

IBM Flex System EN4054 4-port 10Gb Ethernet Adapter

IBM Redbooks Product Guide

The IBM Flex System EN4054 4-port 10Gb Ethernet Adapter is for Power System-based Flex System compute nodes that are based on an Emulex chipset. It supports connectivity to 1 Gb and 10 Gb Ethernet Flex System switches.

Figure 1 shows the adapter.

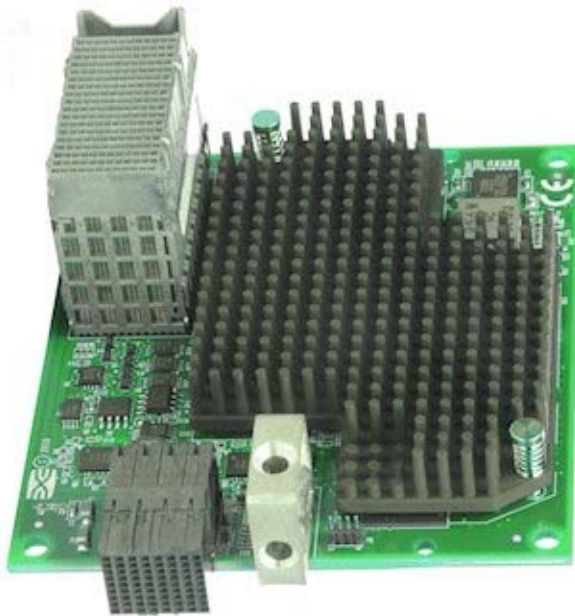


Figure 1. IBM Flex System EN4054 4-port 10Gb Ethernet Adapter

Did you know?

This EN4054 is based on industry-standard PCIe architecture and offers the flexibility to operate as a quad-port 10Gb or 1Gb Ethernet device. The adapter connects to any of the integrated Flex System Ethernet switches and I/O modules that are installed inside the Flex System Enterprise Chassis. This connectivity is via the internal midplane of the chassis and eliminates the need for transceivers or DAC cables between the adapter and switch.

Ordering information

IBM Flex System is a new category of computing that integrates multiple server architectures, networking, storage, and system management capability into a single system that is easy to deploy and manage. IBM Flex System has full built-in virtualization support of servers, storage, and networking to speed provisioning and increased resiliency. In addition, it supports open industry standards, such as operating systems, networking and storage fabrics, virtualization, and system management protocols, to easily fit within existing and future data center environments. IBM Flex System is scalable and extendable with multi-generation upgrades to protect and maximize IT investments.

The following table lists the ordering information for the adapter.

Table 1. Ordering information

Description	Feature code
IBM Flex System EN4054 4-port 10Gb Ethernet Adapter	1762

Features

The adapter includes the following features:

- Four-port 10 Gb Ethernet adapter
- Dual-ASIC Emulex BladeEngine 3 (BE3) controller
- Connection to 1 Gb or 10 Gb data center infrastructure (1 Gb and 10 Gb auto-negotiation)
- PCI Express 2.0 x8 host interface
- Full-duplex (FDX) capability
- Bus-mastering support
- Direct memory access (DMA) support
- Preboot Execution Environment (PXE) support
- IPv4/IPv6 TCP, UDP checksum offload:
 - Large send offload (LSO)
 - Large receive offload
 - Receive side scaling (RSS)
 - IPv4 TCP Chimney Offload
 - TCP Segmentation Offload
- VLAN insertion and extraction
- Jumbo frames up to 9000 bytes
- Load balancing and failover support, including adapter fault tolerance (AFT), switch fault tolerance (SFT), adaptive load balancing (ALB), teaming support, and IEEE 802.3ad
- Enhanced Ethernet (draft):
 - Enhanced Transmission Selection (ETS) (P802.1Qaz)
 - Priority-based Flow Control (PFC) (P802.1Qbb)
 - Data Center Bridging Capabilities eXchange Protocol, CIN-DCBX and CEE-DCBX (P802.1Qaz)
- Supports Serial over LAN (SoL)
- Total Max Power: 23.1 W

Supported servers

The following table lists the IBM Flex System compute nodes that support the adapters.

Table 2. Supported servers

Description	Feature code	p24L (1457)	p260 (7895)	p270 (7954)	p460 (7895)
EN4054 4-port 10Gb Ethernet Adapter	1762	Y	Y	Y	Y

For the latest information about the expansion cards that are supported by each blade server type, see this website:

<http://ibm.com/servers/eserver/serverproven/compat/us/>

I/O adapter cards are installed in the slot in supported servers, such as the p270, as highlighted in the following figure.

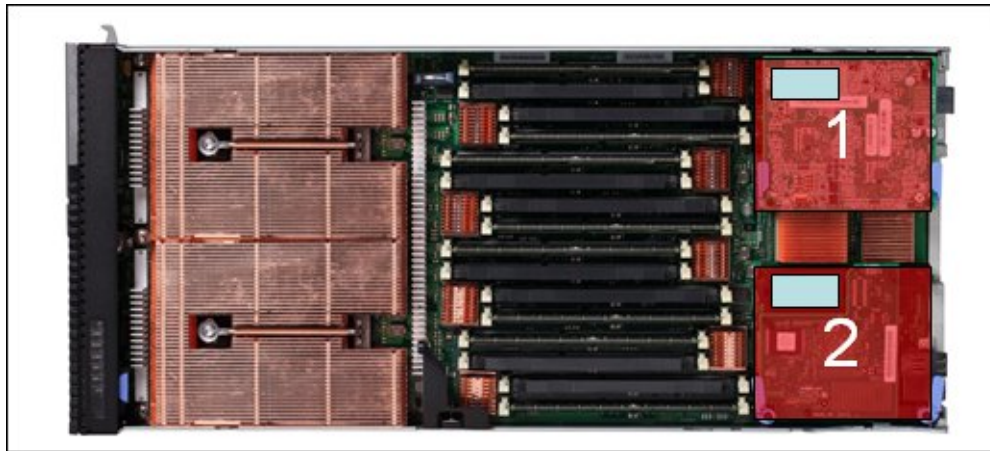


Figure 2. Location of the I/O adapter slots in the IBM Flex System p270 Compute Node

Supported I/O modules

These adapters can be installed in any I/O adapter slot of a supported IBM Flex System compute node. One or two compatible 1 Gb or 10 Gb I/O modules must be installed in the corresponding I/O bays in the chassis. The following table lists the switches that are supported. When connected to the 1 Gb switch, the adapter operates at 1 Gb speeds. When connected to the 40 Gb switch, the adapter operates at 10 Gb speeds.

To maximize the number of usable adapter ports, you also might need to order switch upgrades to enable more ports, as listed in the following table. Alternatively, for CN4093, EN4093R, and S14093 switches, you can use Flexible Port Mapping, which is a new feature of Networking OS 7.8 that allows you to minimize the number of upgrades needed. For more information, see the Product Guides for the switches that are available at this website:

<http://www.redbooks.ibm.com/portals/flexsystem?Open&page=pg&cat=switches>

The table also specifies how many ports of the adapter are supported after the indicated upgrades are applied. Switches should be installed in pairs to maximize the number of ports enabled and to provide redundant network connections.

Table 3. I/O modules and upgrades for use with the EN4054 adapter

Description	Feature code (e-config)	Port count (per pair of switches)
IBM Flex System EN6131 40Gb Ethernet Switch	ESW6	2
IBM Flex System Fabric CN4093 10Gb Converged Scalable Switch + CN4093 10Gb Converged Scalable Switch (Upgrade 1)	ESW2 ESU1	4
IBM Flex System Fabric EN4093R 10Gb Scalable Switch + EN4093 10Gb Scalable Switch (Upgrade 1)	ESW7 3596	4
IBM Flex System Fabric EN4093 10Gb Scalable Switch + EN4093 10Gb Scalable Switch (Upgrade 1)	3593 3596	4
IBM Flex System EN4091 10Gb Ethernet Pass-thru	3700	2
IBM Flex System Fabric SI4093 System Interconnect Module + SI4093 System Interconnect Module (Upgrade 1)	ESWA ESW8	4
IBM Flex System EN2092 1Gb Ethernet Scalable Switch + EN2092 1Gb Ethernet Scalable Switch (Upgrade 1)	3598 3594	4
Cisco Nexus B22 Fabric Extender for IBM Flex System	ESWB	2
IBM Flex System EN4023 10Gb Scalable Switch (Base switch has 24 port licenses; Upgrades 1 & 2 may be needed)	ESWD	4

* This column indicates the number of adapter ports that will be active if indicated upgrades are installed.

The following table shows the connections between adapters that are installed in the compute nodes to the switch bays in the chassis.

Table 4. Adapter to I/O bay correspondence

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

* Ports 3 and 4 require Upgrade 1 of the EN4093 10Gb or the EN2092 1Gb switch. The EN4091 Pass-thru and Cisco B22 supports only ports 1 and 2 (and only when two I/O modules are installed).

The connections between the adapters that are installed in the compute nodes to the switch bays in the chassis are shown in the following figure. The figure shows half-wide servers, such as the p270 with two adapters, and full-wide servers, such as the p460 with four adapters.

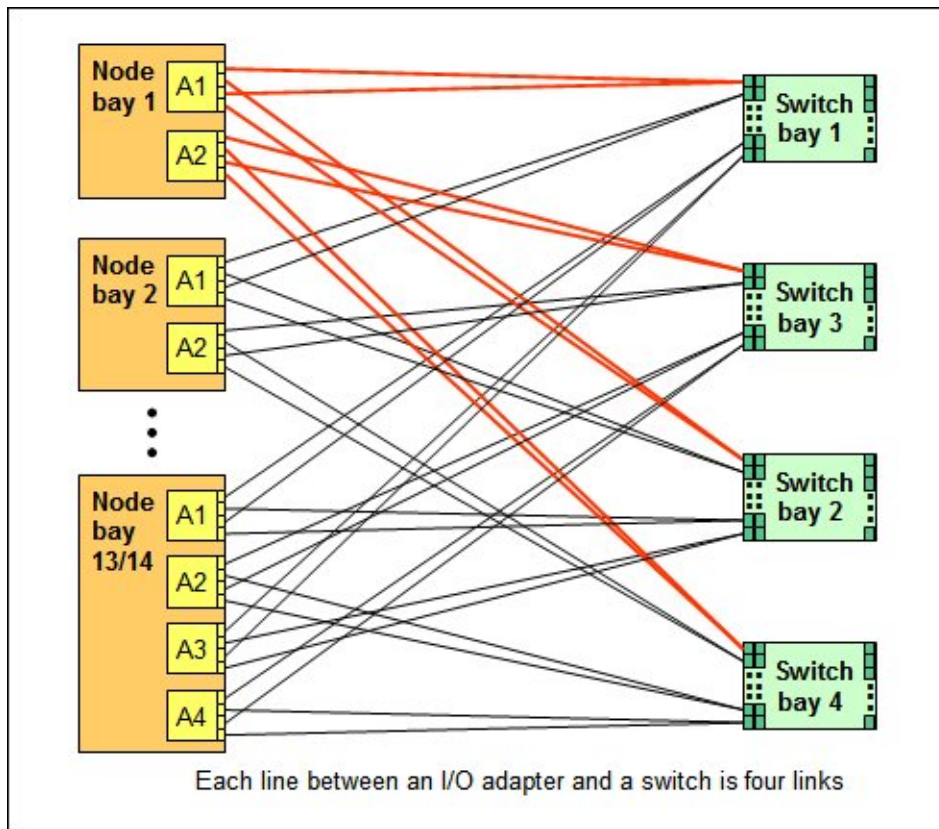


Figure 3. Logical layout of the interconnects between I/O adapters and I/O modules

Operating system support

The EN4054 4-port 10Gb Ethernet Adapter supports the following operating systems:

- AIX 5L for POWER Version 5.3
- AIX Version 6.1
- AIX Version 7.1
- IBM i 6.1
- IBM i 7.1
- IBM Virtual I/O Server
- Red Hat Enterprise Linux 5 for IBM POWER
- Red Hat Enterprise Linux 6 for IBM POWER
- SUSE LINUX Enterprise Server 11 for IBM POWER

Support for operating systems is based on the combination of the expansion card and the blade server on which it is installed. For more information about the specific versions and service packs that are supported, see the following IBM ServerProven website. Select the blade server, and then select the expansion card to see the supported operating systems:

<http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/>

Warranty

There is a 1-year, customer-replaceable unit (CRU) limited warranty. When installed in a server, these adapters assume your system's base warranty and any IBM ServicePac® upgrade.

Physical specifications

The adapter features the following dimensions and weight:

- Width: 100 mm (3.9 in)
- Depth: 80 mm (3.1 in)
- Weight: 13 g (0.3 lb)

The adapter features the following shipping dimensions and weight (approximate):

- Height: 58 mm (2.3 in)
- Width: 229 mm (9.0 in)
- Depth: 208 mm (8.2 in)
- Weight: 0.4 kg (0.89 lb)

Regulatory compliance

The adapter conforms to the following standards:

- United States FCC 47 CFR Part 15, Subpart B, ANSI C63.4 (2003), Class A
- United States UL 60950-1, Second Edition
- IEC/EN 60950-1, Second Edition
- FCC - Verified to comply with Part 15 of the FCC Rules, Class A
- Canada ICES-003, issue 4, Class A
- UL/IEC 60950-1
- CSA C22.2 No. 60950-1-03
- Japan VCCI, Class A
- Australia/New Zealand AS/NZS CISPR 22:2006, Class A
- IEC 60950-1 (CB Certificate and CB Test Report)
- Taiwan BSMI CNS13438, Class A
- Korea KN22, Class A; KN24
- Russia GOST ME01, IEC-60950-1, GOST R 51318.22-99, GOST R 51318.24-99, GOST R 51317.3.2-2006, and GOST R 51317.3.3-99
- IEC 60950-1 (CB Certificate and CB Test Report)
- CE Mark (EN55022 Class A, EN60950-1, EN55024, EN61000-3-2, and EN61000-3-3)
- CISPR 22, Class A

Popular configurations

The adapters can be used in various configurations. The following figure shows two EN4054 4-port 10Gb Ethernet Adapters installed in both slots of the p270, which in turn is installed in the chassis. The chassis also has four IBM Flex System Fabric EN4093R 10Gb Scalable Switches, each with Upgrade 1 installed to enable 28 internal ports.

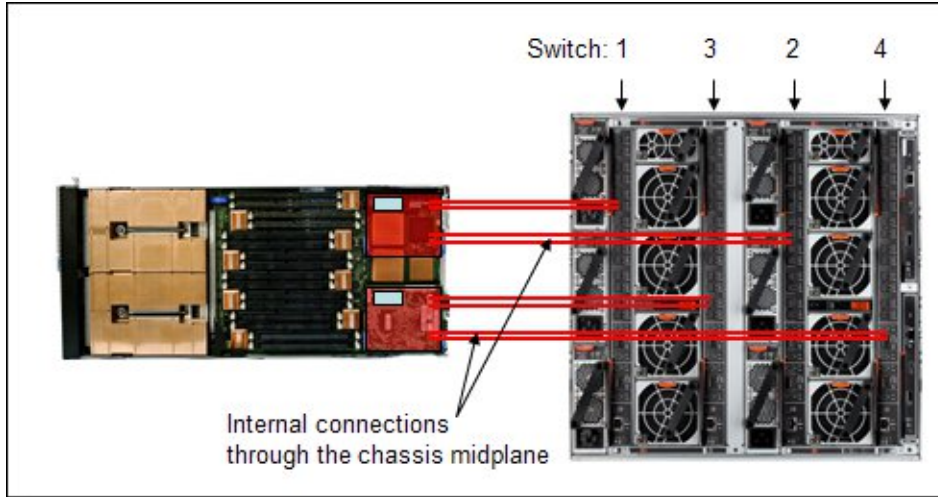


Figure 4. Example configuration

The following table lists the parts that are used in the configuration.

Table 5. Components that are used when the adapter is connected to the 10 GbE switches

Machine type / Feature code	Description	Quantity
7954-24X	IBM Flex System p270 Compute Node or other supported server	1 - 14
1762	IBM Flex System EN4054 4-port 10Gb Ethernet Adapter	2 per server
7893-92X	IBM Flex System Enterprise Chassis	1
ESW7	IBM Flex System Fabric EN4093R 10Gb Scalable Switch	4
3596	IBM Flex System Fabric EN4093 10Gb Scalable Switch (Upgrade 1)	4

Related publications

For more information, see the following resources:

- IBM Flex System Product Guides for Switches:
<http://www.redbooks.ibm.com/portals/flexsystem?Open&page=pg&cat=switches>
- IBM Flex System Product Guides for Servers and Chassis:
<http://www.redbooks.ibm.com/portals/flexsystem?Open&page=pg&cat=nodes>
- IBM Flex System Information Center (User's Guides for servers and options):
<http://publib.boulder.ibm.com/infocenter/flexsys/information>
- *IBM Flex System Interoperability Guide*.
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<http://www.redbooks.ibm.com/abstracts/sg247984.html>
- IBM Configurator for e-business (e-config):
<http://ibm.com/services/econfig/>
- ServerProven for IBM Flex System:
<http://ibm.com/systems/info/x86servers/serverproven/compat/us/flexsystems.html>

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