

## IBM Flex System FC5022 2-port 16Gb FC Adapter

### IBM Redbooks Product Guide

The network architecture on the IBM Flex System™ platform has been specifically designed to address network challenges, giving you a very scalable way to integrate, optimize and automate your data center. The IBM Flex System FC5022 2-port 16Gb FC Adapter enables high-speed access for compute nodes to an external storage area network (SAN). This adapter is based on Brocade architecture, and offers end-to-end 16 Gb connectivity to SAN. It can auto-negotiate, and also work at 8 Gb and 4 Gb speeds. It has enhanced features like N\_Port trunking and N\_Port ID Virtualization (NPIV) as well as boot-from-the-SAN with automatic LUN discovery and end-to-end Server Application Optimization (SAO).

Figure 1 shows the IBM Flex System FC5022 2-port 16Gb FC Adapter.



Figure 1. IBM Flex System FC5022 2-port 16Gb FC Adapter

### Did you know?

The FC5022 adapter is designed to work best with the IBM Flex System FC5022 16Gb SAN Scalable Switch and together, these deliver considerable value by simplifying the deployment of server and SAN resources, reducing infrastructure and operational costs, and maximizing server and SAN reliability, availability, and resiliency.

Even with an 8 Gb Fibre Channel SAN fabric, having 16 Gb adapters and switches in the IBM Flex System means that you can eliminate any oversubscription from the SAN fabric to maximize application throughput. Having 16 Gb adapters and switches also offers future investment protection by enabling the density of virtual machines (VMs) to be increased on a compute node and by providing performance head room to support demanding solid-state drive storage technologies.

## Part number information

Table 1 shows the part number to order this card.

Table 1. Part number and feature code for ordering

Description	Part number	Feature code (x-config)	Feature code (e-config)
IBM Flex System FC5022 2-port 16Gb FC Adapter	88Y6370	A1BP	EC2B

The part number includes the following items:

- One IBM Flex System FC5022 2-port 16Gb FC Adapter
- A documentation CD containing the adapter user's guide
- The *IBM@ Important Notices* document

## Features

The IBM Flex System FC5022 2-port 16Gb FC Adapter has the following features:

- 16 Gbps Fibre Channel
  - Utilize 16 Gbps bandwidth to eliminate internal oversubscription
  - Investment protection with the latest Fibre Channel technologies
  - Reduce the number of ISL external switch ports, optics, cables and power
- Over 500,000 IOPS per port -- maximizes transaction performance and density of VMs per compute node
- Achieves performance of 330,000 IOPS for email exchange and 205,000 IOPS for SQL Database
- Boot from SAN allows the automation SAN Boot LUN discovery to simplify boot from SAN and reduce image management complexity
- Brocade Server Application Optimization (SAO) provides Quality of Service (QoS) levels assignable to VM applications
- Direct I/O enables native (direct) I/O performance by allowing VMs to bypass the hypervisor and communicate directly with the adapter
- Brocade Network Advisor simplifies and unifies the management of Brocade adapter, SAN, and LAN resources through a single pane-of-glass
- LUN Masking, an Initiator-based LUN masking for storage traffic isolation
- N\_Port Id Virtualization (NPIV) allows multiple host initiator N\_Ports to share a single physical N\_Port, dramatically reducing SAN hardware requirements
- Target Rate Limiting (TRL) throttles data traffic when accessing slower speed storage targets to avoid back pressure problems
- Unified driver across all Brocade-based IBM adapter products with automated version synchronization capability
- RoHS-6 compliant

## Supported servers

The following table lists the IBM Flex System compute nodes that support the FC5022 2-port 16Gb FC Adapter.

Table 2. Supported servers

Description	Part number	x220	x240	x440	p24L	p260	p460
IBM Flex System FC5022 2-port 16Gb FC Adapter	88Y6370	Yes	Yes	Yes	No	No	No

See the IBM ServerProven® website for the latest information about the expansion cards that are supported by each blade server type:

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

I/O adapter cards are installed in the slot in supported servers, such as the x240, as highlighted in the following figure.

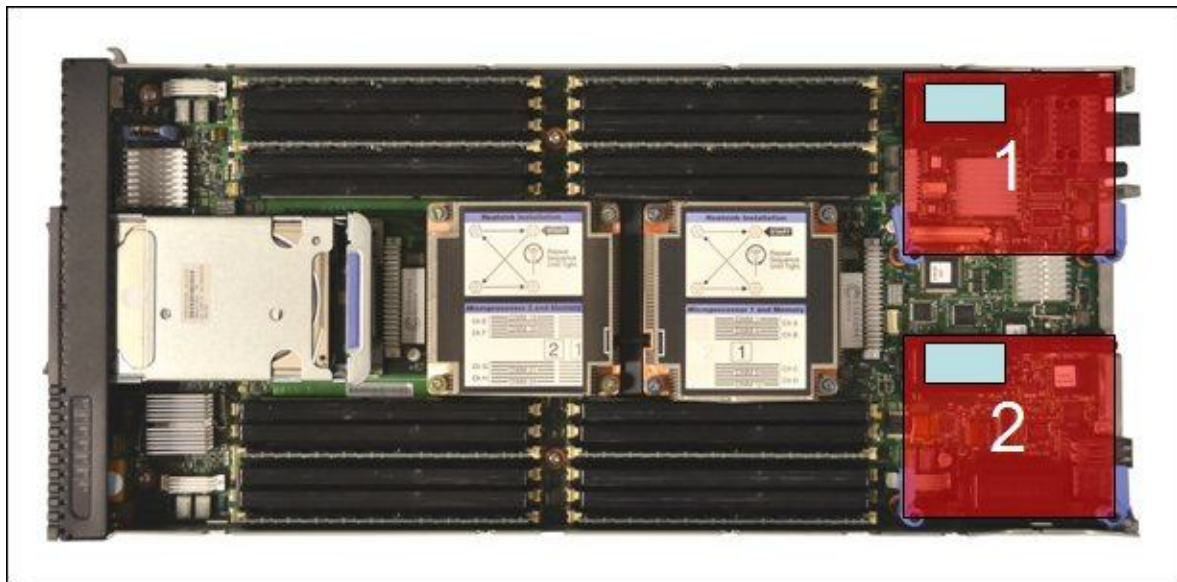


Figure 2. Location of the I/O adapter slots in the IBM Flex System x240 Compute Node

## Supported I/O modules

The FC5022 2-port 16Gb FC Adapter supports the I/O modules listed in the following table. One or two compatible switches must be installed in the corresponding I/O bays in the chassis. Installing two switches means that both ports of the adapter are enabled.

Table 3. I/O modules supported with the FC5022 2-port 16Gb FC Adapter

Description	Part number	Support the FC5022 adapter
IBM Flex System FC3171 8Gb SAN Switch	69Y1930	No
IBM Flex System FC3171 8Gb SAN Pass-thru	69Y1934	No
IBM Flex System FC5022 16Gb SAN Scalable Switch	88Y6374	Yes
IBM Flex System FC5022 24-port 16Gb SAN Scalable Switch	00Y3324	Yes
IBM Flex System FC5022 24-port 16Gb ESB SAN Scalable Switch	90Y9356	Yes

The following table shows the connections between adapters installed in the compute nodes and 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
Slot 2	Port 1	Module bay 3
	Port 2	Module bay 4

The connections between the adapters installed in the compute nodes and the switch bays in the chassis are shown diagrammatically in the following figure.

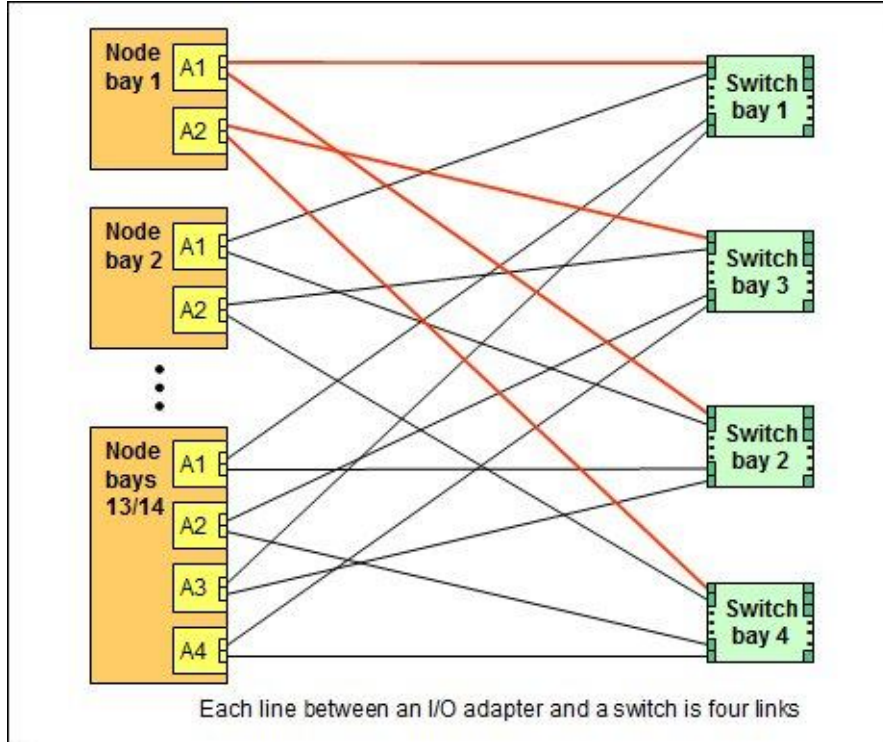


Figure 3. Logical layout of the interconnects between I/O adapters and I/O modules

## Supported operating systems

The FC5022 2-port 16Gb FC Adapter supports the following 64-bit operating systems:

- Microsoft Windows Server 2008 HPC Edition
- Microsoft Windows Server 2008 R2
- Microsoft Windows Server 2008, Datacenter x64 Edition
- Microsoft Windows Server 2008, Enterprise x64 Edition
- Microsoft Windows Server 2008, Standard x64 Edition
- Microsoft Windows Server 2008, Web x64 Edition
- Red Hat Enterprise Linux 5 Server with Xen x64 Edition
- Red Hat Enterprise Linux 5 Server x64 Edition
- Red Hat Enterprise Linux 6 Server x64 Edition
- SUSE LINUX Enterprise Server 10 for AMD64/EM64T
- SUSE LINUX Enterprise Server 11 for AMD64/EM64T
- SUSE LINUX Enterprise Server 11 with Xen for AMD64/EM64T
- VMware ESX 4.1
- VMware ESXi 4.1
- VMware vSphere 5
- VMware vSphere 5.1

See the IBM ServerProven website for the latest information about the specific versions and service packs that are supported:

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

## 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, 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, EN61000-3-3)
- CISPR 22, Class A

## Physical specifications

The dimensions and weight of the adapter are as follows:

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

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)

## Popular configurations

The FC5022 2-port 16Gb FC Adapter can be used in various configurations. The following figure shows the I/O installed in an I/O adapter slot 2 of the x240, which in turn is installed in the chassis. The chassis is connected to an IBM System Storage V7000. The RAID functionality is provided by the external storage system.

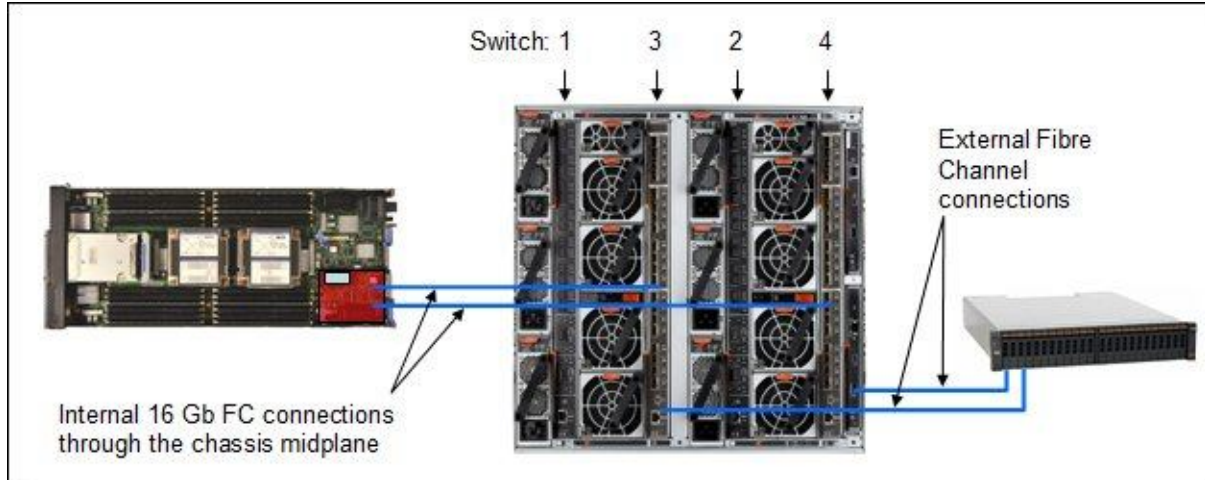


Figure 4. Example configuration

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

Table 5. Components used when connecting the FC5022 2-port 16Gb FC Adapter to external disk storage

Part number/machine type	Description	Quantity
8737	IBM Flex System x240 Compute Node or other supported server	1 to 14
88Y6370	FC5022 2-port 16Gb FC Adapter	1 per server
8721-A1x	IBM Flex System Enterprise Chassis	1
90Y9356	IBM Flex System FC5022 24-port 16Gb ESB SAN Scalable Switch	1 or 2
88Y6393	Brocade 16Gb SFP+ Optical Transceiver	1 per FC cable
39M5698	IBM 1m LC-LC Fiber Channel Cable	1 for each V7000 connection
2076-124	IBM System Storage V7000	1

This configuration also requires additional V7000 features, such as drives and software licenses. These are not listed in the table.

## Related publications

For more information, see the following resources:

- *IBM Flex System FC5022 16Gb SAN Scalable Switch Product Guide*  
<http://www.redbooks.ibm.com/abstracts/tips0870.html>
- *IBM Flex System x240 Compute Node Product Guide*  
<http://www.redbooks.ibm.com/abstracts/tips0860.html>
- *FC5022 2-port 16Gb FC Adapter Installation and User Guide*  
<http://www.ibm.com/support>
- IBM Redbooks® publication *IBM Flex System Products and Technology*, SG24-7984  
<http://www.redbooks.ibm.com/abstracts/sg247984.html>
- IBM Redbooks Product Guides for IBM Flex System servers and options  
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- *IBM Flex System Interoperability Guide*  
<http://www.ibm.com/support>



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