

Lenovo Flex System EN2092 1Gb Ethernet Scalable Switch

Product Guide (withdrawn product)

The Lenovo® Flex System™ EN2092 1Gb Ethernet Scalable Switch enables administrators to offer full Layer 2 and 3 switching and routing capability with combined 1 Gb and 10 Gb external ports in a Flex System chassis. Such consolidation simplifies the data center infrastructure and helps reduce the number of discrete devices, management consoles, and management systems while leveraging the 1 Gb Ethernet infrastructure. In addition, the next-generation switch module hardware supports IPv6 Layer 3 frame forwarding protocols. This Scalable Switch delivers cost savings with flexible port mapping and Features on Demand upgrades, efficient traffic management, increased external bandwidth, and strong Ethernet switching price/performance.

The following figure shows the switch module.



Figure 1. Lenovo Flex System EN2092 1Gb Ethernet Scalable Switch

Did you know?

The base switch configuration comes standard with 24x 1 GbE port licenses that can be assigned to internal or external 1 GbE connections or even external SFP+ ports with flexible port mapping. For example, this feature allows customers to trade off one external 1 GbE RJ-45 port for one internal 1 GbE port (or vice versa) or trade off ten 1 GbE ports for one 10 GbE port. Customers then have the flexibility of turning on more ports when you need them using Lenovo's Features on Demand upgrade licensing capabilities that provide "pay as you grow" scalability without the need to buy additional hardware.

Delivering advanced virtualization awareness and cloud readiness helps simplify management and automates VM mobility by making the network VM aware with VMready® which works with all the major hypervisors.

Key features

The Flex System EN2092 1Gb Scalable Switch is considered particularly suited for these customers:

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

The switch offers the following key features and benefits:

- **Increases network performance**
With the growth of virtualization and the evolution of cloud, many of today's applications require low latency and high-bandwidth performance. The EN2092 delivers non-blocking architecture with 176 Gbps throughput and full line rate performance, making it ideal for managing dynamic workloads across the network. In addition, the switch provides a rich Layer 2 and Layer 3 feature set that is ideal for many of today's data centers, plus it offers a combined external bandwidth of 60 Gb.
- **Pay as you grow investment protection and lower total cost of ownership**
The EN2092's flexible port mapping allows customers to reallocate ports as needed which helps reduce acquisition and operational costs. The base switch configuration includes 24x 1 GbE port licenses that can be assigned to internal 1 GbE connections and 1 GbE or even 10 GbE (by using ten 1 GbE licenses per one 10 GbE port) external ports. Customers then have the flexibility of turning on more 1 GbE connections to the compute node and more 1 GbE or 10 GbE external ports when needed using Lenovo's Features on Demand licensing capabilities that provide "pay as you grow" scalability without the need to buy additional hardware.
- **Cloud ready**
Delivering advanced virtualization awareness helps simplify management and automates VM mobility by making the network VM aware with VMready which works with all the major hypervisors.

Support for Switch Partition (SPAR) allows clients to virtualize the switch with partitions that isolate communications for multi-tenancy environments.
- **Simplifies network infrastructure**
The EN2092 1Gb Scalable Switch simplifies deployment and growth by using its innovative scalable architecture. This architecture helps increase return on investment by reducing the qualification cycle, while providing investment protection for additional I/O bandwidth requirements in the future. The extreme flexibility of the switch comes from the ability to turn on additional ports as required, both down to the compute node and for upstream connections (including 10 GbE). Also, as customers consider migrating to a converged LAN and SAN, the EN2092 switch can be leveraged in either an iSCSI or NAS environment.
- **Simplified management**
A key challenge is the management of a discrete network environment. The EN2092 1Gb Scalable Switch supports a command-line interface (CLI) for integration into existing scripting and automation. Network management can be simplified by using port profiles, topology views, and virtualization management.

Switch Center application is used for advanced levels of provisioning, management, and control, which can significantly reduce deployment and day-to-day maintenance times, while providing in-depth visibility into the network performance and operations of Lenovo switches. Plus, when leveraging tools like VMware vCenter Server or vSphere, or Switch Center provides additional integration for better optimization.

Components and connectors

The following figure shows the front panel of the Flex System EN2092 1Gb Ethernet Scalable Switch.

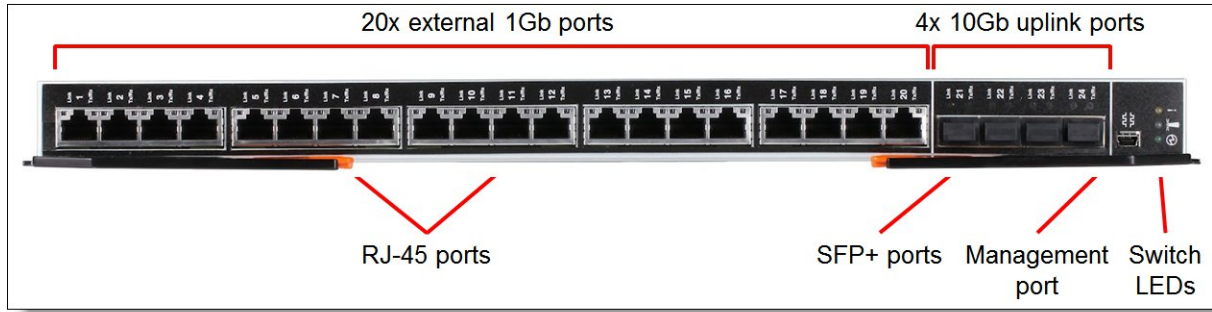


Figure 2. Front panel of the Flex System EN2092 1Gb Ethernet Scalable Switch

The front panel contains the following components:

- 20x 1000BASE-T Ethernet external ports for 10/100/1000 Mbps connections to external Ethernet devices.
- 4x SFP+ external ports to attach SFP/SFP+ transceivers for 1 Gb or 10 Gb connections or DAC cables for 10 Gb Ethernet connections.
- One mini-USB RS-232 console port that provides an additional means to configure the switch module.
- LEDs that display the status of the switch module and the network.

System specifications

The following table lists the EN2092 system specifications.

Table 1. System specifications

Component	Specification
Form factor	Flex System embedded I/O module
Ports	Internal ports: 28x 1 Gb Ethernet (GbE) ports External ports: <ul style="list-style-type: none"> • 20x 1 GbE fixed ports (RJ-45) • 4x SFP/SFP+ ports
Media types (external ports)	10 Gb Ethernet SFP+: <ul style="list-style-type: none"> • 10 GbE short-range (SR) SFP+ transceivers • 10 GbE long-range (LR) SFP+ transceivers • 10 GbE SFP+ DAC cables 1 Gb Ethernet SFP: <ul style="list-style-type: none"> • 1 GbE short-wavelength (SX) SFP transceivers • 1 GbE long-wavelength (LX) SFP transceivers • 1 GbE RJ-45 SFP transceivers

Component	Specification
Port speeds	<ul style="list-style-type: none"> • Internal 1 GbE ports: 1 Gbps • External 1 GbE RJ-45 fixed ports: 10/100/1000 Mbps autosensing • 10 GbE SFP+ transceivers and DAC cables: 10 Gbps • 1 GbE SFP transceivers: 1 Gbps
Data traffic types	Unicast, multicast, broadcast.
Software features	<p>Lenovo Networking OS:</p> <p>Layer 2 switching, Layer 3 switching, virtual local area networks (VLANs), VLAN tagging, spanning tree protocol (STP), link aggregation (trunk) groups (LAGs), Hot Links, Layer 2 failover, quality of service (QoS), VMready, Switch Partitioning (SPAR), Flexible Port Mapping, IPv4/IPv6 management, IPv4/IPv6 routing, IPv4 virtual router redundancy protocol (VRRP).</p>
Performance	<p>Non-blocking architecture with wire-speed forwarding of traffic:</p> <ul style="list-style-type: none"> • Up to 176 Gbps aggregated throughput • 100% line rate performance with 1.8 microseconds switching latency • Up to 9,216-byte jumbo frames
Scalability	<ul style="list-style-type: none"> • MAC address forwarding database entries: 32,000 • VLANs: 1,024 • Per VLAN Rapid Spanning Tree (PVRST) instances: 128 • Multiple STP (MSTP) instances: 32 • Link aggregation groups: 52 • Ports in a link aggregation group: 32
Hot-swap parts	SFP/SFP+ transceivers, SFP+ DAC cables.
Management ports	2x GbE internal ports connected to the chassis management module; 1x RS-232 external port (Mini-USB).
Management interfaces	Industry standard command line interface (isCLI); SNMP v1 and v3. Optional Lenovo Switch Center. Optional Lenovo XClarity for discovery, inventory, and monitoring.
Security features	Secure Shell (SSH); Secure Copy (SCP); Secure FTP (sFTP); user level security; LDAP, RADIUS, and TACACS+ authentication; access control lists (ACLs); port-based network access control (IEEE 802.1x).
Warranty	One-year customer-replaceable unit limited warranty. When installed in a supported chassis, the switch assumes the chassis' base warranty and any warranty service upgrade; warranty includes Networking OS software upgrades.
Mean Time Between Failures	381,936 hours with ambient operating temperature of 40° C.
Dimensions	Height: 30 mm (1.2 in.); width: 401 mm (15.8 in.); depth: 317 mm (12.5 in.)
Weight	3.7 kg (8.1 lb).

Models

The part numbers to order the switch and optional upgrades are shown in the following table.

Table 2. Part numbers and feature codes for ordering

Description	Part number	Feature code
Switch module		
Lenovo Flex System EN2092 1Gb Ethernet Scalable Switch	49Y4294	A0TF
Features on Demand upgrades		
Flex System EN2092 1Gb Ethernet Scalable Switch (Upgrade 1)	90Y3562	A1QW
Flex System EN2092 1Gb Ethernet Scalable Switch (10Gb Uplinks)	49Y4298	A1EN

The part number for the switch includes the following items:

- One Lenovo Flex System EN2092 1Gb Ethernet Scalable Switch
- Documentation package

The switch does not include a serial management cable; the optional Flex System Management Serial Access Cable, 90Y9338, is supported and contains two cables, a mini-USB-to-RJ45 serial cable and a mini-USB-to-DB9 serial cable, either of which can be used to connect to the switch locally for configuration tasks and firmware updates.

The part numbers for the FoD upgrades, 90Y3562 and 49Y4298, include the following items:

- Feature on Demand Activation Flyer
- Upgrade activation letter

The base switch and upgrades are as follows:

- 49Y4294 is the part number for the base switch, and it comes with 14 internal 1 GbE ports enabled, one to each compute node and ten external 1 GbE ports enabled. All external 1 GbE ports have RJ-45 connectors.
- 90Y3562 (Upgrade 1) can be applied on the base switch to take full advantage of four-port adapter cards installed in each compute node. This upgrade enables 14 additional internal ports, for a total of 28 ports (two ports to each node). The upgrade also enables 10 additional external 1 GbE ports for a total of twenty 1 GbE external RJ-45 ports. This upgrade requires the base switch.
- 49Y4298 (10Gb Uplinks) can be applied on the base switch when you need more external bandwidth. The upgrade enables four external 10 GbE ports with SFP+ connectors (SFP+ transceivers or DAC cables are not included). This upgrade requires the base switch.
- Both 90Y3562 (Upgrade 1) and 49Y4298 (10Gb Uplinks) can be applied on the switch at the same time to allow you to use 28 internal 10 GbE ports leveraging all four ports on an four-port expansion card, and to utilize all external ports on the switch.

Flexible port mapping: With Networking OS version 7.8 or later customers have more flexibility in assigning ports that they have licensed on the EN2092 which can help eliminate or postpone the need to purchase upgrades. While the base model and upgrades still activate specific ports, flexible port mapping provides customers with the capability of reassigning ports as needed by moving internal and external 1 GbE ports or trading off ten 1 GbE ports for the use of an external 10 GbE port (or vice versa). This is very valuable when customers consider the flexibility with the base license and with 10Gb Uplinks upgrade.

With flexible port mapping, customers have licenses for a specific number of ports:

- 49Y4294 is the part number for the base switch, and it provides 24x 1 GbE port licenses that can enable any combination of internal and external 1 GbE ports and external 10 GbE ports (with the use of ten 1 GbE port licenses per one 10 GbE port).
- 90Y3562 (Upgrade 1) upgrades the base switch by activation of 14 internal 1 GbE ports and ten external 1 GbE ports which is equivalent to adding 24 more 1 GbE port licenses for a total of 48x 1 GbE port licenses. Any combination of internal and external 1 GbE ports and external 10 GbE ports

(with the use of ten 1 GbE port licenses per one 10 GbE port) can be enabled with this upgrade. This upgrade requires the base switch.

- 49Y4298 (10Gb Uplinks) upgrades the base switch by activation of four external 10 GbE ports for a total of 24x 1 GbE ports and 4x 10 GbE ports. With the use of one external 10 GbE port license for ten 1 GbE ports, any combination of internal and external 1 GbE ports and external 10 GbE ports can be enabled with this upgrade. This upgrade requires the base switch.
- Both 90Y3562 (Upgrade 1) and 49Y4298 (10Gb Uplinks) simply activate all the ports on the EN2092 which is 28 internal 1 GbE ports, 20 external 1 GbE ports, and four external 10 GbE SFP+ ports.

Note: When both Upgrade 1 and 10Gb Uplinks are activated, flexible port mapping is no longer used because all the ports on the EN2092 are enabled.

The following table lists supported port combinations on the switch and required upgrades.

Table 3. Supported port combinations: Default port mapping

Supported port combinations	Upgrade required	Quantity		
		Base switch, 49Y4294	Upgrade 1, 90Y3562	10Gb Uplinks, 49Y4298
<ul style="list-style-type: none"> • 14x internal 1 GbE ports • 10x external 1 GbE ports 		1	0	0
<ul style="list-style-type: none"> • 28x internal 1 GbE ports • 20x external 1 GbE ports 		1	1	0
<ul style="list-style-type: none"> • 14x internal 1 GbE ports • 10x external 1 GbE ports • 4x external 10 GbE ports 		1	0	1
<ul style="list-style-type: none"> • 28x internal 1 GbE ports • 20x external 1 GbE ports • 4x external 10 GbE ports 		1	1	1

Table 4. Supported port combinations: Flexible port mapping

Supported port combinations	Quantity required		
	Base switch, 49Y4294	Upgrade 1, 90Y3562	10Gb Uplinks, 49Y4298
<ul style="list-style-type: none"> • 24x 1 GbE ports (internal and external) or • 14x 1 GbE ports (internal and external) • 1x external 10 GbE SFP+ port 	1	0	0
<ul style="list-style-type: none"> • 48x 1 GbE ports (internal and external) or • 28x 1 GbE ports (internal and external) • 2x external 10 GbE SFP+ ports 	1	1	0
<ul style="list-style-type: none"> • 24x 1 GbE ports (internal and external) • 4x external 10 GbE SFP+ ports or • 44x 1 GbE ports (internal and external) • 2x external 10 GbE SFP+ ports 	1	0	1

Transceivers and cables

With the flexibility of the EN2092 switch, customers can use the following connectivity technologies:

- For 1 GbE links, customers can use RJ-45 UTP cables up to 100 meters. Customers that need longer distances can use the 1000BASE-SX transceivers in the SFP/SFP+ ports, which can drive distances up to 220 meters with 62.5 μ multi-mode fiber (OM1) and up to 550 meters with 50 μ multi-mode fiber (OM2), or the 1000BASE-LX transceivers that support distances up to 10 kilometers with single-mode fiber (1310 nm).
- For 10 GbE links (supported on SFP+ external ports), customers can use direct-attached copper (DAC) SFP+ cables for in-rack cabling for distances up to 7 meters. 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. The 10GBASE-LR transceivers can support distances up to 10 kilometers on single mode fiber.

If the 10Gb Uplinks upgrade (49Y4298) is used or the customer uses flexible port mapping to activate an external SFP+ port, then either SFP+ transceivers or DAC cables are required to provide outside connectivity. The following table lists supported SFP/SFP+ and DAC cable options.

Table 5. SFP/SFP+ transceivers and DAC cables

Description	Part number	Feature code	Maximum quantity supported
Serial console cables			
Flex System Management Serial Access Cable Kit	90Y9338	A2RR	1
SFP transceivers - 1 GbE			
Lenovo 1000BASE-T (RJ-45) SFP Transceiver (no support for 10/100 Mbps)	00FE333	A5DL	4
Lenovo 1000BASE-SX SFP Transceiver	81Y1622	3269	4
Lenovo 1000BASE-LX SFP Transceiver	90Y9424	A1PN	4
SFP+ transceivers - 10 GbE			
Lenovo 10GBASE-SR SFP+ Transceiver	46C3447	5053	4
Lenovo 10GBASE-LR SFP+ Transceiver	90Y9412	A1PM	4
Optical cables for 1 GbE SX SFP and 10 GbE SR SFP+ transceivers			
Lenovo 1m LC-LC OM3 MMF Cable	00MN502	ASR6	4
Lenovo 3m LC-LC OM3 MMF Cable	00MN505	ASR7	4
Lenovo 5m LC-LC OM3 MMF Cable	00MN508	ASR8	4
Lenovo 10m LC-LC OM3 MMF Cable	00MN511	ASR9	4
Lenovo 15m LC-LC OM3 MMF Cable	00MN514	ASRA	4
Lenovo 25m LC-LC OM3 MMF Cable	00MN517	ASRB	4
Lenovo 30m LC-LC OM3 MMF Cable	00MN520	ASRC	4
SFP+ direct-attach cables - 10 GbE			
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

The network cables that can be used with the switch are listed in the following table.

Table 6. EN2092 network cabling requirements

Transceiver	Standard	Cable	Connector
10 Gb Ethernet			
10Gb SR SFP+ (46C3447)	10GBASE-SR	Up to 30 m with fiber optic cables supplied by Lenovo (see Table 5); up to 300 m with OM3 multimode fiber or up to 400 m with OM4 multimode fiber	LC
10Gb LR SFP+ (90Y9412)	10GBASE-LR	1310 nm single-mode fiber cable up to 10 km	LC
Direct attach cable	10GSFP+Cu	SFP+ DAC cables up to 7 m (see Table 5)	SFP+
1 Gb Ethernet			
RJ-45 ports (fixed)	1000BASE-T	UTP Category 5, 5E, and 6 up to 100 meters	RJ-45
1Gb RJ-45 SFP (00FE333)	1000BASE-T	UTP Category 5, 5E, and 6 up to 100 meters	RJ-45
1Gb SX SFP (81Y1622)	1000BASE-SX	Up to 30 m with fiber optic cables supplied by Lenovo (see Table 5); 850 nm multimode fiber cable 50 μ (OM2) up to 550 m or 62.5 μ (OM1) up to 220 m	LC
1Gb LX SFP (90Y9424)	1000BASE-LX	1310 nm single-mode fiber cable up to 10 km	LC
Management ports			
RS-232 serial console port	RS-232	DB-9-to-mini-USB or RJ-45-to-mini-USB console cable (comes with optional Management Serial Access Cable, 90Y9338)	RJ-45

Software features

Note: Features and specifications listed in this section are based on Networking OS 7.8.

The EN2092 Scalable Switch has the following software features:

- Scalability and performance
 - Media access control (MAC) address learning with automatic updates
 - Up to 128 IP interfaces per switch
 - Static and LACP (IEEE 802.3ad) link aggregation
 - 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 and fast uplink convergence for rapid STP convergence
- Availability and redundancy
 - IEEE 802.1D STP for providing L2 redundancy
 - IEEE 802.1s Multiple STP (MSTP) for topology optimization
 - 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 1024 VLANs supported per switch, with VLAN numbers ranging from 1 to 4095 (4095 is used for management module's connection only)
 - 802.1Q VLAN tagging support on all ports
 - Private VLANs
- Security
 - VLAN-based, MAC-based, and IP-based 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; SHA 256 enabled as default
 - IPv6 ACL metering
- 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 Weighted Round Robin (WRR) priority queues per port for processing qualified traffic
- IP v4 Layer 3 functions
 - Host management
 - IP forwarding
 - IP filtering with ACLs, up to 128 ACLs supported
 - Virtual Router Redundancy Protocol (VRRP) for Layer 3 router redundancy
 - Support for up to 128 static routes
 - Routing protocol support (RIP v1, RIP v2, OSPF v2, BGP-4), up to 2048 dynamic routes
 - Support for DHCP Relay
 - Support for IGMP snooping and IGMP relay
 - Support for Protocol Independent Multicast (PIM) in Sparse Mode (PIM-SM) and Dense Mode (PIM-DM).
- IP v6 Layer 3 functions
 - IPv6 host management (except default switch management IP address)
 - IPv6 forwarding
 - Up to 128 static routes
 - Support for OSPF v3 routing protocol
 - IPv6 filtering with ACLs, up to 128 ACLs supported
- Virtualization
 - VMready
 - Up to 2,048 virtual entities (VEs)
 - Automatic VE discovery
 - Up to 32 local or distributed VM groups for VEs
 - NMotion® feature for automatic network configuration migration
 - Switch partitioning (SPAR)
 - SPAR forms separate virtual switching contexts by segmenting the data plane of the module. Data plane traffic is not shared between SPARs on the same switch.
 - SPAR operates as a Layer 2 broadcast network. Hosts on the same VLAN attached to a SPAR can communicate with each other and with the upstream switch. Hosts on the same VLAN but attached to different SPARs communicate through the upstream switch.
 - SPAR is implemented as a dedicated VLAN with a set of internal compute node ports and a single external port or link aggregation (LAG). Multiple external ports or LAGs are not allowed in SPAR. A port can be a member of only one SPAR.

- Manageability
 - Simple Network Management Protocol (SNMP V1 and V3)
 - Telnet interface for CLI
 - Secure Shell (SSH)
 - Serial interface for CLI
 - Scriptable CLI
 - Firmware image update (TFTP, FTP, and sFTP)
 - Network Time Protocol (NTP) for switch clock synchronization
 - Lenovo Switch Center support
 - Lenovo XClarity support (discovery, inventory, and monitoring)
- Monitoring
 - Switch LEDs for external 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 the sFLOW agent for monitoring traffic in data networks (separate sFLOW analyzer required elsewhere)
 - POST diagnostics

The following features are not supported with IPv6:

- Default switch management IP address
- SNMP trap host destination IP address
- Bootstrap Protocol (BOOTP) and DHCP
- RADIUS, TACACS+ and LDAP
- QoS metering and re-marking ACLs for out-profile traffic
- 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

Ethernet standards

The switch supports the following Ethernet 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 802.2 Logical Link Control
- 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
- 10GSFP+Cu SFP+ Direct Attach copper

Warranty

The switch carries a 1-year, customer-replaceable unit (CRU) limited warranty. When installed in a supported chassis, these switches assume your system's base warranty and any Lenovo warranty service upgrade.

Physical specifications

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

- Height: 30 mm (1.2 inches)
- Width: 401 mm (15.8 inches)
- Depth: 317 mm (12.5 inches)
- Weight: 3.7 kg (8.1 lb)

Shipping dimensions and weight (approximate):

- Height: 114 mm (4.5 in)
- Width: 508 mm (20.0 in)
- Depth: 432 mm (17.0 in)
- Weight: 4.1 kg (9.1 lb)

Agency approvals

The switch conforms to the following regulations:

- United States FCC 47 CFR Part 15, Subpart B, ANSI C63.4 (2003), Class A
- IEC/EN 60950-1, Second Edition
- Canada ICES-003, issue 4, Class A
- Japan VCCI, Class A
- Australia/New Zealand AS/NZS CISPR 22:2006, Class A
- Taiwan BSMI CNS13438, Class A
- CE Mark (EN55022 Class A, EN55024, EN61000-3-2, EN61000-3-3)
- CISPR 22, Class A
- China GB 9254-1998
- Turkey Communique 2004/9; Communique 2004/22
- Saudi Arabia EMC.CVG, 28 October 2002

Chassis and adapter cards

The EN2092 switches are installed in I/O bays in the rear of the Flex System chassis, as shown in the following figure. Switches are typically installed in pairs because ports on I/O adapter cards are routed to two I/O bays for redundancy and performance. The chassis supports up to four EN2092 switches.

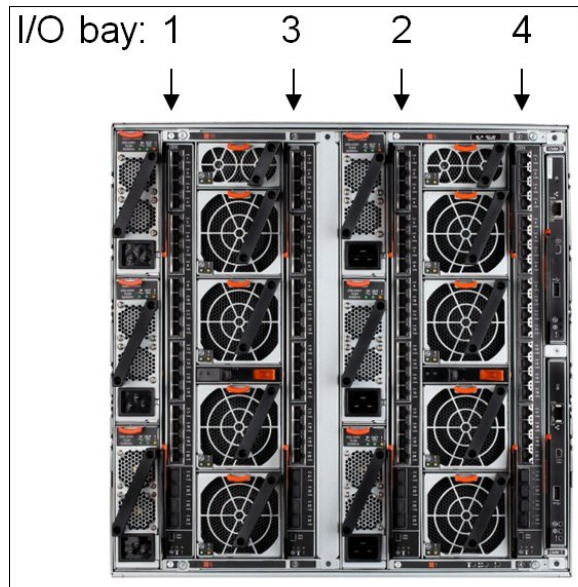


Figure 3. Location of the I/O bays in the Flex System chassis

The EN2092 switch can be installed in bays 1, 2, 3, and 4 of the Flex System chassis. A supported adapter card must be installed in a corresponding slot of the compute node. Each adapter can use up to four lanes to connect to the respective I/O module bay. The EN2092 is able to use up to two of the four lanes.

In compute nodes that have an integrated dual-port 10 GbE network interface controller (NIC), NIC's ports are routed to bays 1 and 2 with a specialized periscope connector, and the adapter card is not required. However, when needed, the periscope connector can be replaced with the adapter card. In such a case integrated NIC will be disabled.

Prior to Networking OS 7.8, with 4-port or 8-port adapters, an optional Upgrade 1 (90Y3562) was required for the switch to allow communications on four ports. With Networking OS 7.8 or later, there is no need to buy additional switch upgrades for 4-port adapters if the total number of port licenses on the switch does not exceed the number of external (upstream network ports) and internal (compute node network ports) connections used.

Notes:

- 10 GbE LOM and adapters supported by the EN2092 operate at 1 GbE speeds.
- On an 8-port adapter, only up to four ports can be used with the EN2092 switches (two adapter ports per switch, two EN2092 switches per adapter), and the remaining four ports cannot be used.

The following table shows compatibility information for the EN2092 and Flex System chassis.

Table 7. Flex System chassis compatibility

Description	Part number	Enterprise Chassis with CMM	Enterprise Chassis with CMM2	Carrier-grade Chassis with CMM2
Flex System EN2092 1Gb Ethernet Scalable Switch	49Y4294	Yes	Yes	Yes

The midplane connections between the adapters that are installed in the compute nodes to the I/O module bays in the chassis are listed in the following table. Half-wide compute nodes support up to two adapters, and full-wide compute nodes support up to four adapters.

Table 8. Adapter to I/O bay correspondence

I/O adapter slot in the compute node	Port on the adapter	Corresponding I/O module bay in the chassis			
		Bay 1	Bay 2	Bay 3	Bay 4
Slot 1	Port 1	Yes			
	Port 2		Yes		
	Port 3	Yes			
	Port 4		Yes		
Slot 2	Port 1			Yes	
	Port 2				Yes
	Port 3			Yes	
	Port 4				Yes
Slot 3 (full-wide compute nodes only)	Port 1	Yes			
	Port 2		Yes		
	Port 3	Yes			
	Port 4		Yes		
Slot 4 (full-wide compute nodes only)	Port 1			Yes	
	Port 2				Yes
	Port 3			Yes	
	Port 4				Yes

The following table lists the I/O adapters that are supported by the EN2092 1Gb Scalable Switch. 10 GbE adapters operate at 1 GbE speeds when used with this switch.

Table 9. Network adapters

Description	Part number	Feature code
10 Gb Ethernet (10 GbE adapters operate at 1 GbE speeds)		
Embedded 10Gb Virtual Fabric Adapter (2-port)*	None	None
Flex System CN4022 2-port 10Gb Converged Adapter#	88Y5920	A4K3
Flex System CN4052 2-port 10Gb Virtual Fabric Adapter	00JY800	A5RP
Flex System CN4052S 2-port 10Gb Virtual Fabric Adapter	00AG540	ATBT
Flex System CN4054 10Gb Virtual Fabric Adapter (4-port)	90Y3554	A1R1
Flex System CN4054R 10Gb Virtual Fabric Adapter (4-port)	00Y3306	A4K2
Flex System CN4054S 4-port 10Gb Virtual Fabric Adapter	00AG590	ATBS
Flex System CN4058S 8-port 10Gb Virtual Fabric Adapter	94Y5160	A4R6
1 Gb Ethernet		
Embedded 1 Gb Ethernet controller (2-port)**	None	None
Flex System EN2024 4-port 1Gb Ethernet Adapter	49Y7900	A10Y

* The Embedded 10Gb Virtual Fabric Adapter is built into select compute nodes.

The CN4022 supports 1 Gbps links with firmware 2.4.1D1 and driver nx2-2.2.5f-1.710.11 or later levels. For additional information, refer to <https://www-947.ibm.com/support/entry/myportal/docdisplay?Indocid=migr-5094970>.

** The Embedded 1 Gb Ethernet controller is built into select compute nodes.

Network connectivity

The following table lists the network switches that are offered by Lenovo that can be used with the EN2092 in Flex System network connectivity solutions.

Table 10. Network switches

Description	Part number
1 Gb Ethernet switches	
Lenovo RackSwitch G7028 (Rear to Front)	7159BAX
Lenovo RackSwitch G7052 (Rear to Front)	7159CAX
Lenovo RackSwitch G8052 (Rear to Front)	7159G52
10 Gb Ethernet switches	
Lenovo RackSwitch G8124E (Rear to Front)	7159BR6
Lenovo RackSwitch G8264 (Rear to Front)	7159G64
Lenovo RackSwitch G8272 (Rear to Front)	7159CRW
Lenovo RackSwitch G8296 (Rear to Front)	7159GR6
10 Gb Converged switches	
Lenovo RackSwitch G8264CS (Rear to Front)	7159DRX
40 Gb Ethernet switches	
Lenovo RackSwitch G8332 (Rear to Front)	7159BRX

For more information, see the list of Product Guides in the Top-of-rack Switches category:

<http://lenovopress.com/servers/options/switches>

Storage connectivity

The EN2092 switch can be used for external NAS and iSCSI SAN storage connectivity.

NAS storage connectivity

The following external NAS storage systems are offered by Lenovo that can be used with the EN2092 switch in 1 Gb and 10 Gb Ethernet NAS storage connectivity solutions:

- Lenovo Storage N3310
- Lenovo Storage N4610

For more information, see the list of Product Guides in the Network-Attached Storage category:

<http://lenovopress.com/storage/nas>

iSCSI storage connectivity

The following table lists the external SAN storage systems that are offered by Lenovo that can be used with the EN2092 switch in 1 Gb and 10 Gb iSCSI storage connectivity solutions.

Table 11. External storage systems

Description	Part number
Lenovo Storage S2200	
Lenovo Storage S2200 LFF Chassis FC/iSCSI Single Controller, Rack Kit, 9x5NBD	64114B1
Lenovo Storage S2200 LFF Chassis FC/iSCSI Dual Controller, Rack Kit, 9x5NBD	64114B2
Lenovo Storage S2200 SFF Chassis FC/iSCSI Single Controller, Rack Kit, 9x5NBD	64114B3
Lenovo Storage S2200 SFF Chassis FC/iSCSI Dual Controller, Rack Kit, 9x5NBD	64114B4
Lenovo Storage S3200	
Lenovo Storage S3200 LFF Chassis FC/iSCSI Single Controller, Rack Kit, 9x5NBD	64116B1
Lenovo Storage S3200 LFF Chassis FC/iSCSI Dual Controller, Rack Kit, 9x5NBD	64116B2
Lenovo Storage S3200 SFF Chassis FC/iSCSI Single Controller, Rack Kit, 9x5NBD	64116B3
Lenovo Storage S3200 SFF Chassis FC/iSCSI Dual Controller, Rack Kit, 9x5NBD	64116B4
IBM Storwize	
IBM Storwize V3500 3.5-inch Dual Control Storage Controller Unit	6096CU2
IBM Storwize V3500 2.5-inch Dual Control Storage Controller Unit	6096CU3
IBM Storwize V3700 3.5-inch Storage Controller Unit	6099L2C
IBM Storwize V3700 2.5-inch Storage Controller Unit	6099S2C
IBM Storwize V3700 2.5-inch DC Storage Controller Unit	6099T2C
IBM Storwize V5000 LFF Control Enclosure	6194L2C
IBM Storwize V5000 SFF Control Enclosure	6194S2C
IBM Storwize V7000 2.5-inch Storage Controller Unit	6195SC5

For more information, see the list of Product Guides in the following categories:

- Lenovo Storage
<https://lenovopress.com/storage/san/lenovo>
- IBM Storage
<https://lenovopress.com/storage/san/ibm>

Related publications and links

For more information, see the following Flex System EN2092 1Gb Ethernet Scalable Switch product publications that are available from the [Flex System Information Center](#):

- *Flex System EN2092 1Gb Ethernet Scalable Switch Installation Guide*
- *Flex System EN2092 1Gb Ethernet Scalable Switch Application Guide*
- *Flex System EN2092 1Gb Ethernet Scalable Switch Industry Standard CLI Command Reference*

For additional Flex System information, see these resources:

- *Flex System Enterprise Chassis Product Guide*:
<http://lenovopress.com/tips0865>
- *Flex System Products and Technology*, SG24-8255:
<http://lenovopress.com/sg248255>
- *Flex System Interoperability Guide*:
<http://lenovopress.com/fsig>
- *Product Guides for Flex System compute nodes and options*:
<http://lenovopress.com/flexsystem>

Related product families

Product families related to this document are the following:

- [1 Gb Embedded Connectivity](#)
- [Blade Networking Modules](#)

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