



**IBM Flex System FC5022 2-Port 16Gb FC Adapter**

# **User's Guide**





**IBM Flex System FC5022 2-Port 16Gb FC Adapter**

# **User's Guide**

Note: Before using this information and the product it supports, read the general information in Appendix C, "Notices," the Safety Information and Environmental Notices and User Guide documents on the IBM Documentation CD, and the Warranty Information document that comes with the product.

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# Safety

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Before installing this product, read the Safety Information.

قبل تركيب هذا المنتج، يجب قراءة الملاحظات الأمنية

Antes de instalar este produto, leia as Informações de Segurança.

在安装本产品之前，请仔细阅读 **Safety Information** (安全信息)。

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

Ennen kuin asennat tämän tuotteen, lue turvaohjeet kohdasta Safety Information.

Avant d'installer ce produit, lisez les consignes de sécurité.

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

Πριν εγκαταστήσετε το προϊόν αυτό, διαβάστε τις πληροφορίες ασφάλειας (safety information).

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

A termék telepítése előtt olvassa el a Biztonsági előírásokat!

Prima di installare questo prodotto, leggere le Informazioni sulla Sicurezza.

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

Пред да се инсталира овој продукт, прочитајте информацијата за безбедност.

Les sikkerhetsinformasjonen (Safety Information) før du installerer dette produktet.

Przed zainstalowaniem tego produktu, należy zapoznać się z książką "Informacje dotyczące bezpieczeństwa" (Safety Information).

Antes de instalar este produto, leia as Informações sobre Segurança.

Перед установкой продукта прочтите инструкции по технике безопасности.

Pred inštaláciou tohto zariadenia si pečítajte Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

Antes de instalar este producto, lea la información de seguridad.

Läs säkerhetsinformationen innan du installerar den här produkten.

# Safety statements

## Important:

Each caution and danger statement in this document is labeled with a number. This number is used to cross reference an English-language caution or danger statement with translated versions of the caution or danger statement in the *Safety Information* document.

For example, if a caution statement is labeled “Statement 1,” translations for that caution statement are in the *Safety Information* document under “Statement 1.”

Be sure to read all caution and danger statements in this document before you perform the procedures. Read any additional safety information that comes with the server or optional device before you install the device.

This device is intended for use with UL Listed IBM devices.

## Statement 1:



## DANGER

Electrical current from power, telephone, and communication cables is hazardous.

### To avoid a shock hazard:

- Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.
- Connect all power cords to a properly wired and grounded electrical outlet.
- Connect to properly wired outlets any equipment that will be attached to this product.
- When possible, use one hand only to connect or disconnect signal cables.
- Never turn on any equipment when there is evidence of fire, water, or structural damage.
- Disconnect the attached power cords, telecommunications systems, networks, and modems before you open the device covers, unless instructed otherwise in the installation and configuration procedures.
- Connect and disconnect cables as described in the following table when installing, moving, or opening covers on this product or attached devices.

### To Connect:

1. Turn everything OFF.
2. First, attach all cables to devices.
3. Attach signal cables to connectors.
4. Attach power cords to outlet.
5. Turn device ON.

### To Disconnect:

1. Turn everything OFF.
2. First, remove power cords from outlet.
3. Remove signal cables from connectors.
4. Remove all cables from devices.



Statement 3:



**CAUTION:**

When laser products (such as CD-ROMs, DVD drives, fiber optic devices, or transmitters) are installed, note the following:



**DANGER**

Some laser products contain an embedded Class 3A or Class 3B laser diode. Note the following.

Laser radiation when open. Do not stare into the beam, do not view directly with optical instruments, and avoid direct exposure to the beam.



Class 1 Laser Product  
Laser Klasse 1  
Laser Klass 1  
Luokan 1 Laserlaite  
Appareil À Laser de Classe 1

Statement 8:



**CAUTION:**

Never remove the cover on a power supply or any part that has the following label attached.



Hazardous voltage, current, and energy levels are present inside any component that has this label attached. There are no serviceable parts inside these components. If you suspect a problem with one of these parts, contact a service technician.



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

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The IBM Flex System™ FC5022 2-Port 16Gb FC Adapter provides two Fibre Channel connections capable of providing 16 Gbps or 8 Gbps to devices on Fibre Channel (FC) SANs. FC communications are routed through the adapter ports to the system chassis midplane and onto Fibre Channel switches installed in the chassis. Depending on the system configuration, the adapter provides up to 16 Gbps of full-duplex line-rate bandwidth per port.

This User's Guide contains information and instructions for installing the adapter, updating the firmware, configuring the adapter, and solving problems. See the *IBM Flex System Installation and Service Guide* that comes with the compute node to install the adapter; then, return to this User's Guide for the information and instructions needed to complete the installation.

This User's Guide contains the following instructions and information for the adapter:

- Adapter features and specifications.
- Installing the adapter.
- Installing and updating the adapter boot code, device drivers, utilities, and management software.
- Using the Brocade BIOS Configuration utility, the Host Connectivity Manager (HCM), and Brocade Command Line Utility (BCU) to configure the adapter.
- Performing basic troubleshooting tasks and resolving problems.
- Important notices and safety statements.
- Getting help, service, and technical assistance.

(For information about the types of compatible devices available for IBM products, contact your IBM marketing representative or authorized reseller. For a list of supported optional devices, see <http://www.ibm.com/servers/eserver/serverproven/compat/us/>.)

## Notes:

1. Unless otherwise stated, references to the IBM Flex System FC5022 2-Port 16Gb FC Adapter is also referred to as “the adapter” throughout this document.
2. Changes are made periodically to the IBM® website. Procedures for locating firmware and documentation might vary slightly from what is described in this document.
3. The illustrations in this document might differ slightly from your hardware.
4. The screens that are described or referenced in this document might differ slightly from the screens that are displayed by your system. Screen content varies according to the type of IBM Flex System chassis and the firmware versions and options that are installed.

## Related documentation

This User's Guide contains setup and installation instructions for the adapter and general information about the adapter, including how to configure, update, and troubleshoot the adapter, and how to get help. For the most up-to-date product documentation for all of your IBM Flex System products, go to the IBM Flex System Information Center at the following location:

<http://publib.boulder.ibm.com/infocenter/flexsys/information/index.jsp>.

The following IBM Flex System documentation is available:

- *IBM Flex System network device User's Guides*  
These documents contain detailed information about installing, configuring, updating, and troubleshooting specific IBM Flex System network devices, which include network switches and adapters.
- *IBM Flex System Chassis Management Module Command-Line Interface Reference Guide*  
This document explains how to use the Chassis Management Module command-line interface (CLI) to directly access management functions. The command-line interface also provides access to the text-console command prompt on each compute node through a Serial over LAN (SOL) connection.
- *IBM Flex System Enterprise Chassis Installation and Service Guide*  
This document contains hardware installation instructions for the switches and other components that install in the IBM Flex System chassis.
- *IBM Flex System Chassis Management Module User's Guide*  
This document explains how to use the Chassis Management Module user interface to manage chassis components.
- *IBM Flex System Manager System Management Guide*  
This document explains how to use the IBM Flex System Manager user interface to manage chassis components.
- *Environmental Notices and User Guide*  
This document is provided on the IBM Notices for Network Devices CD, and it contains translated environmental notices.
- *Safety Information*  
This document is provided on the IBM Notices for Network Devices CD, and it contains translated caution and danger statements. Each caution and danger statement that appears in the documentation has a number that you can use to locate the corresponding statement in your language in the Safety Information document.
- *Warranty Information*  
This ships with your product provides specific warranty information.

For instructions to install the IBM Flex System FC5022 2-Port 16Gb FC Adapter on the compute node, see the *IBM Flex System Installation and Service Guide* that comes with the compute node.

For other information on the IBM Flex System FC5022 2-Port 16Gb FC Adapter, refer to sections on the Brocade 1867 adapter in documentation located at [www.brocade.com/adapters-ibm-flex](http://www.brocade.com/adapters-ibm-flex). The following publications are available:

- *Brocade Adapters Installation and Reference Manual*. See the following chapters and information:
  - Product Overview chapter  
This chapter provides detailed information on hardware and software features, driver packages, boot installation packages, and operating system support.
  - Specifications chapter  
This chapter provides complete hardware specifications, including environmental and power information.
  - Boot Code chapter  
This chapter describes host boot support available on the adapter and provides an introduction to boot over SAN. It also includes procedures to update adapter boot code, configure boot over SAN, and configure fabric-based boot over SAN. Use this chapter when configuring a host to boot its operating system from a boot device located somewhere on the SAN instead of the host's local disk or direct-attached storage.
  - Adapter Configuration appendix.  
This appendix is optional for expert network administrators, who need to modify values for adapter instance-specific persistent and driver-level configuration parameters.
- *Brocade Adapters Administrator's Guide*. Refer to this guide for details on the Brocade Command Line Utility (BCU) commands and the Host Connectivity Manager (HCM) application.
- *Brocade Adapters Troubleshooting Guide*. This guide contains complete information on troubleshooting problems for all Brocade adapter models.

Download the following Brocade publications referenced in this User's Guide through <http://ibm.brocadeassist.com/public/FabricOSv7xRelease>. On this website, select the **Documentation** tab, then select **Download by** Fabric Operating System 7.0.0. Note that Fabric OS is the operating system for the Fibre Channel switch.

- *Brocade Fabric OS Administrator's Guide*
- *Brocade Network Advisor SAN User Manual*

## Notices and statements in this document

The caution and danger statements in this document are also in the multilingual *Safety Information* document, which is provided on the *IBM Notices for Network Device* CD. Each statement is numbered for reference to the corresponding statement in your language in the *Safety Information* document.

The following notices and statements are used in this document:

- **Note:** These notices provide important tips, guidance, or advice.
- **Important:** These notices provide information or advice that might help you avoid inconvenient or problem situations.
- **Attention:** These notices indicate potential damage to programs, devices, or data. An attention notice is placed just before the instruction or situation in which damage could occur.
- **Caution:** These statements indicate situations that can be potentially hazardous to you. A caution statement is placed just before the description of a potentially hazardous procedure step or situation.
- **Danger:** These statements indicate situations that can be potentially lethal or extremely hazardous to you. A danger statement is placed just before the description of a potentially lethal or extremely hazardous procedure step or situation.

## Features and specifications

The IBM Flex System FC5022 2-Port 16Gb FC Adapter supports the following features for enhanced performance and connectivity in the SAN networks.

### General features

- BIOS support:
  - x86 and x64 Basic Input/Output System (BIOS)
  - Unified Extensible Firmware Interface (UEFI)
  - UEFI Human Interface Infrastructure (HII)
  - PCI BIOS 3.1 or later
  - SMBIOS specification version 2.4 or later
  - Fabric-based boot LUN discovery
- Human Interface Infrastructure (HII) menu support. These menus are integrated into the UEFI configuration browser. Options in these menus allow you to enable, disable, and set port speed for adapter ports.
- Host Connectivity Manager (HCM) device management and Brocade Command Line Utility (BCU) tools for comprehensive adapter management.
- Hyper-V. This consolidates multiple server roles as separate virtual machines (VMs) using the Windows Server 2008 operating system and provides integrated management tools to manage both physical and virtual resources.

- Management APIs for integration with a management application, such as IBM System Storage® Network Advisor, and other management frameworks.
- Plug-n-play and power management for all supported operating systems.
- RoHS-6. Certification by the European Union Restriction of Hazardous Substances Directive (RoHS) that adapter hardware components do not contain any of the six restricted materials. These are mercury, chromium VI, cadmium, polybrominated biphenyl ether, lead, and polybrominated biphenyl.
- Storage Management Initiative Specification (SMI-S).  
Specification supporting the Common Information Model (CIM) Provider, which allows any standard Common Information Model (CIM) and SMI-S-based management software to manage installed Brocade adapters.

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**NOTE**

Although SMI-S Provider and CIM Provider may be used interchangeably, CIM is the more generic term, while SMI-S is storage-specific.

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- Open Fabric Manager (OFM) based WWN provisioning.
- Windows Management Implementation (WMI).
- Windows Server 2008, RedHat Enterprise Linux (RHEL), SUSE Linux Enterprise (SLES), and VMware ESX Server.
- Windows Server Core, a minimal server option for Windows Server 2008 operating systems that provides a low-maintenance server environment with limited functionality. All configuration and maintenance is done through command line interface windows or by connecting to a system remotely through a management application.
- Windows 7. Windows 7 x86 is supported by Windows 2008 x86 drivers. Windows 7 x64 is supported by Windows 2008 R2 X64 drivers.

## Fibre Channel features

The IBM Flex System FC5022 2-Port 16Gb FC Adapter supports the following Fibre Channel features for enhanced performance and connectivity in the SAN:

- Over 500,000 input/output operations per second (IOPS) per port for maximum I/O transfer rates.
- Up to 1,600 Mbps throughput per port full duplex.
- Host Connectivity Manager (HCM) device management and Brocade Command Line Utility (BCU) tools.
- Management APIs for integration with a Management application, such as Network Advisor, and other management frameworks.
- Quality of Service (QoS) feature working in conjunction with the Advanced SAN Fabric QoS feature on Brocade switches to assign high, medium (default), or low traffic priority to a given source or destination traffic flow.

The following licenses must be installed on the switch connected to each adapter port:

- Adaptive Networking (AN) license
- Server Application Optimization (SAO) license

To determine if these licenses are installed on a connected Brocade switch, execute the Fabric OS **licenseshow** command. For more information about Fabric OS commands and QoS support, refer to the *Brocade Fabric OS Administrator's Guide*.

# 1 Features and specifications

- **FCP-IM I/O Profiling**

This feature, available through HCM, can be enabled or disabled on a physical port. When enabled, the driver firmware categorizes I/O latency data into average, minimum, and maximum categories. Use this feature to analyze traffic patterns and help tune Fibre Channel adapter ports, fabrics, and targets for better performance. Note that enabling this feature impacts I/O performance.
- **Interrupt Coalescing**

This feature provides a method to delay generation of host interrupts and thereby combines (coalesce) processing of multiple events. This reduces the interrupt processing rate and reduces the time that the CPU spends on context switching. You can configure the following parameters per port to adjust interrupt coalescing:

  - **Interrupt time delay.** There is a time delay during which the host generates interrupts. You can increase this delay time and thereby coalesce multiple interrupt events into one. This results in fewer interrupts for interrupt events.
  - **Interrupt latency timer.** An interrupt is generated when no new reply message requests occur after a specific time period. You can adjust this time period and thereby minimize I/O latency.
- **16 Virtual Channels (VCs) per port.** VC-RDY flow control can use these multiple channels for Quality of Service (QoS) and traffic prioritization in physical and virtualized network environments.
- **Target rate limiting.**

You can enable or disable this feature on specific ports. Target rate limiting relies on the storage driver to determine the speed capability of discovered remote ports, then uses this information to throttle FCP traffic rates to slow-draining targets. This reduces or eliminates network congestion and alleviates I/O slowdowns at faster targets.

Target rate limiting is enforced on all targets that are operating at a speed lower than that of the target with the highest speed. If the driver is unable to determine a remote port's speed, 1 Gbps is assumed. You can change the default speed using BCU commands. Target rate limiting protects only FCP write traffic.
- **N\_Port ID Virtualization (NPIV)**

Allows multiple N\_Ports to share a single physical N\_Port. Multiple Fibre Channel initiators can share this single physical port and reduce SAN hardware requirements.
- **Server Application Optimization (SAO).** When used with Brocade storage fabrics with enabled SAO licensing, Fibre Channel ports can use advanced Adaptive Networking features, such as QoS, designed to ensure Service Level Agreements (SLAs) in dynamic or unpredictable enterprise-class virtual server environments with mixed-SLA workloads.
- **End-to-end link beaconing** between an adapter port and a switch port to which it connects. (The switch requires Brocade Fabric OS 6.3x or later.)
- **Boot over SAN.** This feature provides the ability to boot the host operating system from a boot device located somewhere on the SAN instead of the host's local disk or direct-attached Fibre Channel storage. Specifically, this "boot device" is a logical unit number (LUN) located on a storage device. Booting from direct-attached Fibre Channel storage is also supported.
- **Fabric-based boot LUN discovery,** a feature that allows the host to obtain boot LUN information from the fabric zone database.

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**NOTE**

This feature is not available for direct-attached targets.

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- LUN masking:

LUN masking establishes access control to shared storage to isolate traffic between different initiators that are zoned in with the same storage target. LUN masking is similar to zoning, where a device in a specific zone can communicate only with other devices connected to the fabric within the same zone. With LUN masking, an initiator port is allowed to only access those LUNs identified for a specific target. Plus, the LUN masking configuration is stored persistently across driver loads and system reboots.

Enable LUN masking on an adapter physical port through the HCM **Basic Port Configuration** dialog box and the BCU **fcpim -lunmaskadd** command to identify the logical port (initiator) and remote WWN (target) for the LUN number. Refer to the *Brocade Adapter Administrator's Guide* for more information on configuration.

This feature has following limitations:

- Only 16 LUN masking entries are allowed per physical port.
- Multiple BCU instances for adding and deleting LUN masking are not supported.

You can configure LUN masking for a particular target even without the actual devices being present in the network.

When configuring boot over SAN, mask the boot LUN so that the initiator has exclusive access to the boot LUN. Refer to the *Brocade Adapters Administrator's Guide* for more information.

- Support for Hyper-V. Hyper-V consolidates multiple server roles as separate virtual machines (VMs) using the Windows Server 2008 operating system and provides integrated management tools to manage both physical and virtual resources.
- Support for Windows Server Core, a minimal server option for Windows Server 2008 operating systems that provides a low-maintenance server environment with limited functionality. All configuration and maintenance is done through command line interface windows or by connecting to a system remotely through a management application. Windows Server Core is supported by Windows Server 2008 adapter drivers.
- Support for MSI-X, an extended version of Message Signaled Interrupts (MSI), defined in the PCI 3.0 specification. MSI-X helps improve overall system performance by contributing to lower interrupt latency and improved utilization of the host CPU. MSI-X is supported by Linux RHEL 5, RHEL 6, SLES 10, SLES 11, Windows 2008, and ESX Server 4.0, 4.1, and 5.0.
- Point-to-point topology.
- Management support for Storage Management Initiative Specification (SMI-S).
- Fibre Channel-Security Protocol (FC-SP) providing device authentication through key management.
- Internet Protocol over Fibre Channel (IPFC) driver

This supports transmission of IP traffic over Fibre Channel links. This driver is only included in the Linux "noarch" RPM package (brocade\_driver\_linux\_<version>.tar.gz).

## I/O virtualization features

The IBM Flex System FC5022 2-Port 16Gb FC Adapter supports physical function-based I/O virtualization to provide data isolation and sharing of the bandwidth resources. For adapter ports, each port has one Fibre Channel (FC) function as the factory default.

Virtual HBAs (vHBAs) are virtual port partitions that appear as virtual or logical HBAs to the host operating system. vHBAs are supported on adapter Fibre Channel ports. Multiple vHBAs are not yet supported, so you cannot create them or delete them from an adapter. The default physical function (PF) associated with HBA ports is *vHBA*. HCM discovers and displays all vHBAs as “FC.”

The following are limitations of vHBAs:

- Multiple vHBAs per port are not supported (planned for future software release).
- Target rate limiting (TRL) and Quality of Service (QoS) are not supported at the vHBA level (only at the physical port level).
- Boot over SAN is not supported at the vHBA level (only at the physical port level).

## Adapter specifications

[Table 1](#) contains additional specifications for the IBM Flex System FC5022 2-Port 16Gb FC Adapter.

**TABLE 1** Adapter specifications

Feature	Description
Adapters per compute node	One or two two-port 16 Gbps FC Adapters per IBM Flex System FC5022 compute node
Port speeds	16 Gbps or 8 Gbps speed per Fibre Channel port
System board connectors	Copper high-speed SERDES
ASIC	<ul style="list-style-type: none"> <li>• Provides the Fibre Channel functionality for the adapter.</li> <li>• Two on-board processors, each operating at 400 MHz, which coordinate and process data in both directions.</li> </ul>
External serial FLASH memory	<ul style="list-style-type: none"> <li>• Stores firmware and adapter BIOS code</li> <li>• 4 MB capacity</li> </ul>
Data transfer rate	16 or 8 Gbps full-duplex
Fibre Channel performance	Over 500,000 IOPs (maximum) per port Over 1,000,000 IOPS per dual-port adapter
Data rate	<ul style="list-style-type: none"> <li>• 16 Gbps Fibre Channel: 14.025 Gbps (1600 MB/sec) full duplex</li> <li>• 8 Gbps Fibre Channel: 8.5 Gbps (800 MB/sec) full duplex</li> </ul>
Topology	Fibre Channel - Point-to-Point (N_Port)
Airflow	Provided by IBM Flex System chassis.
Altitude	Operating - 3,050 meters (10,000 ft.) Nonoperating - 3,050 meters (10,000 ft.)
Operating temperature	10 to 35°C (50 to 95°F)
Nonoperating temperature	Maximum: 45°C (113°F) Minimum: 5°C (41°F)

**TABLE 1 Adapter specifications (Continued)**

Feature	Description
Operating humidity	20% to 80%
Nonoperating Humidity	8% to 80%
Power dissipation	8.5 W maximum 8 W nominal
Operating voltage	Per PCIe 2.0 specifications
Dimensions	4.19 in. (106.5 mm) depth 3.34 in. (84.9 mm) width 1.64 in. (41.5 mm) height
Weight	.31 pounds (140 grams)
Topology	Switched Point-to-Point (N_Port)
Data protection	Cyclic redundancy check (CRC) on PCIE and line-side links ECC within the ASIC memory blocks (2-bit detection and 1-bit correction) Error correction code (ECC) and parity through the ASIC
Supported Fibre Channel features and protocols	<ul style="list-style-type: none"> <li>• SCSI over FC (FCP)</li> <li>• FCP2</li> <li>• FCP3</li> <li>• FC-SP Authentication</li> <li>• NPIV</li> <li>• Quality of Service (QoS)</li> <li>• Target rate limiting</li> <li>• Boot over SAN</li> <li>• Fabric-Based Boot LUN Discovery</li> <li>• I/O Interrupt Coalescing</li> <li>• T10 Data CRC</li> <li>• Multiple Priority (VC_RDY)</li> <li>• Frame-Level Load Balancing</li> <li>• Persistent Binding</li> <li>• Fabric-Based Configuration</li> <li>• vHBA</li> </ul>
Other features	<ul style="list-style-type: none"> <li>• ASIC Flip-flops Parity Protected</li> <li>• T10 Data CRC</li> <li>• ECC Memory Parity Protected</li> </ul>

**NOTE**

The IBM Flex System FC5022 2-Port 16Gb FC Adapter conforms to environmental and power specifications for the supported compute nodes and IBM Flex System chassis in which they are installed. Refer to the documentation provided for these products for more information.

# 1 Features and specifications

## Installing the adapter

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This chapter provides information and instructions to install adapter drivers, utilities, and management software. It also provides information to configure the adapter. To install the adapter on the IBM Flex System compute node, see the *IBM Flex System Installation and Service Guide* that comes with the compute node; then, return to this User's Guide to install drivers, utilities, and software.

## Installing the device drivers, utilities, and HCM

This section provides details on installing adapter device drivers, utilities, and the Host Connectivity Manager (HCM) management software for your adapter.

A single adapter driver “package” is available for installing drivers and other components to all supported host operating systems and platforms. Each driver package contains the following components:

- A driver for your host system.

The IBM Flex System FC5022 2-Port 16Gb FC Adapter requires installation of the storage (FC) driver. This driver is included in all driver installation packages. The storage driver provides Fibre Channel frame transport for adapter ports.

- Firmware.

Firmware is installed in the adapter's on-board flash memory and operates on the adapter's CPU. It provides an interface to the host device driver and off-loads many low-level hardware-specific programming tasks typically performed by the device drivers. The firmware provides appropriate support for drivers to manage the hardware.

- Management utilities.

These utilities include the Brocade Command Line Utility (BCU), Brocade Adapter Software Installer (BASI), installer scripts, and HCM agent. The GUI-based Brocade Adapter Software Installer (BASI) application installs HCM, all driver packages, and utilities based on your host operating system.

For details on using HCM and BCU commands to manage the adapter, refer to the *Brocade Adapters Administrator's Guide*.

Download the latest driver packages, boot code image, utilities, and additional Brocade adapter documentation from [www.brocade.com/adapters-ibm-flex](http://www.brocade.com/adapters-ibm-flex).

## Installing software on Windows and Linux systems

This section contains instructions for using the GUI-based Brocade Adapter Software Installer (BASI) on Windows and Linux systems. For detailed instructions on installing software using BASI, BASI commands, native installer scripts, and operating system commands, refer to the *Brocade Adapters Installation and Reference Manual*. Download this publication and driver packages from [www.brocade.com/adapters-ibm-flex](http://www.brocade.com/adapters-ibm-flex).

### *Important notes*

The following notes provide information on general installation and specific operating system installation:

- The procedures in this section assume that the host's operating system has been installed and is functioning normally.
- The Brocade Adapter Software Installer (BASI) GUI-based application or commands are the preferred methods to install the following components on your host system:
  - Storage and network drivers
  - Management Utilities. These include the HCM agent, BCU, BASI, installation scripts, CIM provider, and SNMP agent files
  - HCM only
- You must use the Brocade Adapter Software Installer application to install the Host Connectivity Manager (HCM). You can install HCM to the host system where the adapter is installed or on a separate remote management platform. After installation, an HCM desktop shortcut is available on Windows and Linux systems.
- When using the Brocade Adapter Software Installer to install HCM, a "Found Backed up data" message displays if a backup directory exists for previously installed software. This message prompts you to restore or not to restore old configuration data.
- Only one driver installation is required for all Brocade adapters installed in a host system.
- Root or administrator privileges are required for installing the driver package.
- The following Brocade Adapter Software Installers are available for Windows and Linux operating systems. For VMware systems, these installers only operate on "guest" operating systems.
  - Windows systems BASI  
`brocade_adapter_software_installer_windows_<version>.exe`
  - Linux systems BASI  
`brocade_adapter_software_installer_linux_<version>.bin`

Download BASI programs for your system from the adapters download page at [www.brocade.com/adapters-ibm-flex](http://www.brocade.com/adapters-ibm-flex).

- Software installation or upgrade on a host system with a large number of adapters could take much longer than normal.
- To use the Brocade Adapter Software Installer on Linux RHEL 6.x x64 systems, you must install the x32-compatible libraries as they are not installed by default. Refer to "Using BASI and HCM on RHEL 6.x version x64 systems" on page 13.
- On Linux SLES 10 and 11 systems when installing the source-based driver packages (`brocade_driver_linux_<version>.tar.gz`) or when using the Brocade Adapter Software Installer and the kernel has been upgraded to a version without pre-compiled binaries, perform the following tasks to make sure the drivers will load on system reboot:
  - For Linux SLES 10 systems, make sure that the `LOAD_UNSUPPORTED_MODULES_AUTOMATICALLY` variable on your system is set to "yes." This variable is in the following configuration file:  
`/etc/sysconfig/hardware/config`

- For Linux SLES 11, change the “allow\_unsupported\_modules” value from 0 to 1 in the following file:  
`/etc/modprobe.d/unsupported-modules`
- When installing the driver package on Windows 2008 and VMware systems, open the TCP/IP port 34568 to allow HCM Agent communication with the HCM. (This procedure is necessary because of firewall issues.)
  - For VMware, use the following commands to open port 34568:  
`/usr/sbin/esxcfg-firewall -o 34568,tcp,in,https`  
`/usr/sbin/esxcfg-firewall -o 34568,udp,out,https`
  - For Windows, use Windows Firewall and Advanced Service (WFAS) to open port 34568.
- Before installing the driver on Windows systems, install the following hot fixes from the Microsoft “Help and Support” website, and then reboot the system:
  - Windows 2008  
 KB968675 is recommended. This fixes a non-paged memory leak in a Windows 2008 storage stack.  
  
 KB2490742 is recommended when installing storage drivers to avoid a “Ox000000B8” stop error when shutting down or hibernating a system running Windows 7 or Windows Server 2008 R2.
- If you receive errors when launching the GUI-based Brocade Adapter Software Installer, such as `InvocationTargetException` errors, your system may not be able to run a GUI-based application. Refer to the *Brocade Adapters Installation and Reference Manual* for instructions on using software installer commands.
- Ensure that the Visual Studio 2005 SP1 (or later) Redistributable package is installed on Windows 2003 R2 SP3 systems to avoid problems starting HCM Agent.
- Installing software with the Brocade Adapter Software Installer automatically starts the HCM Agent.
- For Windows systems only, installing adapter software creates a BCU desktop shortcut on your system desktop. Use this shortcut to launch the BCU> command prompt and enter BCU commands.
- By default, the `initrd` file will be backed up automatically during Linux installations. During installation, a dialog box displays with the location of the file. If a file exists, a dialog box displays with its current location and allows you to overwrite the file, not overwrite the file, or quit.

### ***Using BASI and HCM on RHEL 6.x version x64 systems***

The Brocade Adapter Software Installer and HCM are 32-bit applications. To use these applications on Linux RHEL 6.x version x64 systems, you must first install the x32-compatible libraries because they are not installed by default.

To install these libraries, use the following steps.

1. Install `glibc.i686` or select “Compatibility Libraries” under “Base System” when installing RHEL 6.x.
2. Install the following RPMs once you install RHEL 6.x:

---

#### **NOTE**

These RPMs should be available under the Packages folder on the RHEL 6.0 or 6.1 DVD.

---

## 2 Installing the device drivers, utilities, and HCM

- libXau-1.0.5-1.el6.i686.rpm
- libxcb-1.5-1.el6.i686.rpm
- libX11-1.3-2.el6.i686.rpm
- libXext-1.1-2.el6.i686.rpm
- libXi-1.3-2.el6.i686.rpm
- libXtst-1.0.99.2-3.el6.i686.rpm

### *Installing adapter software using BASI*

Use these steps to install software using the GUI-based BASI application. Download the appropriate

1. Download the appropriate installer for your host's operating system from [www.brocade.com/adapters-ibm-flex](http://www.brocade.com/adapters-ibm-flex). Following are the programs for Windows and Linux:

- Windows

`brocade_adapter_software_installer_windows_<version>.exe`

- Linux

`brocade_adapter_software_installer_linux_<platform>_<version>.bin`

2. Execute the appropriate Brocade Adapter Software Installer program (.exe or .bin file) that you downloaded in the previous step.

A progress bar displays as files are extracted.

When all files are extracted, a **Brocade Adapter Software** title screen displays.

3. When the Brocade Adapter Software Installer **Introduction** screen displays read the recommendations and instructions, then click **Next**.
4. When the **License Agreement** screen displays, select **I accept the terms of the License Agreement**, then click **Next** to continue.
5. If a backup directory exists for previously installed software, a "Found Backed up data" message displays prompting you to restore old configurations. Select either to restore or not to restore and continue installation. If this message does not display, go on to [step 6](#).
6. If a screen displays listing existing software components already installed on your system, select one of the following options, click **Continue**, then skip to [step 10](#). If this message does not display, go on to [step 7](#).
  - **Install with existing configuration.** The installer compares each configured property and keeps the original value if different than the default value.
  - **Install with default configuration.** The installer upgrades the software and loads with default configurations.

---

#### **NOTE**

Existing versions of the software components will be overwritten with the current versions you are installing if you continue.

---

7. If a message displays prompting you to close HCM, close the application if it is running, and then click **OK**.

The **Choose Install Set** screen displays.



8. Select which software component you want to install, and then click **Next**.

If you are installing the management utilities and messages display warning that the HCM Agent requires storage and network driver installation or does not match the current driver installation, click **OK**, and select the **Management Utilities** and **Storage and Network Drivers** options.

If a message displays warning that the installed boot image is not compatible with the driver installation, perform one of the following steps:

- Select **Yes** to update the image and continue installation.
  - Select **No** to not update the image and continue installation.
9. If the **Choose Install Folder** screen displays, prompting you to choose a destination folder for the software, select one of the following options. If this screen does not display, proceed to [step 10](#).
    - Enter a location for installing the software.
    - Select **Choose** to browse to a location on your file system.
    - Select **Restore Default Folder** to enter the default installation folder.

10. When the **Package Location Information** screen displays listing the installed software components and their locations on your system, click **Next** to continue.

11. Review information on the **Pre-Installation Summary** screen and click **Install** to begin installation.

A progress bar displays installation progress.

---

**NOTE**

For Windows systems, a **Force Driver Installation** message box displays if a better driver is already installed for the adapter. If a message displays, select **OK** to overwrite the existing driver or **Cancel** to quit installation.

---

12. When the **Install Complete** screen displays, confirm that all software installed successfully. If the screen instructs you to restart or reboot the system, select any options that apply.

13. Click **Done** to confirm installation.

14. Verify driver installation through tools available on your host system. Refer to the “Confirming driver package installation” section in the “Software Installation” chapter of the *Brocade Adapters Installation and Reference Manual* for details.

15. To make sure that the drivers and boot code are synchronized, be sure to update your adapter with the latest boot image whenever you install or update adapter driver packages. Refer to [Chapter 3, “Updating drivers, firmware, and boot code”](#).

---

**NOTE**

Installing expansion card software creates a Brocade Command Line Utility (BCU) desktop shortcut on your system desktop. Use this shortcut instead of other methods to launch the BCU> command prompt and enter BCU commands.

---

### Installing software on VMware systems

For VMware ESX and ESXi systems, drivers and utilities are provided as ISO images packaged in a tarball file (.tr.gz) that you must extract and then install using adapter installer scripts. Scripts are available for ESX 4.X, ESXi 4.X, and ESXi 5.0 systems. In addition, you can use VMware tools to install software “bundles.” Various installation options are available, depending on your VMware release. Refer to the “Driver installation and removal on VMware systems” section of the *Brocade Adapters Installation and Reference Manual* for instructions.

Obtain driver packages and software ISO images for your host’s operating system and platform, as well as installation instructions in the *Brocade Adapters Installation and Reference Manual* from [www.brocade.com/adapters-ibm-flex](http://www.brocade.com/adapters-ibm-flex).

---

#### NOTE

Because some versions of the ESX and ESXi driver installation process do not enforce maintenance mode, it is recommended that you put the host in maintenance mode, as a system reboot is required after installation.

---

## Configuring the adapter

After you install the device drivers and connect the adapter to the fabric and target devices, you can use the tools described in this section to further configure its settings, verify its operational status, and check for proper connection.

To configure and manage the storage and networking features of the IBM Flex System FC5022 2-Port 16Gb FC Adapter, you can use the following tools:

- Brocade BIOS Configuration Utility
- Brocade Host Connectivity Manager (HCM)
- Brocade Command Line Utility (BCU)
- Standard networking tools for Windows, Linux, and VMware

### Brocade BIOS Configuration Utility

The Brocade BIOS Configuration Utility allows you to perform the following operations on selected adapters:

- Enable or disable BIOS to support boot over SAN.
  - You must enable BIOS to support boot over SAN for an adapter port. If disabled, the host system cannot boot from Fibre Channel disk drives.
  - The default setting for the adapter boot BIOS is *enabled* on all adapter ports.
- Enable one of the following Boot Options:
  - Fabric Discovered  
Host boots from LUN information provided by the fabric.

---

#### NOTE

Fabric-based boot LUN discovery (Fabric Discovered) is not supported for booting from direct-attached targets.

---

- Flash Values  
Host boots from LUN information stored in flash memory.
- First LUN  
Host boots from the first visible LUN.

---

**NOTE**

To boot from direct-attached targets, you must use the **First LUN** or **Flash Values** options.

---

- Select a boot device from discovered targets.
- Review adapter properties, such as the following:
  - Port speed
  - PWWN
  - NWWN
  - BIOS version

For details on how to activate and use the BIOS Configuration Utility, refer to [Appendix A, “Using the BIOS Configuration Utility”](#).

You can also perform many of these tasks using the Host Connectivity Manager (HCM) and Brocade Command Line Utility (BCU) commands. Refer to the Boot Code chapter in the *Brocade Adapters Installation and Reference Manual* for more details on the following topics:

- Configuring BIOS using BCU commands or HCM
- Configuring boot over SAN
- Configuring UEFI
- Installing operating systems and adapter drivers on boot LUNs
- Installing full driver packages on boot LUNs
- Fabric-based boot LUN discovery
- Booting systems without operating systems or local drives
- Updating the Windows driver on adapters used for boot over SAN

Access the *Brocade Adapters Installation and Reference Manual* from [www.brocade.com/adapters-ibm-flex](http://www.brocade.com/adapters-ibm-flex).

## Configuring storage drivers

This section provides an overview of storage driver functions that you can configure for the IBM Flex System FC5022 2-Port 16Gb FC Adapter on supported operating systems. For detailed information on configuring these parameters, refer to the “Adapter Configuration” appendix in the *Brocade Adapters Installation and Reference Manual* located at [www.brocade.com/adapters-ibm-flex](http://www.brocade.com/adapters-ibm-flex).

---

**ATTENTION**

These parameters are should only be changed by power users with great caution.

---

### ***Storage instance-specific persistent parameters***

You can modify default values for the following functions using specific BCU commands for driver parameters:

- Authorization algorithm, policy, and secret
- Adapter name
- vHBA interrupt coalesce, delay, and latency
- Log level
- Path time-out value (TOV)
- PCIe maximum read request size
- Port maximum frame size, speed, topology, and name
- Port enable or disable

You can modify default values for these parameters using BCU commands and by modifying the `bfa.conf` file. For more detailed information, refer to the “Adapter Configuration” appendix in the *Brocade Adapters Installation and Reference Manual*.

---

#### **NOTE**

Driver parameters should only be changed by power users with great caution.

---

### ***Storage driver-level parameters***

Driver-level configuration parameters are global parameters used by all storage driver instances. The default values for the driver configuration parameters are compiled into the driver. Tools for configuring these parameters depend on the operating system and parameter being configured.

#### **Linux and VMware parameters**

You can modify parameters for the following functions:

- Maximum scatter gather elements supported
- Maximum SCSI requests per LUN
- Fabric Device Management Interface (FDMI) enable or disable
- Host name
- Enable/disable auto-recover IOC on heartbeat failure
- Adapter log level setting
- MSIx interrupt enable or disable
- Maximum unassisted FC exchanges
- Maximum number of FCIP I/O requests
- Maximum number of remote ports
- Maximum number of scatter gather pages
- Maximum number of task management commands
- Maximum number of unsolicited FC receive buffers
- Operating system name
- OS patch level
- Number of elements in request queues

- Delay for deleting offline remote port

You can modify parameters on Linux systems using **modprobe**.

You can modify parameters on VMware systems using **esxcfg-module**.

For more detailed information, refer to the “Adapter Configuration” appendix in the *Brocade Adapters Installation and Reference Manual*.

---

**NOTE**

These parameters should only be changed by power users with great caution.

---

**Windows driver parameters**

You can modify default values for the following parameters:

- Enable or Fabric Device Management Interface (FDMI) registrations
- Maximum SCSI requests per LUN
- Auto recovery of I/O controller on heartbeat failure
- Delay for deleting offline remote port
- Disable MSIx interrupt

You can modify these parameters using the **drvconf --key** command, the Registry Edit tool, and BCU commands. For more detailed information, refer to the “Adapter Configuration” appendix in the *Brocade Adapters Installation and Reference Manual*.

---

**NOTE**

These parameters should only be changed by power users with great caution.

---

## Managing the adapter

You can manage the IBM Flex System FC5022 2-Port 16Gb FC Adapter using the following tools:

- The Brocade Host Connectivity Manager (HCM) and Command Line Utility (BCU) are the primary management tools for the IBM Flex System FC5022 2-Port 16Gb FC Adapter. You can load HCM as an optional application through the Brocade Adapter Software Installer (BASI). BCU loads with the driver package either through BASI or HCM.
- The IBM System Storage Network Advisor (also known as the Brocade Network Advisor) provides management features for adapters, such as adapter discovery, in-context launch of HCM, authentication, and other features. Refer to the *Brocade Network Advisor SAN User Manual* for more details:

BIOS and UEFI boot code support Chassis Management Module (CMM) connectivity and Open Fabric Manager (OFM) for configuring SAN connections and SAN target selection, and WWN virtualization. Refer to your appropriate IBM documentation covering OFM for more information.

### Using HCM and BCU

The Host Connectivity Manager (HCM) is a management software GUI for configuring, troubleshooting, and monitoring the IBM Flex System FC5022 2-Port 16Gb FC Adapter and device connections on local and remote host systems. The Brocade Command Line Utility (BCU), which loads with the driver package, provides commands that perform comparable functions on a local host system. These functions include the following:

## 2 Managing the adapter

- Discovery using the agent software running on the servers attached to the SAN, which enables you to contact the devices in your SAN.
- Configuration management, which enables you to configure local and remote systems. With HCM, you can configure adapter port and features.
- Management and monitoring of ports.
- Diagnostics, which enables you to test the adapters and the devices to which they are connected:
  - Adapter, PHY module, BIOS, and port data.
  - Link status of each adapter and its attached devices
  - Logs of adapter, port, and HCM events,
  - Loopback tests to evaluate the ports and the error rate on the adapter
  - Read/write buffer test, which tests the link between the adapter and its devices
  - FC protocol tests, including echo, ping, and trace route
- Monitoring, which provides statistics for adapter ports, authentication activities, firmware, I/O controller, virtual ports, fabric, FCP initiator mode, remote ports, virtual ports, and other areas.
- Security, which enables you to specify a CHAP secret and configure authentication parameters.
- Event notifications, which provide asynchronous notification of various conditions and problems through a user-defined event filter.

For details on using BCU commands and HCM, refer to the *Brocade Adapters Administrator's Guide* located at [www.brocade.com/adapters-ibm-flex](http://www.brocade.com/adapters-ibm-flex).

# Updating drivers, firmware, and boot code

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## Drivers

To update driver packages, simply install new packages using steps for the applicable operating system under “[Installing the device drivers, utilities, and HCM](#)” on page 11.

### Notes:

- When upgrading the driver for Windows systems, you do not need to reboot the host system as the driver upgrades immediately. The upgrade reloads the adapter firmware and reinitializes the link.
- When upgrading Windows 2008 drivers on adapters used for booting over SAN, install the new driver without removing the existing driver. If you remove the existing driver before installing a new driver, installation may fail and the operating system will become unbootable.
- When upgrading the driver for Linux systems, you do not need to reboot the host system. The new driver is effective after system reboot.
- When upgrading the drivers for Solaris systems, you must reboot the host system. The new drivers are not effective until after system reboot.

You can update installed drivers on connected hosts using the **Adapter Software** dialog box in HCM. Updating the driver updates all of the following components to the latest versions:

- Network and storage driver
- HCM Agent
- initrd file (Linux systems)

## Updating drivers with HCM

To update drivers with HCM, use the following steps:

1. Download the driver package for your host system operating system and platform from [www.brocade.com/adapters-ibm-flex](http://www.brocade.com/adapters-ibm-flex).
2. Launch HCM.

---

### NOTE

After installation, an HCM desktop shortcut is available for launching HCM on Windows and Linux systems.

---

3. Select a host on the HCM device tree, and then select **Adapter Software** under the **Configure** menu.

The **Adapter Software** dialog box displays.

4. Enter the filename of the updated driver in the **Driver File** text box.

OR

Click the **Browse** button and navigate to the location of the driver file to update.

5. Select **Start Update**.

The selected file downloads. If an error occurs during the downloading process, an error message displays.

6. Review the installation progress details that display in the dialog box to determine if the files install successfully.

---

**NOTE**

During the installation, a warning message may display that the installed boot image is not compatible with drivers being installed. You can obtain current boot image files from the adapters website and install these through the Adapter Software dialog box. Refer to “[Updating boot code using HCM](#)” on page 24 for instructions.

---

### Notes

- This feature upgrades existing software installed on the host system. Downgrades are not supported.
- During installation, dialog boxes validate installation success. Since the Solaris and VMware ESX Server operating systems require a reboot for the driver update to take effect, successful installation is not validated in the dialog boxes.
- It is recommended that you put VMware ESX hosts in maintenance mode during installation procedures, as since a system reboot is required after installation.

## Firmware

Adapter firmware loads with the current driver package for your server operating system and platform. Obtain the latest driver packages from [www.brocade.com/adapters-ibm-flex](http://www.brocade.com/adapters-ibm-flex).

To install driver packages, refer to “[Installing the device drivers, utilities, and HCM](#)” on page 11.

### Determining firmware level

You can determine the current firmware version installed on your adapter flash memory using one of the following methods:

- Enter the **bcu adapter --query** command. The installed BIOS version displays in the Flash Information section of the command output.
- View the adapter **Properties** panel in HCM. To view the panel, select the adapter in the device tree, and then click the **Properties** tab in the right pane.



## Boot code

Boot code or the boot image contains BIOS, UEFI, and other supported boot code and firmware used by the code to boot from the adapter. Although boot code for the adapter installs driver packages, whenever you update drivers, you should also update with the latest boot code image. You can update boot code using the Brocade Command Line Utility (BCU) commands or the Host Connectivity Manager (HCM).

The adapter boot code supports the following systems:

- Peripheral Component Interconnect (PCI) firmware 3.0 and earlier PCI BIOS versions  
Boot code for PCI system
- BIOS  
Boot code for x86 and x86\_x64 platforms
- Unified Extensible Firmware Interface (UEFI)  
Boot code for UEFI systems

A single, updatable boot code image, stored in the adapter option read-only memory (option ROM) memory, contains all boot code for supported host platforms.

---

**NOTE**

By default, BIOS and UEFI are enabled on adapter ports for boot over SAN.

---

---

**NOTE**

All Brocade adapters installed on a host system must use the same boot code version.

---

---

**NOTE**

To keep drivers and boot code synchronized, be sure to update your adapter with the latest boot image *after* you install or update adapter driver packages. Be sure to update drivers before updating the boot code.

---

## Determining boot code level

You can determine the current BIOS version installed on your adapter using one of the following methods:

- View the BIOS that displays on your system screen during hardware reinitialization, just before you are prompted to press **Ctrl** and **B** or **Alt** and **B** to enter the Brocade Configuration Utility.
- Enter the **bcu adapter --query** command. The installed BIOS version displays in the Flash Information section of the command output.
- View the adapter **Properties** panel in HCM. To view the panel, select the adapter in the device tree, and then click the **Properties** tab in the right pane.

## Updating boot code using BCU commands

Use the following steps to update adapters with the latest boot code using BCU commands.

1. Download the latest boot code from the “Boot Code” area on [www.brocade.com/adapters-ibm-flex](http://www.brocade.com/adapters-ibm-flex).
2. Extract the boot code image file.

3. Enter the following BCU command:

```
bcu boot --update <ad_id> <image file> -a
```

where:

<ad_id>	ID of the adapter (adapter)
<image file>	Name of firmware image file
-a	Indicates that the boot code should be updated on all installed Brocade adapters found on the host. Note that the adapter identification (ad_id) should not be specified if the -a option is specified.

### Updating boot code using HCM

To update adapters with the latest boot code using HCM, use the following steps:

1. Obtain the latest boot code from the “Boot Code” area of [www.brocade.com/adapters-ibm-flex](http://www.brocade.com/adapters-ibm-flex).
2. Extract the boot code image file.
3. Launch HCM.
4. Select a host on the device tree, and then select **Adapter Software** from the **Configure** menu.  
The **Adapter Software** dialog box displays.
5. Enter the filename of the boot image in the **Boot Image File** text box.  
OR  
Click the **Browse** button and navigate to the location of the file to update.
6. Click **Start Update**.  
The selected file downloads. If an error occurs during the downloading process, an error message displays.
7. Review the installation progress details that display in the dialog box to determine if the files install successfully.

---

#### NOTE

Because updating the VMware ESX driver requires rebooting the system, the boot code cannot be updated along with the driver using the **Adapter Software** dialog box. HCM will not restrict selecting the boot image for update on the VMware ESX platforms.

---

## Updating firmware and device drivers through IBM

IBM® periodically makes I/O adapter firmware and device driver updates available for the compute node. Provisioning is the set of actions that you take to update the firmware and device drivers and install the operating system. Several tools are available to help you update the firmware and device drivers in the provisioning process.

- **IBM Flex System Manager Update Manager**

IBM Flex System Manager Update Manager acquires, installs, and manages firmware and device driver updates and monitors your compute nodes to ensure that they remain current. For more information about IBM Flex System Manager Update Manager, see [“Updating firmware and software from the IBM Flex System Manager management software”](#).

- **UpdateXpress System Packs**

UpdateXpress System Packs (UXSP) contain an integration-tested bundle of online, updateable firmware and device drivers for your compute node. The IBM ToolsCenter Bootable Media Creator uses UpdateXpress System Packs to update the firmware and device drivers.

Typically, use UpdateXpress System Packs to update firmware and devices drivers for a compute node that has previously been provisioned. For more information about UpdateXpress System Packs, see the [IBM UpdateXpress website](#).

- **IBM ToolsCenter Bootable Media Creator**

You can use IBM ToolsCenter Bootable Media Creator to create bootable media that is suitable for applying firmware updates and running preboot diagnostics. Using IBM ToolsCenter Bootable Media Creator, you can create a single bootable image on supported media (such as CD, DVD, ISO image, USB flash drive, or set of PXE files) that bundles multiple IBM Flex System tools and updates from UpdateXpress System Packs, which contain Windows and Linux® firmware updates.

Typically, use IBM ToolsCenter Bootable Media Creator for the initial setup of a compute node. For more information about the IBM Bootable Media Creator, see the [IBM Bootable Media Creator website](#).

To provision a compute node with updated firmware and device drivers by using IBM ToolsCenter Bootable Media Creator, complete the following steps.

1. Download IBM ToolsCenter Bootable Media Creator to a computer that is connected over the management network to the IBM Flex System Manager management software that is managing the compute node.
2. Create the bootable media of firmware and device driver updates.
3. Connect to the IBM Flex System Manager management software that is managing the IBM Flex System chassis in which the compute node is installed.
4. From IBM Flex System Manager Chassis Manager, select the compute node. In the Actions column, select Remote Control.

---

**NOTE**

Note: The user ID that you use to log in to IBM Flex System Manager management software must have sufficient user permissions to manage the compute node.

---

5. From the Remote Control session, mount the bootable media (using Remote Media).
6. Start the compute node to boot the media and install the updates.

### 3 Updating firmware and device drivers through IBM

**Important:** To avoid problems and to maintain system performance, always make sure that the I/O adapter firmware and device drivers are consistent in all compute nodes in the IBM Flex System chassis.

# Solving problems

---

This chapter provides troubleshooting information to help you solve some problems that might occur while you are setting up the IBM Flex System FC5022 2-Port 16Gb FC Adapter.

If you cannot locate and correct a problem by using the information in this section, see [Appendix B](#), “Getting help and technical assistance”.

## Basic troubleshooting

Because mezzanine adapters, such as IBM Flex System FC5022 2-Port 16Gb FC Adapter, are installed in compute nodes as part of an IBM Flex System chassis, problems may occur for reasons other than when adapters are installed in standard host systems. This section outlines some general methods for isolating causes of problems with adapter operation. For more information, refer to the troubleshooting and maintenance information published for your specific IBM Flex System compute node and chassis. Also, refer to the support location on the IBM website for your compute node and chassis.

If problems exist with adapter operation on a compute node, verify the following:

- The compute node is turned on.
- The adapter is installed in the appropriate connector on the compute node. On some compute nodes, connectors may only support a specific adapter type. Refer your *IBM Flex System Installation and Service Guide* for help.
- The chassis is configured for adapter operation. Refer to your *IBM Flex System Enterprise Chassis Installation and Service Guide* and documentation on chassis components for help.
- The compute node on which the adapter is installed is correctly configured for adapter operation and is correctly installed in the chassis. Refer to your *IBM Flex System Enterprise Chassis Installation and Service Guide* for help.
- All devices in the chassis that support adapter operation are installed in the appropriate bays and correctly configured. Refer to your *IBM Flex System Enterprise Chassis Installation and Service Guide* for help.
- You are using the latest device drivers, firmware, and BIOS for the compute node and other components in the chassis that support adapter operation.

## Detailed troubleshooting

Detailed troubleshooting and debugging procedures for the adapter are available in the *Brocade Adapters Troubleshooting Guide* at [www.brocade.com/adapters-ibm-flex](http://www.brocade.com/adapters-ibm-flex).

## Parts listing

Replaceable components are of three types:

- **Tier 1 customer replaceable unit (CRU):** Replacement of Tier 1 CRUs is your responsibility. If IBM installs a Tier 1 CRU at your request, you will be charged for the installation.
- **Tier 2 customer replaceable unit (CRU):** You may install a Tier 2 CRU yourself or request IBM to install it, at no additional charge, under the type of warranty service that is designated for your server.
- **Field replaceable unit (FRU):** FRUs must be installed only by trained service technicians.

For information about the terms of the warranty, see the *Warranty Information* document.

The replaceable components in the following table are Tier 1 CRUs. If other components require replacement, see the documentation that came with those devices for instructions.

**TABLE 2** Replaceable components and corresponding CRU/FRU identifiers

Name of component	CRU number (Tier 1)
IBM Flex System FC5022 2-Port 16Gb FC Adapter	88Y6373

## Using the BIOS Configuration Utility

---

To configure BIOS parameters using the Brocade BIOS Configuration Utility, use the following steps.

1. When you are prompted to enter the Brocade BIOS configuration menu during the IBM Flex System FC5022 2-Port 16Gb FC Adapter initialization, press **Alt+B** or **Ctrl+B**.

The Brocade BIOS Configuration Menu displays a list of installed adapter ports, similar to the following.

```

Brocade BIOS Config Menu

Select the Adapter

Ad No   Model No   PCI Bus/Dev/Fn   PWWN
1/0     Brocade-1867   08/00/00         10:00:8C:7C:FF:11:12:00
1/1     Brocade-1867   08/00/01         10:00:8C:7C:FF:11:12:01

<ESC>-Go back <ENTER>-Select and configure <Up/Down>-Navigate
<Alt-Q>-Exit <Alt-S>-Save and exit <Left/Right>-Change values

```

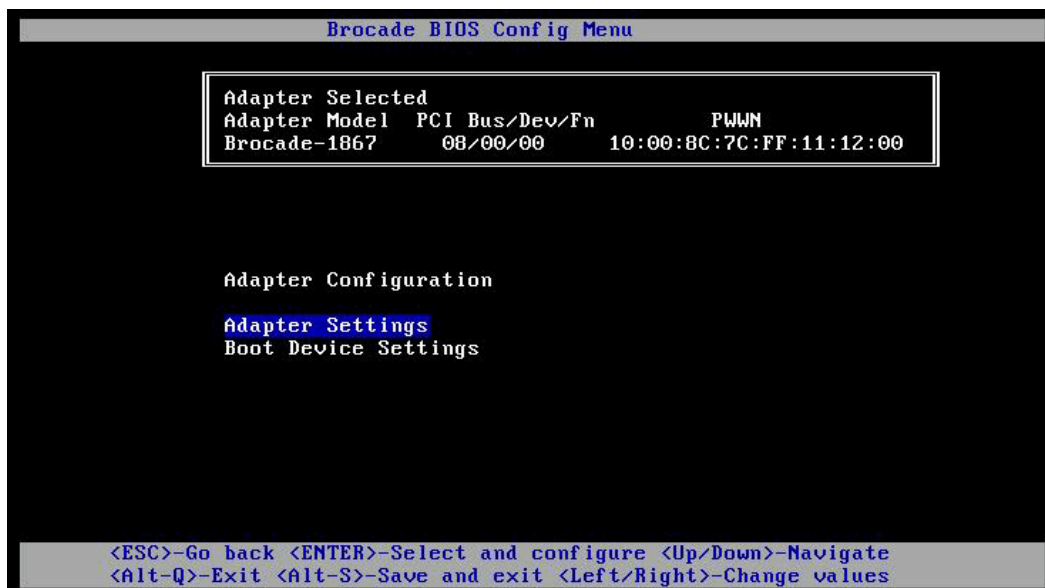
Under the **Ad No** column, 1/0 and 1/1 are the first port and second port respectively on the first installed adapter. Note that 2/0 and 2/1 are the first and second port on the second installed adapter if installed.

Select **Page Up** to go to a previous screen or **Page Down** to go to the next screen.

2. Select a port that you want to configure.

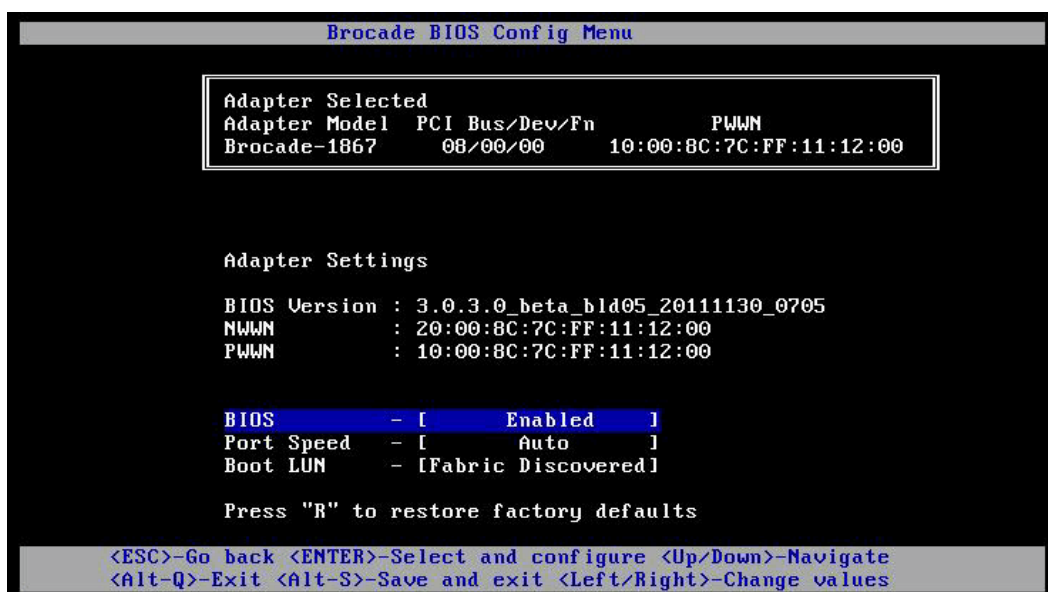
A screen similar to the following displays. In the following example, port 0 was selected.

## A Using the BIOS Configuration Utility



3. Select one of the following:
  - **Adapter Settings.** Use the Adapter Settings screen to enable BIOS, port speed, and auto-discovery of boot LUN information on the fabric. You can determine adapter WWNN and PWWN. Proceed to [step 4](#).
  - **Boot Device Settings.** Use the Device Settings screen to select the boot target and LUN for booting the host system. Proceed to [step 6](#).
4. Select **Adapter Settings** and press **Enter** to begin adapter configuration.

A screen similar to the following displays showing the port's current BIOS version, NWWN, and PWWN. [Table 3](#) on page 31 explains options available for BIOS, port speed, and boot LUN settings.





**TABLE 3** Brocade BIOS Configuration Utility field descriptions

Field	Description
BIOS	The value of BIOS must be <i>Enable</i> for the selected adapter port to support boot over SAN. If this setting is set to <i>Disable</i> , the system will not boot from the Fibre Channel disk drives that are connected to the selected adapter port. <b>NOTE:</b> The default setting for all adapter ports is <i>Enable</i> .
BIOS Version	Displays the Brocade BIOS boot code version installed on the card.
Boot LUN	<ul style="list-style-type: none"> <li>• <b>Fabric Discovered.</b> When enabled, LUN information, such as the location of the boot LUN, is provided by the fabric. Refer to the <i>Brocade Adapters Installation and Reference Manual</i> for more information.</li> <li>• <b>Flash Values.</b> Boot LUN information will be obtained from flash memory. Note that values are saved to flash when you configure and save them through the BIOS Configuration Utility and BCU.</li> <li>• <b>First LUN.</b> The host boots from the first LUN visible to the adapter that is discovered in the fabric.</li> </ul> <p><b>NOTE:</b> To boot from direct-attached targets, you must use the <b>First LUN</b> or <b>Flash Values</b> options.</p> <p><b>NOTE:</b> Fabric-based boot LUN discovery (Fabric Discovered) is not supported for booting from direct-attached targets.</p>
NWWN	Displays the port's Node World-Wide Name.
PWWN	Displays the port's unique Port World-Wide Name.
Port Speed	Sets the speed for the adapter port. <b>NOTE:</b> Auto allows the adapter port to automatically negotiate link speed with the connected port.

5. Change any parameters by following the instructions at the bottom of the BIOS Configuration Utility screen. For example, use the following keys to select and change information:

- Up and Down keys - Scroll to a different field.
- **Enter** - Select a field and configure values.
- Left and Right arrow keys - Change a value.
- **Alt + S** - Save configuration values to adapter flash memory.
- **Alt + Q** - Exit the utility.
- **Esc** - Go back a screen.
- **Page Up** or **Page Down** - Go to preceding or next screen.

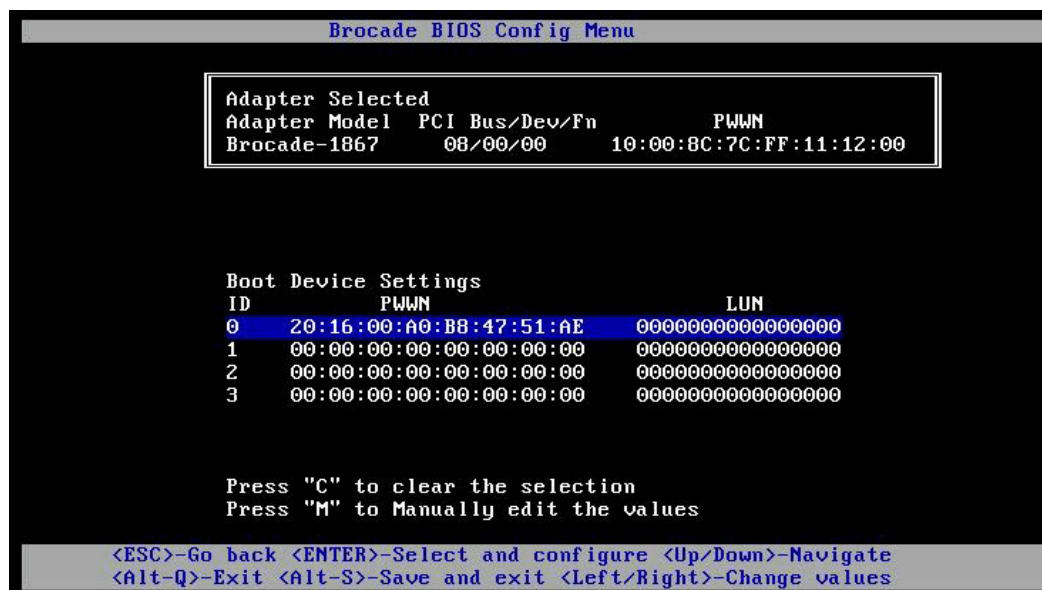
**NOTE**

To restore factory default settings, press **R**.

6. To configure boot devices, select **Boot Device Settings** from the initial menu screen for the adapter port ([step 3](#)) and press Enter to designate a discovered LUN as a boot device.

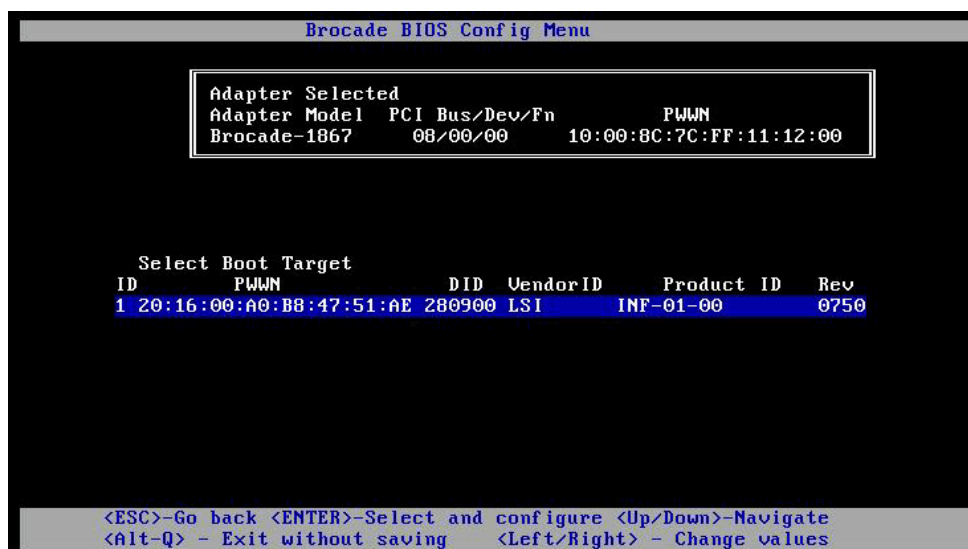
A list of up to four boot devices displays, showing the PWWN of the storage port and the LUN number designated as a boot LUN. The first device listed is the primary boot device. The host first tries to boot from the primary device, then the succeeding devices in the list.

## A Using the BIOS Configuration Utility



- Use the Up and Down arrow keys to select a boot device, then use one of the following options to configure boot device settings:
  - Press **C** to clear a selected boot device from the list.
  - Press **M** to manually edit boot device information, then enter the PWWN and LUN values for the boot device. Press **M** to exit.
  - Select a device and press **Enter**. This displays additional screens that allow you to select discovered LUNs as boot devices.

If you select a device under Boot Device Settings and press **Enter**, a screen similar to the following displays listing all discovered boot targets.



- Select a target on which you want to designate a boot LUN and press **Enter**.

A screen similar to the following displays listing device information and LUNs visible to the adapter.

```

Brocade BIOS Config Menu

Adapter Selected
Adapter Model  PCI Bus/Dev/Fn      PWWN
Brocade-1867   08/00/00      10:00:BC:7C:FF:11:12:00

ID      PWWN      DID Vendor ID      Product ID      Rev
1 20:16:00:A0:B8:47:51:AE 280900 LSI      INF-01-00      0750

Select Boot LUN
ID      LUN      Capacity
1 0000000000000000      4(GB)
2 00FE000000000000      25(GB)

<ESC>-Go back <ENTER>-Select and configure <Up/Down>-Navigate
<Alt-Q> - Exit without saving <Left/Right> - Change values

```

- Select the LUN on the target device that you want to designate as the boot LUN for the host. This must be the same LUN that you bind to the adapter port using the storage system's management or configuration utility.

---

**NOTE**

You only need to select the bootable LUN once. After the first boot, the same LUN will be used until changed through the BIOS Configuration Utility.

---

- Press **Enter**. The selected device will be added to the list of boot devices for the adapter. (In the following example, the boot LUN with ID2 was selected from the screen shown in [step 8](#).)

```

Brocade BIOS Config Menu

Adapter Selected
Adapter Model  PCI Bus/Dev/Fn      PWWN
Brocade-1867   08/00/00      10:00:BC:7C:FF:11:12:00

Boot Device Settings
ID      PWWN      LUN
0 20:16:00:A0:B8:47:51:AE 00FE000000000000
1 00:00:00:00:00:00:00:00 0000000000000000
2 00:00:00:00:00:00:00:00 0000000000000000
3 00:00:00:00:00:00:00:00 0000000000000000

Press "C" to clear the selection
Press "M" to Manually edit the values

<ESC>-Go back <ENTER>-Select and configure <Up/Down>-Navigate
<Alt-Q>-Exit <Alt-S>-Save and exit <Left/Right>-Change values

```

## **A** Using the BIOS Configuration Utility

11. Save or exit the configuration utility.
  - To save the configuration, press **Alt + S**.
  - To exit without saving, press **Alt + Q**.

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---

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- Check all cables to make sure that they are connected.
- Check the power switches to make sure that the system and any optional devices are turned on.
- Use the troubleshooting information in your system documentation, and use the diagnostic tools that come with your system.
- Go to the IBM support website at <http://www.ibm.com/supportportal/> to check for technical information, hints, tips, and new device drivers or to submit a request for information.

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## C Electronic emission notices



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