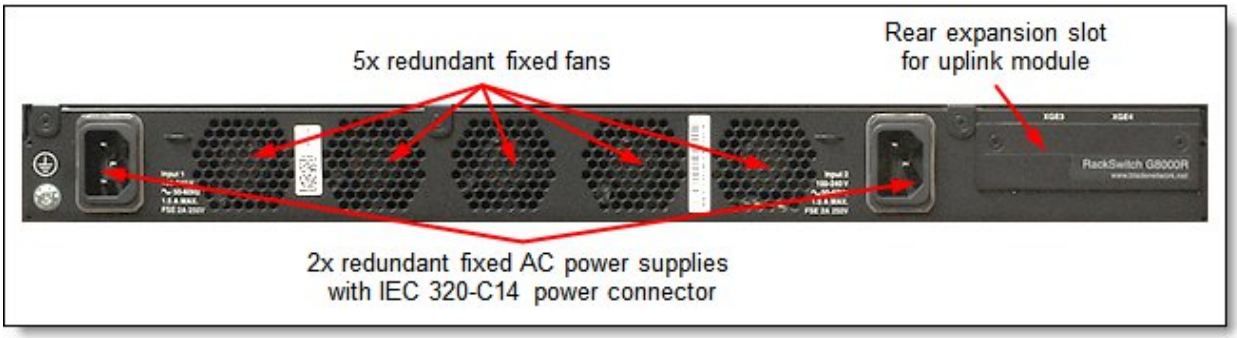

Figure 3. Rear panel of the RackSwitch G8000

The rear panel of the G8000 contains the following components:

- Two redundant fixed AC power supplies (IEC 320-C14 power connector)
- Five redundant fixed fans
- Rear expansion slot for an uplink module

Figure 4 shows Uplink Modules for the G8000.

Figure 4. Uplink Modules for the G8000

Network cabling requirements

The network cables that can be used with the switch are listed in Table 4.

Table 4. G8000 network cabling requirements

Transceiver	Standard	Cable	Connector
10 Gb Ethernet			
10GBASE-SR SFP+ Transceiver (46C3447)*	10GBASE-SR	Up to 30 m with fiber optic cables supplied by Lenovo (see Table 3); 850 nm OM3 multimode fiber cable up to 300 m or up to 400 m with OM4 multimode fiber	LC
10GBASE-LR SFP+ Transceiver (90Y9412)*	10GBASE-LR	1310 nm single-mode fiber cable up to 10 km	LC
10GBASE-ER SFP+ Transceiver (90Y9415)*	10GBASE-ER	1310 nm single-mode fiber cable up to 40 km	LC
SFP+ direct attach cable*	10GSFP+Cu	SFP+ DAC cables up to 7 m (see Table 3)	SFP+
CX4 copper cable**	10GBASE-CX4	InfiniBand 4X copper cables up to 15 m	SFF-8470 (InfiniBand 4X)
1 Gb Ethernet			
RJ-45 ports (fixed)	1000BASE-T	UTP Category 5, 5E, and 6 up to 100 meters	RJ-45
1000BASE-T SFP Transceiver (00FE333)	1000BASE-T	UTP Category 5, 5E, and 6 up to 100 meters	RJ-45
1000BASE-SX SFP Transceiver (81Y1622)	1000BASE-SX	Up to 30 m with fiber optic cables supplied by Lenovo (see Table 3); 850 nm multimode fiber cable (50 μ) up to 550 m or up to 220 m (62.5 μ)	LC
1000BASE-LX SFP Transceiver (90Y9424)	1000BASE-LX	1310 nm single-mode fiber cable up to 10 km	LC
Management ports			
Ethernet management port	1000BASE-T	UTP Category 5, 5E, and 6 up to 100 meters	RJ-45
RS-232 serial console port	RS-232	DB-9-to-Mini-USB or RJ-45-to-Mini-USB (come standard with the switch)	Mini-USB

* Requires Dual-port 10GbE SFP+ Uplink Module (46C3417).
** Requires Dual-port 10GbE CX4 Uplink Module (46C3421).

Warranty

The RackSwitch G8000 comes with a limited 3-year hardware warranty with Next Business Day (NBD), 9x5, Customer Replaceable Unit (CRU) warranty service and includes a 3-year software license, providing entitlement to upgrades over that period. Optional warranty and maintenance upgrades are available for the G8000 through Lenovo Services offerings:

- Warranty service upgrades (3, 4, or 5 years):
    - 24x7 onsite repair with 2-hour target response time
    - 24x7 onsite repair with 4-hour target response time
    - 9x5 onsite repair with 4-hour target response time
- Maintenance (post-warranty) service offerings (1 or 2 years):
    - 24x7 onsite repair with 2-hour target response time
    - 24x7 onsite repair with 4-hour target response time
    - 9x5 onsite repair with 4-hour target response time
    - 9x5 onsite repair with next business day target response time

Lenovo service upgrade offerings are region-specific; that is, each region might have its own service types, service levels, response times, and terms and conditions. Not all covered types of Lenovo service upgrade offerings might be available in a particular region.

For more information about the Lenovo warranty service upgrade offerings that are available in your region, visit the Product Selector at the following website:
https://www-304.ibm.com/sales/gss/download/spst/servicepac

Physical specifications

The approximate dimensions and weight of the G8000 switch are as follows:

- Height: 44 mm (1.7 in.)
- Width: 439 mm (17.3 in.)
- Depth: 445 mm (15.0 in.)
- Weight: 5.5 kg (12.0 lb)

Operating environment

The G8000 switch is supported in the following operating environment:

- Temperature: 0 to 45 ºC (32 to 113 ºF).
- Relative humidity: Non-condensing, 10 - 85%
- Altitude: up to 3,049 m (10,000 feet)
- Acoustic noise: Less than 65 dB
- Airflow: Front-to-rear or rear-to-front cooling
- Electrical input: 50-60 Hz, 100-240 V AC auto-switching
- Typical power: 120 W

Agency approvals

The switch conforms to the following regulations:

- Safety certifications
  - UL60950-1
  - CAN/CSA 22.2 No.60950-1
  - EN 60950-1
  - IEC60950-1
  - NOM NYCE 019
  - GOST R MEK 60950-1
  - GB4943-2001
- Electromagnetic compatibility certifications
  - FCC 47CFR Part 15 Class A
  - EN 55022 Class A
  - ICES-003 Class A
  - VCCI Class A
  - AS/NZS CISPR 22 Class A
  - CISPR 22 Class A
  - EN 55024
  - EN 300386
  - CE
- Environmental
  - Reduction of Hazardous Substances (ROHS) 6
  -

Typical configurations

Typical configurations are:

- Rack-optimized server aggregation: 1 GbE attached rack servers
- Server 1 GbE aggregation and connection to storage

Rack-optimized server aggregation:1 GbE attached rack servers

Examples of possible high-concentration configurations for rack or blade server implementations are as follows:

- High-concentration of rack-optimized servers, for example:
  - System x or ThinkServer® 1U or 2U servers with a 1 GbE adapter installed
  - System x or ThinkServer 4U servers with multiple 1 GbE connections per server
  - BladeCenter using any of the following modules in the chassis:
    - Layer 2/3 Copper and Fiber Gigabit Ethernet Switch Modules for BladeCenter
    - 1/10Gb Uplink Ethernet Switch Module for BladeCenter
    - Intelligent Copper Pass-Thru Module for BladeCenter
    - Server Connectivity Module for BladeCenter
- Low-profile, high-performance, 48-port GbE switch needed to perform aggregation function per rack

Figure 5 shows rack optimized server aggregation of 1 GbE attached rack servers.

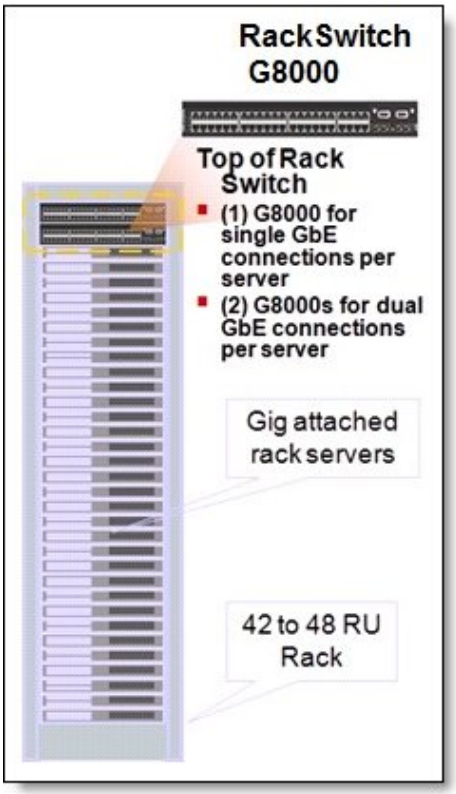

Figure 5. Rack optimized server aggregation of 1 GbE attached rack servers

Table 5 lists the features and benefits.

Table 5 Features and benefits

Features	Benefits
Line-rate, non-blocking, all 48 ports	Supports massive compute and virtualization workloads.
Less than 3 micro-seconds latency	Faster application response times.
Four 10 GbE uplink ports (40 Gb bandwidth to the core or upstream switch)	Minimal oversubscription: 1:0.8 (~1 to 1).
Standards-based Layer 2/3 protocols, industry standard CLI	Interoperates with existing network. No learning curve.

The design goal is to interoperate with an existing Layer 2/3 switch and deploy G8000s at the Data Center Edge:

- Logical configuration: Configure G8000s for Layer 2. Apply VLAN domains (1 and 2) at Core switches.
- Full Layer 2/3 feature set: STP, MSTP, RSTP, PVRST+; RIP v1/2, static routes, and OSPF.
- Security: 802.1X; RADIUS/TACACS+; Wire Speed ACLs, SSH v1, v2; HTTPS Secure BBI.
- QoS: Up to eight queues/port, IEEE 802.1p and DiffServ prioritization.

Figure 6 shows an example of a rack-optimized server aggregation logical design.

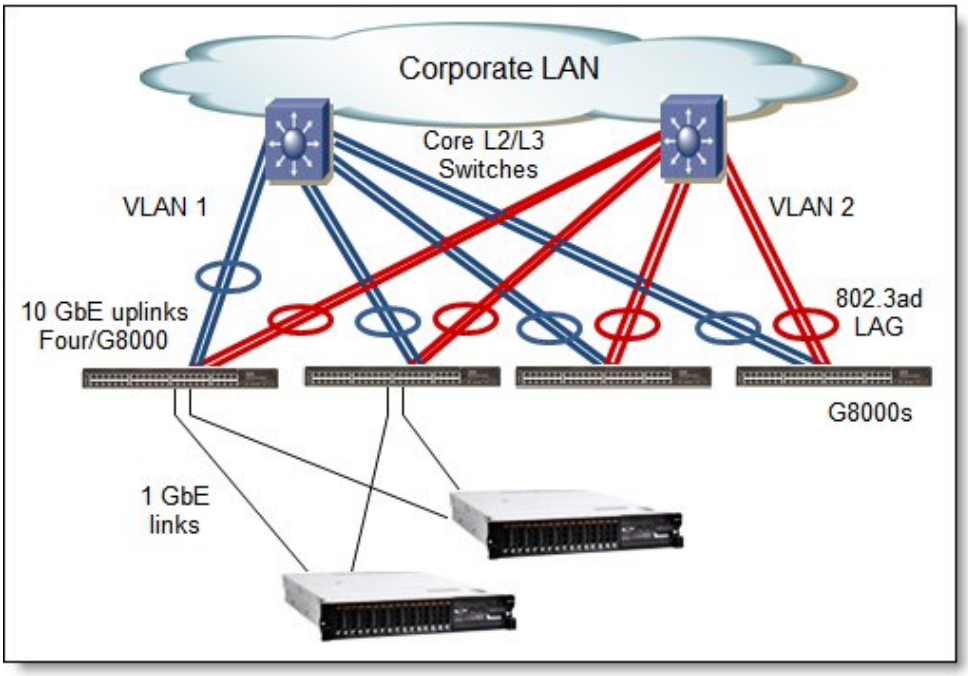

Figure 6. Rack optimized server aggregation logical design

Server 1 GbE aggregation and connection to storage

Here are the features of the server 1 GbE aggregation and connection to storage:

- A good price/performance point for a data center environment with 1 Gigabit performance and investment protection for 10 GbE
- Good for connectivity to network attached storage (NAS):
  - LenovoEMC px4-300r
  - LenovoEMC px4-400r
  - LenovoEMC px12-400r
  - LenovoEMC px12-450r
- Ideal for connectivity to iSCSI:
  - Storwize V3700
  - Storwize V5000
  - Storwize V7000

Figure 7 shows NAS and iSCSI storage connectivity.

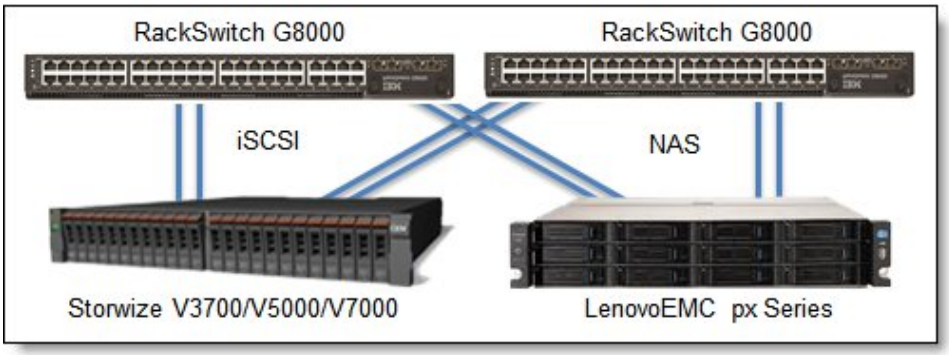

Figure 7. NAS and iSCSI storage connectivity

Related publications and links

For more information, visit https://www-947.ibm.com/support/entry/portal/documentation_expanded_list/system_networking/data_center_ethernet/ethernet_switches/ibm_rackswitch_g8000-7309,_0446?productContext=1305016377 to see the following RackSwitch G8000 product resources:

- *RackSwitch G8000 Installation Guide*
- *RackSwitch G8000 isCLI Command Reference*
- *RackSwitch G8000 Application Guide*
- *RackSwitch G8000 Browser-Based Interface Quick Guide*
- *RackSwitch G8000 Menu-Based Command Reference*

For more information see the following publications:

- US Announcement Letter for G8000 models:
  Rear-to-front model:
  http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=an&subtype=ca&&htmlfid=897/ENUS110-136

  Front-to-rear model:
  http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=an&subtype=ca&&htmlfid=897/ENUS111-072

Related product families

Product families related to this document are the following:

- 1 Gb Ethernet Connectivity
- Top-of-Rack Switches

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