

## RackSwitch G8124E

### Product Guide (withdrawn product)

The RackSwitch™ G8124E (shown in Figure 1) delivers exceptional performance that is both lossless and low latency. In addition, the G8124E delivers excellent cost savings as you consider acquisition costs, energy costs, plus its feature-rich design with when it comes to virtualization, CEE/FCoE, high availability, and its enterprise class Layer 2 and Layer 3 functionality.

With support for 1 Gb Ethernet or 10 Gb Ethernet, the G8124E switch is designed for those clients that are leveraging 10 GbE today or have plans to in the future. This is the first top of rack (TOR) 10 GbE switch designed to support Virtual Fabric, which helps clients significantly reduce cost and complexity when it comes to the I/O requirements of most virtualization deployments today. Virtual Fabric can help clients reduce the number of multiple I/O adapters down to a single dual-port 10 GbE adapter, in addition to reducing the number of cables and upstream switch ports required. Virtual Fabric allows clients to carve up a dual-port 10 GbE adapter into eight virtual NICs (vNICs) and create dedicated virtual pipes between the adapter and the switch for optimal performance, plus higher availability and better security. This functionality provides the ability to dynamically allocate bandwidth per vNIC in increments of 100 Mb, while being able to adjust over time without downtime.



Figure 1. RackSwitch G8124E

### Did you know?

The G8124E switch is designed to support a number of separate types of configurations from a server or downstream switches: 1 Gb, 10 Gb, virtual NIC, Converged Enhanced Ethernet (CEE/FCoE), and iSCSI. This single switch can handle all these workloads and can connect to an upstream 1 Gb or 10 Gb infrastructure, or both.

The G8124E is designed to support data center bridging (DCB), which is the IEEE's group of protocols that provide Lossless Ethernet and allows for clients to reduce the costs of implementing FCoE by leveraging port aggregation before connecting to more costly upstream gateway devices.

The G8124E can be configured in "easy connect" mode to allow for transparent and simple connectivity to the upstream network, enabling easy connectivity to upstream Cisco, Juniper or other networks without having to change those networks.

Virtual Fabric helps clients reduce costs and complexity in environments where they need four or more NICs per server. A perfect example is virtualization, where clients often need as many as eight NICs per server.

The G8124E can help clients reduce the complexity of managing VMs and VM migration with VMready® feature that makes the network VM-aware.

## Part number information

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

Table 1. Part numbers and feature codes for ordering

Description	Part number	Feature code for MTM 7309-HC6	Feature code for MTM 7309-HC7
Switch			
RackSwitch G8124E (Rear to Front)	7309BR6	A1PF	None
RackSwitch G8124E (Front to Rear)	7309BF7	None	A1PG
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
iDataPlex Rail Kit	90Y3535	None	A1SZ
Air Inlet Duct for 382 mm RackSwitch	00D6062	A3HG	None

The part numbers for the G8124E switches include the following items:

- One RackSwitch G8124E switch
- Generic Rack Mount Kit (2-post)
- 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 G8124E switch has two redundant 275 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).

The G8124E 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 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 G8124E 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 G8124E (rear-to-front airflow) switch for 4-post rack installations.

The G8124E (front-to-rear airflow) switch optionally supports Recessed 19-inch 4-Post Rail Kit (00CG089) which is 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 G8124E (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 G8124E switch ships standard without any AC power cables. Table 2 lists the part numbers and feature codes to order the power cables (two power cables are required per switch).

Table 2. Power cables

Description	Part number	Feature code for MTM 7309-HC6 and 7309-HC7
<b>Rack power cables</b>		
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
<b>Line cords</b>		
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

## Supported cables and transceivers

With the flexibility of the G8124E switch, clients can take advantage of the technologies that they require for multiple environments:

- For 1 GbE links, clients can use RJ-45 SFP transceivers with UTP cables up to 100 m. Clients that need longer distances can use a 1000BASE-SX transceiver, which can drive distances up to 220 meters by using 62.5  $\mu$  multi-mode fiber and up to 550 meters with 50  $\mu$  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, 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.

Table 3 lists the supported cables and transceivers.

Table 3. Supported transceivers and direct-attach cables

Description	Part number	Feature code (MTM 7309-HC6 / 7309-HC7)	Maximum quantity supported
<b>SFP transceivers - 1 GbE</b>			
Lenovo 1000BASE-T SFP Transceiver (does not support 10/100 Mbps)	00FE333	A5DL	24
Lenovo 1000BASE-SX SFP Transceiver	81Y1622	3269	24
Lenovo 1000BASE-LX SFP Transceiver	90Y9424	A1PN	24
<b>SFP+ transceivers - 10 GbE</b>			
Lenovo 10GBASE-SR SFP+ Transceiver	46C3447	5053	24
Lenovo 10GBASE-LR SFP+ Transceiver	90Y9412	A1PM	24
Lenovo 10GBASE-ER SFP+ Transceiver	90Y9415	A1PP	24
<b>Optical cables for 1 GbE SFP SX and 10 GbE SFP+ SR transceivers</b>			
Lenovo 0.5m LC-LC OM3 MMF Cable	00MN499	ASR5	24
Lenovo 1m LC-LC OM3 MMF Cable	00MN502	ASR6	24
Lenovo 3m LC-LC OM3 MMF Cable	00MN505	ASR7	24
Lenovo 5m LC-LC OM3 MMF Cable	00MN508	ASR8	24
Lenovo 10m LC-LC OM3 MMF Cable	00MN511	ASR9	24
Lenovo 15m LC-LC OM3 MMF Cable	00MN514	ASRA	24
Lenovo 25m LC-LC OM3 MMF Cable	00MN517	ASRB	24
Lenovo 30m LC-LC OM3 MMF Cable	00MN520	ASRC	24
<b>SFP+ passive direct-attach cables - 10 GbE</b>			
Lenovo 0.5m Passive DAC SFP+ Cable	00D6288	A3RG	24
Lenovo 1m Passive DAC SFP+ Cable	90Y9427	A1PH	24
Lenovo 1.5m Passive DAC SFP+ Cable	00AY764	A51N	24
Lenovo 2m Passive DAC SFP+ Cable	00AY765	A51P	24
Lenovo 3m Passive DAC SFP+ Cable	90Y9430	A1PJ	24
Lenovo 5m Passive DAC SFP+ Cable	90Y9433	A1PK	24
Lenovo 7m Passive DAC SFP+ Cable	00D6151	A3RH	24
<b>SFP+ active direct-attach cables - 10 GbE</b>			
Lenovo 1m Active DAC SFP+ Cable	95Y0323	A25A	24
Lenovo 3m Active DAC SFP+ Cable	95Y0326	A25B	24
Lenovo 5m Active DAC SFP+ Cable	95Y0329	A25C	24
Lenovo 1m Active DAC SFP+ Cable (replaces 95Y0323)	00VX111	AT2R	24
Lenovo 3m Active DAC SFP+ Cable (replaces 95Y0326)	00VX114	AT2S	24
Lenovo 5m Active DAC SFP+ Cable (replaces 95Y0329)	00VX117	AT2T	24

## Benefits

The RackSwitch G8124E switch is considered particularly suited for these clients:

- Clients who are looking for ultra low latency 10 GbE networking
- Clients who are looking to converge their SAN and LAN and needing a FCoE transit switch
- Clients who are looking for ways to reduce cost (CAPEX)
  - Converge LAN and SAN traffic
  - Purchase fewer adapters, transceivers and cables per server
  - Reduce upstream switching costs – fewer ports
- Clients who are looking to reduce complexity (OPEX)
  - Fewer adapters to manage
  - Manage fewer cables helping reduce potential points of failure
  - Ability to standardize on Ethernet from all servers, Ethernet for all connectivity in a rack
  - Ability to push out FC split to the end of the row

The RackSwitch G8124E offers the following benefits:

- **High performance:** The 10 GbE low latency (as low as 570 nanoseconds) switch provides the best combination of extremely low latency, non-blocking line-rate switching and ease of management.
- **Lower power and better cooling:** The G8124E uses as little power as two 60 W light bulbs, 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 G8124E rear-to-front cooling design reduces data center air conditioning costs by having airflow match the servers in the rack. In addition, variable speed fans assist in automatically reducing power consumption.
- **Virtual Fabric** can help customers address I/O requirements for multiple NICs while also helping reduce cost and complexity. Virtual Fabric allows for the carving up of a physical NIC into multiple virtual NICs (2 - 8 vNICs) and creates a virtual pipe between the adapter and the switch for improved performance, availability, and security while reducing cost and complexity.
- **VM-aware networking:** VMready software on the switch helps reduce 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 VM providers such as VMware, Citrix, Xen, IBM PowerVM, and Microsoft Hyper-V.
- **Layer 3 functionality:** The switch includes Layer 3 functionality, which provides security and performance benefits as inter-VLAN traffic stays within the chassis. This switch also provides the full range of Layer 3 protocols from static routes for technologies such as Open Shortest Path First (OSPF) and Border Gateway Protocol (BGP) for enterprise customers.
- **Seamless interoperability:** RackSwitch switches interoperate seamlessly with other vendors' upstream switches. For more information, see *Tolly Reports: Tolly Functionality and Certification: RackSwitch G8000 and G8124 and Cisco Catalyst Interoperability Evaluation*, found at the following website: <http://tolly.com/ts/2009/blade/G8100/Tolly209116BladeRackSwitchInteroperability.pdf>
- **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.
- **Converged fabric:** The switch is designed to support CEE/DCB and connectivity to FCoE gateways. CEE helps enable clients to combine storage, messaging traffic, VoIP, video, and other data on a common data center Ethernet infrastructure. FCoE helps enable highly efficient block storage over Ethernet for consolidating server network connectivity. As a result, clients can deploy a single server interface for multiple data types, which can simplify both deployment and management of server network connectivity, while maintaining the high availability and robustness required for storage transactions.
- **Transparent networking capability:** With a simple configuration change to Easy Connect mode, the RackSwitch G8124E becomes a transparent network device, invisible to the core, eliminating network

administration concerns of Spanning Tree Protocol configuration/interoperability, VLAN assignments and avoids any possible loops. By emulating a host NIC to the data center core, it accelerates the provisioning of VMs by eliminating the need to configure the typical access switch parameters.

## Features and specifications

**Note:** Features and specifications listed in this section are based on Networking OS 7.9.

The RackSwitch G8124E has the following features and specifications:

- Form factor: 1U rack mount switch
  - RackSwitch G8124E Rear-to-Front version for ports located in the rear of the rack matching System x®, BladeCenter® and Flex System® designs
  - RackSwitch G8124E Front-to-Rear version for ports located in the front of the rack matching airflow of iDataPlex® and NeXtScale™ System designs
- Ports
  - 24 ports for 1 Gb or 10 Gb Ethernet SFP/SFP+ transceivers (support for 1000BASE-SX, 1000BASE-LX, 1000BASE-T, 10GBASE-SR, 10GBASE-LR, and 10GBASE-ER) or SFP+ direct-attach copper cables. SFP+ modules and DAC cables are not included and must be purchased separately.
  - Two 10/100/1000 Ethernet port (RJ-45 connector) for out of band (OOB) management
  - One RS-232 serial port (Mini-USB connector) that provides an additional means to configure the switch
- Scalability and performance
  - 1 Gb and 10 Gb Ethernet ports for bandwidth optimization and performance
  - Non-blocking architecture with wire-speed forwarding of traffic and aggregated throughput of 480 Gbps
  - 100% line-rate performance with 570 nanoseconds switching latency
  - Media access control (MAC) address learning: automatic update, support for up to 16,000 MAC addresses
  - Up to 128 IP interfaces per switch (interfaces 127 and 128 are reserved for switch management)
  - Static and LACP (IEEE 802.3ad) link aggregation, up to 16 trunk groups with up to 12 ports per trunk group
  - Support for jumbo frames (up to 9,216 bytes)
  - Broadcast/multicast storm control
  - IGMP snooping to 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 and fast uplink convergence for rapid STP convergence
- Availability and redundancy
  - Virtual Router Redundancy Protocol (VRRP) for Layer 3 router 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 a single switch
  - IEEE 802.1w Rapid STP (RSTP) provides rapid STP convergence for critical delay-sensitive traffic like 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
  - Up to 4095 VLANs supported per switch, with VLAN numbers ranging from 1 to 4095 (VLAN 4095 is used by the management network.)
  - Port-based VLANs

- 802.1Q VLAN tagging support
  - Private VLANs support
- 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
  - NIST 800-131A Encryption
  - Selectable encryption protocol
- 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 output Class of Service (COS) queues per port for processing qualified traffic
  - IPv4/IPv6 ACL metering
- IP v4 Layer 3 functions
  - Host management
  - IP forwarding
  - IP filtering with ACLs, up to 127 IPv4 ACLs supported
  - VRRP for router redundancy
  - Support for up to 128 static routes
  - Routing protocol support (RIP v1, RIP v2, OSPF v2, BGP)
  - Support for DHCP Relay
  - Support for IGMP snooping
  - Support for Protocol Independent Multicast (PIM) in Sparse Mode (PIM-SM) and Dense Mode (PIM-DM).
- IPv6 Layer 3 functions
  - IPv6 host management
  - IPv6 forwarding
  - Support for OSPF v3 routing protocol
  - IPv6 filtering with ACLs, up to 128 IPv6 ACLs supported
- Virtualization
  - Virtual NICs (vNICs) with Ethernet, iSCSI, or FCoE traffic on vNICs
  - Virtual link aggregation groups (vLAGs)
  - VMready support
    - Up to 2,048 virtual entities (VEs)
    - Automatic VE discovery
    - Up to 1,024 local or distributed VM groups for VEs
    - NMotion™ feature for automatic network configuration migration
- Converged Enhanced Ethernet
  - Priority-Based Flow Control (PFC) (IEEE 802.1Qbb) extends 802.3x standard flow control to allow the switch to pause traffic based on the 802.1p priority value in each packet's VLAN tag.
  - Enhanced Transmission Selection (ETS) (IEEE 802.1Qaz) provides a method for allocating link bandwidth based on the 802.1p priority value in each packet's VLAN tag.
  - Data Center Bridging Capability Exchange Protocol (DCBX) (IEEE 802.1AB) allows neighboring network devices to exchange information about their capabilities.
- Fibre Channel over Ethernet (FCoE)
  - FC-BB5 FCoE specification compliant
  - FCoE transit switch operations
  - FCoE Initialization Protocol (FIP) support for automatic ACL configuration
  - Link Aggregation Group (LAG) support for FCoE traffic
  - Supports 2,048 FCoE sessions with FIP Snooping by using Class ID ACLs
- 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, FTP, and Secure FTP (sFTP)
- Network Time Protocol (NTP) for switch clock synchronization
- Netconf (XML)
- Switch Center management application
- Monitoring
  - Switch LEDs for port status and switch status indication
  - Remote Monitoring (RMON) agent to collect statistics and proactively monitor switch performance
  - Port mirroring for analyzing network traffic passing through switch
  - Change tracking and remote logging with 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
- VMware Virtual Center (vCenter) for VMready
- Routing Information Protocol (RIP)
- Border Gateway Protocol (BGP)
- Protocol Independent Multicast (PIM)
- Virtual Router Redundancy Protocol (VRRP)
- sFLOW



## Standards supported

The switch supports the following standards:

- IEEE 802.1AB Data Center Bridging Capability Exchange Protocol (DCBX)
- IEEE 802.1D Spanning Tree Protocol (STP)
- IEEE 802.1p Class of Service (CoS) prioritization
- IEEE 802.1s Multiple STP (MSTP)
- IEEE 802.1Q Tagged VLAN
- IEEE 802.1Qbb Priority-Based Flow Control (PFC)
- IEEE 802.1Qaz Enhanced Transmission Selection (ETS)
- IEEE 802.1x port-based authentication
- IEEE 802.1w Rapid STP (RSTP)
- IEEE 802.3 10BASE-T Ethernet
- IEEE 802.3ab 1000BASE-T copper twisted pair Gigabit Ethernet
- IEEE 802.3ad Link Aggregation Control Protocol
- 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 802.3u 100BASE-TX Fast Ethernet
- IEEE 802.3x Full-duplex Flow Control
- IEEE 802.3z 1000BASE-SX short range fiber optics Gigabit Ethernet
- IEEE 802.3z 1000BASE-LX long range fiber optics Gigabit Ethernet

## Connectors and LEDs

Figure 2 shows the front panel of the RackSwitch G8124E.

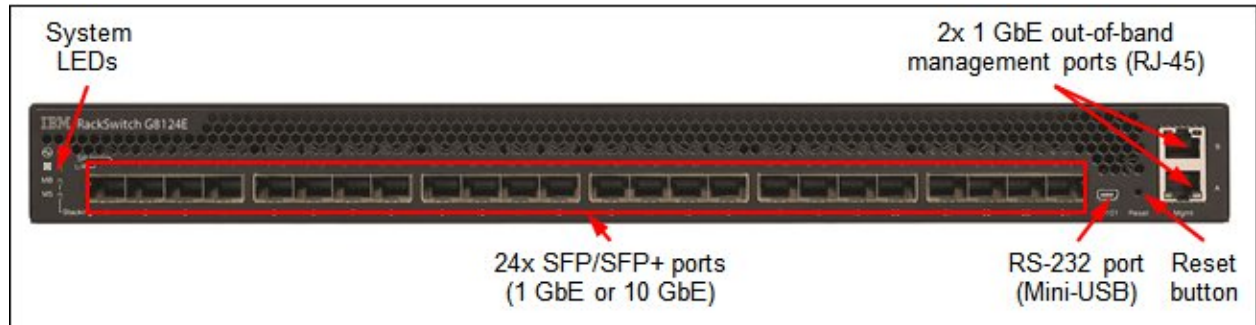


Figure 2. Front panel of the RackSwitch G8124E

The front panel of the G8124E 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.
- 24x SFP/SFP+ port connectors to attach SFP/SFP+ transceivers for 1 Gb or 10 Gb Ethernet connections or DAC cables for 10 Gb Ethernet connections.
- 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 G8124E.

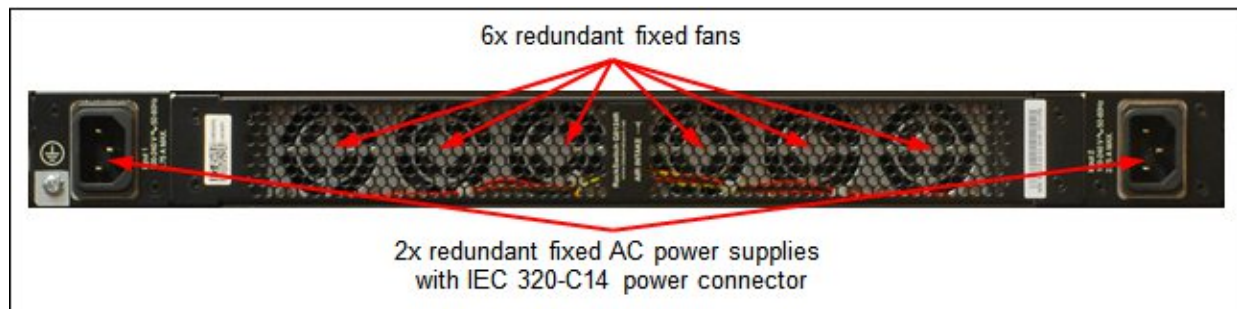


Figure 3. Rear panel of the RackSwitch G8124E

The rear panel of the G8124E contains the following components:

- Two redundant fixed AC power supplies (IEC 320-C14 power connector)
- Six redundant fixed fans

## Network cabling requirements

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

Table 4. G8124E network cabling requirements

Transceiver	Standard	Cable	Connector
<b>10 Gb Ethernet</b>			
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
Direct attach cable	10GSFP+Cu	SFP+ DAC cables up to 7 m (see Table 3)	SFP+
<b>1 Gb Ethernet</b>			
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 up to 550 m (50 $\mu$ ) or up to 220 m (62.5 $\mu$ )	LC
1000BASE-LX SFP Transceiver (90Y9424)	1000BASE-LX	1310 nm single-mode fiber cable up to 10 km	LC
<b>Management ports</b>			
1 GbE management ports	1000BASE-T	UTP Category 5, 5E, and 6 up to 100 meters	RJ-45
RS-232 management port	RS-232	DB-9-to-mini-USB or RJ-45-to-mini-USB console cable (comes standard with the switch)	Mini-USB

## Warranty

The RackSwitch G8124E comes with a standard 3-year hardware warranty with Next Business Day (NBD), 9x5, Customer Replaceable Unit (CRU) warranty service from Lenovo. Software Upgrade Entitlement is based on the switch's warranty or post warranty extension and service contracts. Optional warranty and maintenance upgrades are available for the G8124E switch through Lenovo Services:

- 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 G8124E switch are as follows:

- Height: 44 mm (1.7 in.)
- Width: 440 mm (17.3 in.)
- Depth: 381 mm (15.0 in.)
- Weight: 6.4 kg (14.1 lb)

## Operating environment

The G8124E switch is supported in the following operating environment:

- Temperature: 0 to 45 °C (32 to 113 °F).
- 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 with redundant variable speed fans for reduced power draw
- Electrical input: 50-60 Hz, 100-240 V AC auto-switching
- Typical power: 116 - 170 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

The following sections describe popular configurations.

### Virtual Fabric configuration

Virtual Fabric is built using industry standards and is an ideal solution for customers that require more than two NICs per server. Over the past couple of years many clients have seen their I/O requirements per server increase anywhere from four to six to eight, or even more, NICs per server, especially with the adoption of virtualization. Virtual Fabric allows clients the ability to use a virtual NIC approach using 10 Gb Ethernet technology to help reduce cost and complexity, and achieve better performance and more flexibility. For example:

- **Reduce costs (acquisition and operating)** by using fewer adapters, cables, and upstream switch ports.
- **Reduce complexity:** Fewer items to manage based on industry standards making thing easier to manage with the addition of high availability and better security.
- **Better performance:** Significantly more I/O bandwidth per server and lower latency than traditional 1 Gb Ethernet.
- **Flexibility:** The ability to carve up a dual-port 10 GbE adapter into 4 - 8 virtual NICs and create virtual pipes between the adapter and switch for higher availability and security. Not only can customers dynamically allocate I/O bandwidth to each virtual NIC, Virtual Fabric also provides the ability to change those allocations as needed. For example, a customer may have one configuration for workload during the day and another during the evenings. Virtual Fabric has the ability to make those changes on the fly without downtime.

Virtual Fabric (Figure 4) is designed in partnership with Emulex. The components needed for this solution are as follows:

- Emulex 10 Gb Virtual Fabric Adapters for System x  
For more details, see *Emulex 10Gb Virtual Fabric Adapter II and III Family for System x* , TIPS0844 at: <http://lenovopress.com/tips0844>

- RackSwitch G8124E

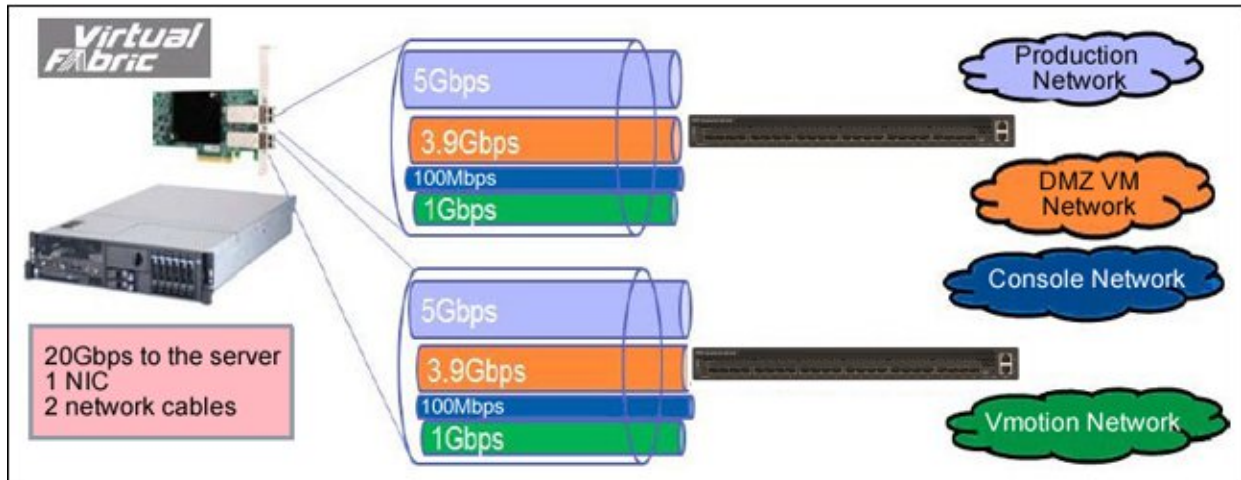


Figure 4. Virtual Fabric topology

#### Rack-optimized server aggregation: 10 GbE attached rack servers

Aggregation and servers are as follows:

- Concentration of rack-optimized servers, for example:
  - System x or ThinkServer 1U or 2U servers with a 10 GbE adapter installed
  - BladeCenter using any of the following modules in the chassis:
    - BladeCenter 1/10Gb Uplink Ethernet Switch Module
    - BladeCenter Virtual Fabric 10Gb Switch Module
    - 10Gb Ethernet Pass-Thru Module for BladeCenter
  - Flex System using any of the following Ethernet modules in the chassis:
    - Flex System EN2092
    - Flex System Fabric EN4093/EN4093R
- Low-profile, high-performance, 24-port 10-GbE switch needed to perform aggregation function per rack

Figure 5 shows a G8124E top-of-rack switch.

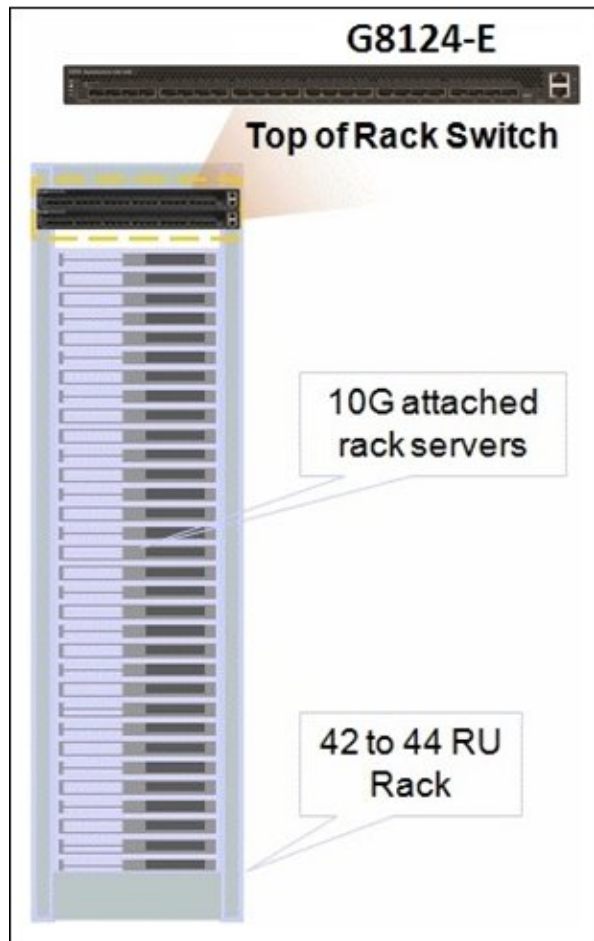


Figure 5. G8124E top-of-rack switch

Table 5 lists the features and benefits of the server aggregation.

Table 5. Features and benefits

Features	Benefits
Line-rate, non-blocking, all 24-ports	Supports massive compute and virtualization workloads.
Less than 600 nano-second latency	Faster application response times.
Support for IGMP Snooping and L3 forwarding	Enables high-bandwidth, low-latency multicast applications.
Standards-based Layer 2/3 protocols, industry standard CLI	Interoperates with existing network. No learning curve.

#### Rack-optimized server aggregation: 1 GbE attached rack servers

The design goal is a G8124E (10 GbE) switch at Distribution Layer and G8052 (1 GbE) at Edge/Access (Figure 6):

- Logical configuration: Configure G8052s for Layer 2 and apply static routes for L3 forwarding.
- Full Layer 2/3 feature set: STP, MSTP, RSTP, PVRST+;RIP v1/2, static routes, 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.

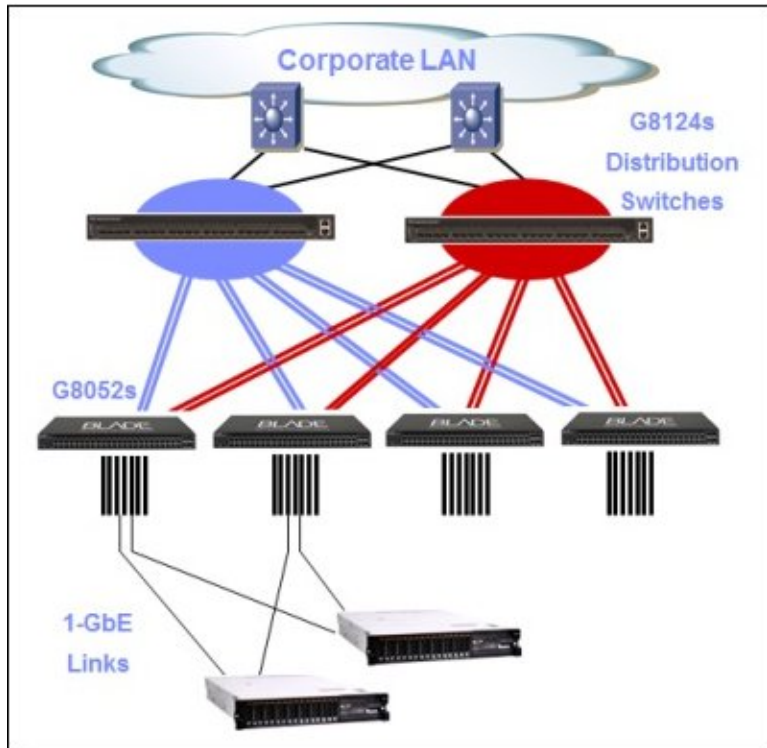


Figure 6. Rack-optimized server aggregation: 1 GbE attached rack servers

### IP storage over 10-GbE: Changing the economics of storage

G8124E benefits for IP storage applications (Figure 7):

- Lossless Ethernet Fabric
- Ultra-low latency for time-sensitive disk reads/writes
- Line-rate, high-bandwidth performance
- Low power consumption with fewer components
- Low-cost, pay-as-you-grow 10G storage network



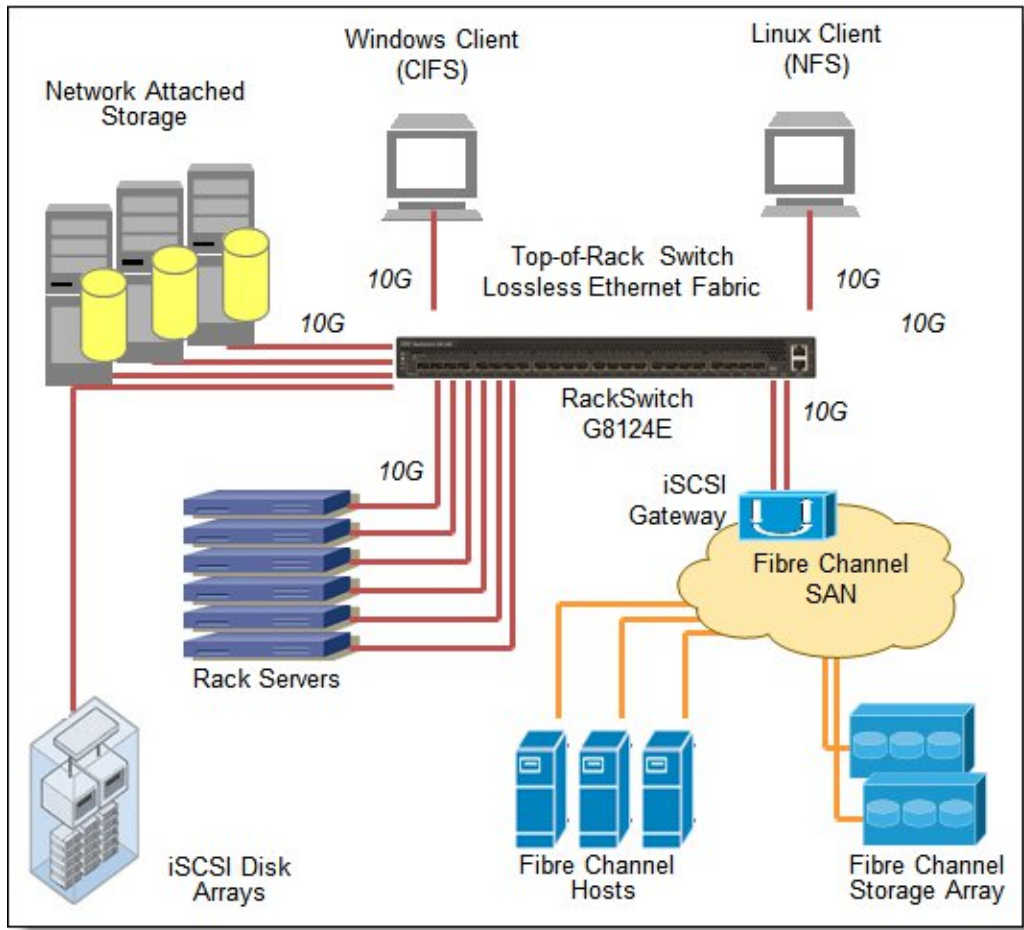


Figure 7. G8124E benefits for IP storage over 10 GbE

## Related publications and links

For more information, visit <http://www-947.ibm.com/support/entry/portal/Documentation> to see the following RackSwitch G8124E product resources:

- *RackSwitch G8124E Installation Guide* :
- *RackSwitch G8124E isCLI Command Reference*
- *RackSwitch G8124E Application Guide*
- *RackSwitch G8124E Browser-Based Interface Quick Guide*
- *RackSwitch G8124E Menu-Based Command Reference*

For more information, see the following resources:

- G8124E Product Page: <http://ibm.biz/Bdx4gJ>
- US Announcement Letter: <http://ibm.biz/Bdx4gV>

## Related product families

Product families related to this document are the following:

- [10 Gb Ethernet Connectivity](#)
- [Top-of-Rack Switches](#)

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