

## BladeCenter QS21 Type 0792

# Installation and User's Guide

## Welcome.

Thank you for buying an IBM blade server. Your blade server features superior performance, availability, and scalability.

This *Installation and User's Guide* contains information for setting up, configuring, and using your blade server.

Additionally, a service information label is attached to each BladeCenter unit and blade server. This label provides a graphical summary of many of the installation and service activities that are associated with each device.

For more information about your BladeCenter components and features, you can view the publications on the *Documentation* CD or download them from the IBM Support Web site.

Go to http://www.ibm.com/bladecenter/

Before installing the BladeCenter QS21 in a BladeCenter unit, complete the following procedures:

- Install and configure the rack according to the documentation that came with the rack.
- Install the BladeCenter unit into the rack and configure it, according to the documentation that comes with the BladeCenter unit.
- Supply input power to the BladeCenter unit.Install the latest firmware in all BladeCenter
- components.

Before you install the blade server into the BladeCenter unit, install optional components such as memory modules and expansion cards in the blade server.

Install the blade server in the BladeCenter unit. See Chapter 4 for more information.





BladeCenter QS21 Type 0792



## Installation and User's Guide

#### Note

Before using this information and the product it supports, read the general information in Appendix C, "Notices," on page 81 and the Warranty and Support Information document for your blade server type on the Documentation CD.

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## Safety

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 pečítaje 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.

## Important:

All caution and danger statements in this documentation begin with a number. This number is used to cross reference an English caution or danger statement with translated versions of the caution or danger statement in the *IBM Safety Information* book.

For example, if a caution statement begins with a number 1, translations for that caution statement appear in the *IBM Safety Information* book under statement 1.

Be sure to read all caution and danger statements in this documentation before performing the instructions. Read any additional safety information that comes with the blade server or optional device before you install the device. 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:		То	Disconnect:
1.	Turn everything OFF.	1.	Turn everything OFF.
2.	First, attach all cables to devices.	2.	First, remove power cords from outlet.
3.	Attach signal cables to connectors.	3.	Remove signal cables from connectors.

- 4. Attach power cords to outlet.
- 5. Turn device ON.

4. Remove all cables from devices.

Statement 2:



### **CAUTION:**

When replacing the lithium battery, use only IBM Part Number 43W9859 or 03N2449 or an equivalent type battery recommended by the manufacturer. If your system has a module containing a lithium battery, replace it only with the same module type made by the same manufacturer. The battery contains lithium and can explode if not properly used, handled, or disposed of.

Do not:

- Throw or immerse into water
- Heat to more than 100°C (212°F)
- Repair or disassemble

Dispose of the battery as required by local ordinances or regulations.

Statement 3:



## **CAUTION:**

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

- Do not remove the covers. Removing the covers of the laser product could result in exposure to hazardous laser radiation. There are no serviceable parts inside the device.
- Use of controls or adjustments or performance of procedures other than those specified herein might result in hazardous radiation exposure.



#### 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 4:









≥ 32 kg (70.5 lb)



≥ 55 kg (121.2 lb)

## CAUTION:

Use safe practices when lifting.

Statement 5:



## **CAUTION:**

The power control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.



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.

Statement 13:



#### DANGER

Overloading a branch circuit is potentially a fire hazard and a shock hazard under certain conditions. To avoid these hazards, ensure that your system electrical requirements do not exceed branch circuit protection requirements. Refer to the information that is provided with your device for electrical specifications.

Statement 21:



CAUTION:

Hazardous energy is present when the blade is connected to the power source. Always replace the blade cover before installing the blade.

**WARNING:** Handling the cord on this product or cords associated with accessories sold with this product, will expose you to lead, a chemical known to the State of California to cause cancer, and birth defects or other reproductive harm. *Wash hands after handling.* 

**ADVERTENCIA:** El contacto con el cable de este producto o con cables de accesorios que se venden junto con este producto, pueden exponerle al plomo, un elemento químico que en el estado de California de los Estados Unidos está considerado como un causante de cancer y de defectos congénitos, además de otros riesgos reproductivos. *Lávese las manos después de usar el producto.* 

## **Chapter 1. Introduction**

This chapter gives an overview of the features of the IBM<sup>®</sup> BladeCenter<sup>®</sup> QS21 and what options are available.

## The BladeCenter QS21

The high performance BladeCenter QS21 is based on the 64-bit Cell Broadband Engine<sup>™</sup> (Cell/B.E.) processor with a frequency of 3.2 GHz. Two processors are supported per blade and are directly mounted on the blade planar board to provide multiprocessing capability. Each processor includes 32/32 KB L1 (data/instruction) and 512 KB L2 cache.

The Cell/B.E. implementation of the broadband processor architecture includes one PowerPC<sup>®</sup> Processor Element (PPE) element and eight synergistic processing elements (SPE). Each SPE includes one synergistic processing unit (SPU) with its own local store (LS), and one dedicated memory flow controller (MFC), which has an associated memory management unit (MMU) to hold and process memory protection and access permission information. To facilitate data flow on-chip and externally, the Cell/B.E. also implements the broadband engine bus and other I/O structures. The memory subsystem on BladeCenter QS21 consists of 18 XDR memory modules per Cell/B.E. chip, creating 1 GB of error checking and correction (ECC) memory per Cell/B.E. chip. The system board therefore has a total of 2 GB system memory.

There is a high speed RAMBUS interface to the processor, a PCI-X connector for BladeCenter I/O extension cards, a 4x PCI-Express channel providing high speed I/O, a 1 Gigabit Ethernet NIC, a UART and an external bus controller. Attached to the external bus are a Flash EPROM device (8 Mbyte), 1 MB of battery-backed NVRAM and battery-backed real-time clock (RTC).

The local service processor supports environmental monitoring, front panel, chip initialization and the BladeCenter unit Advanced Management Module interface.

To ensure compatibility with existing blades, the BladeCenter QS21 provides two midplane connectors. These connectors contain Gigabit Ethernet links, USB ports (for support of BladeCenter unit media tray devices), power and a unit management bus. The blade includes support for an optional InfiniBand expansion card and an optional Serial Attached SCSI (SAS) card.

For more information about the processor itself, see http://www.ibm.com/ developerworks/power/cell.

## Features and specifications

The BladeCenter QS21 is a high-density, high-performance multiprocessor server system. It is based on the Cell Broadband Engine processor (Cell/B.E.) and provides leading edge performance density with its single wide 2-way blade server.

The BladeCenter QS21 conforms to the generic BladeCenter infrastructure and is designed for operation with the high-speed interconnect in the following BladeCenter units:

- BladeCenter H Type 8852
- BladeCenter HT Types 8740 and 8750 (enterprise environment only)
- BladeCenter S Types 7779 and 8886 (non RAID type only)

BladeCenter QS21 support is only available for the BladeCenter units listed above.



Figure 1. BladeCenter QS21

The BladeCenter QS21 has the following major components:

- 2 Cell/B.E. processor chips (Cell/B.E.-0 and Cell/B.E.-1) operating at 3.2 GHz
- 2 GB XDR system memory with ECC, 1 GB per Cell/B.E. chip
- · 2 Cell/B.E. companion chips, one per Cell/B.E. chip
- 2 x 16 lanes PCIe, 2 masters per Cell/B.E. companion chip
- 1 PCI-X bus per Cell/B.E. companion chip, running at 100 MHz
- · Interface to optional DDR2 memory, for use as the I/O Buffer
- Onboard Dual Channel Gb-Ethernet controller BCM5704S
- Onboard USB controller NEC uPD720101
- 1 BladeCenter PCI-X expansion card connector
- 1 BladeCenter High-Speed connector for 2 x 8 PCIe buses
- 1 Special additional I/O expansion connector for 2 x 16 PCIe buses
- 4 DIMM slots (2 slots per Cell/B.E. companion chip) for optional I/O Buffer DDR2 VLP DIMMs
- Integrated Renesas 2166 Service processor (BMC, IPMI compliant code stack)

The average maximum for power budgeting is 300 W for a QS21 blade server without options.

Through the BladeCenter Advanced Management Module Web interface, you can view the blade server firmware code and other hardware configuration information.

**Note:** Power, cooling, removable-media drives, external ports, and advanced system management are provided by the IBM BladeCenter. For more information, see the relevant BladeCenter guide.

## Power configuration and power throttling

Each blade server is powered by two BladeCenter redundant power-supply modules. By enforcing a power policy known as power domain oversubscription, the BladeCenter unit can share the power load between two power modules to ensure efficient power for each device in the BladeCenter unit. This policy is enforced when the initial power is applied to the BladeCenter unit or when a blade server is inserted into the BladeCenter unit. You can configure and monitor the power environment by using the management module.

For more information about configuring power, see the management-module documentation.

## **Boot support**

The BladeCenter QS21 can boot from:

- · The optical drive of the BladeCenter unit media tray
- A SAS storage device, typically one or more hard disks attached to the BladeCenter unit
- A storage device attached to the network

## Support for local storage

The BladeCenter provides a SAS solution for local storage. This comprises a SAS Expansion Card attached to the blade server, a SAS switch in the rear of the chassis, and various options to attach storage to that integrated SAS switch. An optional SAS Expansion Card is available for the BladeCenter QS21.

Storage can be attached via the external SAS host controller. The BladeCenter QS21 supports the SAS drives of the IBM System Storage<sup>™</sup> DS3200 and the IBM System Storage EXP3000 expansion unit. Check the IBM BladeCenter support Web site for details of supported SAS drives at http://www.ibm.com/systems/bladecenter/ support/.

## Major components of the blade server

In order to see the components of the BladeCenter QS21 you must remove it from the BladeCenter unit and remove the cover. Figure 2 on page 4 shows the major components of the blade server.



Figure 2. BladeCenter components

Both Cell/B.E. processors and Cell/B.E. companion chips are underneath the heat sinks and therefore not visible. The Cell/B.E. processors and the system XDR memory are soldered onto the system board and are not removable.

## Reliability, availability, and serviceability features

Three important features in server design are reliability, availability, and serviceability (RAS). These RAS features are designed to help ensure that your blade server is available when you want to use it; and, in the event of a failure, help you easily diagnose and repair the failure with minimal inconvenience.

The following is a list of some of the RAS features that your blade server supports:

- Transparent CPU Hardware error recovery
- · ECC for XDR and DDR2 memory
- PFA for CEs on the Cell/B.E. companion chip attached I/O Buffer DDR2 DIMMs
- · Memory Scrubbing on XDR system memory
- XDR System memory failure isolation for memory errors to a single memory interface (Cell/B.E.-0 or Cell/B.E.-1 attached)
- DDR2 I/O Buffer memory failure isolation to a single DIMM
- PCI Bus Parity

Blade level features include:

- Degraded boot for both XDR and DDR2 memory errors. XDR memory errors may create holes in the memory map.
- · Automatic server recovery and restart:
  - Automatic reboot after boot hangs (with switch of the boot flash to the backup image)
  - Automatic reboot after checkstop (without switch of the boot flash side)
- Environmental monitors and alerts
- · System VPD and VPD on all major electronic components
- Lightbox LEDs
- · System Management Services (SMS) menu support
- · Checkstop detection with data logging and automated reboot

The BladeCenter unit supports the following features:

- · Redundant power supplies
- · Power Supply error detection
- Remote Power control
- System Event Logs through Advanced Management Module
- Redundant Blowers, switches, Advanced Management Modules
- Hotplug of all BladeCenter unit field replaceable units (FRUs) including blowers, switches and power supplies

## **Registering your BladeCenter QS21**

Record information about the blade server in the following table. You need this information when you register the blade server with IBM. You can register the blade server at http://www.ibm.com/support/mysupport/.

Product name	BladeCenter QS21
Machine type	0792
Model number	
Serial number	

The machine type, model number, and serial number are on the label that covers the base of the blade server. The label is visible when the blade server is not in the BladeCenter unit.

## Checking for software and firmware updates

Occasionally, firmware and software updates become available. To check for updates and download the latest device drivers, firmware updates or documents, go to http://www.ibm.com/support/us/en/.

## Notices and statements used in this document

The caution and danger statements that appear in this document are also in the multilingual *Safety Information* document, which is on the IBM *BladeCenter Documentation* CD. Each statement is numbered for reference to the corresponding statement in the *Safety Information* document.

The following notices and statements are used in this document:

- Notes: 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.

## Using this book

This Installation and User's Guide provides information to help you:

- Set up the BladeCenter QS21
- Start and configure the BladeCenter QS21
- Install options
- · Install the operating system
- Perform basic troubleshooting of the BladeCenter QS21

Note: The illustrations in this document might differ slightly from the hardware.

Updates might be available for this document. You can check for the most recent version at http://www.ibm.com/support/us/en/.

## **Related documentation**

In addition to this document, the following documentation also comes with the server:

• Problem Determination and Service Guide

This document is in Portable Document Format (PDF) on the *Documentation* CD. It contains information to help you solve problems yourself, and it contains information for service technicians.

Safety Information

This document is in Portable Document Format (PDF) on the *Documentation* CD. 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 and Support Information

This document is in PDF on the IBM *Documentation* CD. It contains information about the terms of the warranty and about service and assistance.

 IBM Software Development Kit for Multicore Acceleration Version 3.0.0 Installation Guide

This document is in PDF and can be downloaded from http://www.ibm.com/ alphaworks/tech/cellsw/download. It contains information about how to install the operating system and how to program applications for the blade server.

Depending on the server model, additional documentation might be included on the *Documentation* CD.

The blade server can have features that are not described in the documentation that comes with the server. Additionally, the documentation might be updated occasionally to include information about those features, or technical updates might be available to provide additional information that is not included in the blade server documentation on the CD. You can check for the most recent versions of all BladeCenter documentation at http://www.ibm.com/support/us/en/.

In addition to the documentation in this library, be sure to review the planning and installation documents for your BladeCenter hardware available at http://www.ibm.com/support/us/en/.

## The Documentation CD

The *Documentation* CD contains documentation for the blade server in PDF and includes the IBM Documentation Browser to help you find information quickly.

## Hardware and software requirements

The Documentation CD requires the following minimum hardware and software:

- Microsoft<sup>®</sup> Windows<sup>®</sup> 2000, Windows XP or Red Hat Linux<sup>®</sup>
- 100 MHz microprocessor
- 32 MB of RAM
- Adobe<sup>®</sup> Acrobat Reader 3.0 (or later) or xpdf, which comes with Linux operating systems
  - **Note:** Acrobat Reader software is included on the CD, and you can install it when you run the Documentation Browser.

## **Using the Documentation Browser**

Use the Documentation Browser to browse the contents of the CD, read brief descriptions of the books, and view books using Adobe Acrobat Reader or xpdf. The Documentation Browser automatically detects the regional settings in use in your system and displays the books in the language for that region (if available). If a book is not available in the language for that region, the English version is displayed.

Use one of the following procedures to start the Documentation Browser:

- If Autostart is enabled, insert the CD into your CD or DVD drive. The Documentation Browser starts automatically.
- If Autostart is disabled or is not enabled for all users:
  - If you are using a Windows operating system, insert the CD into your CD or DVD drive and click Start ► Run. In the Open field, type:
     x:\win32.bat

where *x* is the drive letter of your CD drive, then click **OK**.

 If you are using a Linux operating system, insert the CD into your CD drive; then, run the following command from the /mnt/cdrom directory: sh runlinux.sh

The **Available Topics** list displays all the books for the blade server. Some books might be in folders. A plus sign (+) indicates each folder or book that has additional books under it. Click the plus sign to display the additional books.

When you select a book, a description of the book appears under **Topic Description**. To select more than one book, press and hold the Ctrl key while you select the books. Click **View Book** to view the selected book or books in Acrobat Reader or xpdf. If you selected more than one book, all the selected books are opened in Acrobat Reader or xpdf.

To search all the books, type a word or word string in the **Search** field and click **Search**. The books in which the word or word string appears are listed in order of the most occurrences. Click a book to view it, and press Crtl+F to use the Acrobat search function or Alt+F to use the xpdf search function within the book.

Click Help for detailed information about using the Documentation Browser.

## Chapter 2. Blade server power, controls, and indicators

This chapter describes the power features, how to turn on and turn off the blade server, and what the controls and indicators mean. This chapter also identifies the system board connectors.

## Turning on the blade server

The BladeCenter QS21 is hot-swappable and can be inserted into the BladeCenter unit when the unit is already powered up. However, it can only be powered on by one of the methods described in this section. While the blade server is powering up, the power-on LED on the front of the server is lit. See "Blade server controls and LEDs" on page 11 for the power-on LED states.

After you have installed the BladeCenter QS21 into a powered up BladeCenter unit, wait until the power on LED on the blade server flashes slowly before turning on the blade server.

You can turn on the blade server in any of the following ways:

## Using the power control button

You can press the power-control button Figure 3 which is behind the control-panel door on the front of the blade server if local power control is enabled for the blade server. Local power control is enabled and disabled through the BladeCenter Management Module Web interface.



Figure 3. Blade server power button

#### Using the BladeCenter Advanced Management Module

You can use the BladeCenter Management Module Web interface to turn on the blade server remotely.

## Using the Wake on LAN<sup>®</sup> feature:

If you want to use the Wake on LAN feature, the feature must be enabled in the installed operating system and it must not have been disabled through the Advanced Management Module.

In the event of a power failure the BladeCenter unit and then the blade server can start automatically when power is restored. You must configure this through the BladeCenter Advanced Management Module. See the *BladeCenter Management Module User's Guide* for further information about this feature.

## Turning off the blade server

When you turn off the blade server, it is still connected to power through the BladeCenter unit and can continue to respond to requests from the service processor, including remote requests to turn the blade server on. To remove all power from the blade server, you must physically remove it from the BladeCenter unit or power off the BladeCenter unit.

To avoid loss of data, shut down the Linux operating system before you turn off the blade server. Shut down the operating system by entering the shutdown -h now command at the command prompt or by choosing **shutdown** if you are using a graphical user interface (GUI). See your operating system documentation for additional information about shutting down the operating system.

If the BladeCenter unit has not been turned off, the blade server can be turned off in any of the following ways:

#### Using the power control button

You can press the power control button behind the control-panel door on the front panel of the blade server. This starts an orderly shutdown of the operating system, providing your operating system supports this feature, before turning off the BladeCenter QS21. If the operating system stops functioning, pressing and holding the power control button for more than 4 seconds turns off the blade server.

#### Using the BladeCenter Advanced Management Module

You can use the Advanced Management Module Web interface to turn off the blade server remotely. You can also configure the Advanced Management Module to turn off the blade server automatically if the system is not operating correctly.

**Note:** After turning off the blade server, wait at least 5 seconds before turning it on again.

## Blade server controls and LEDs

This section describes the controls and LEDs on the front panel of the blade server. For further information about the LEDs and how they can be used to assist in troubleshooting, see *Problem Determination and Service Guide*.



Figure 4. Power-control button and LEDS

**Note:** The control panel door which normally covers the LEDs and power-control button is omitted for reasons of clarity.

#### Activity LED:

This green LED lights when there is network activity.

### Location LED:

This blue LED is turned on remotely by the system administrator to assist in locating the blade server. The location LED on the BladeCenter unit lights at the same time.

#### Information LED:

This amber LED lights to indicate that information about a system error has been placed in the Advanced Management Module Event Log. The information LED remains on until turned off by Advanced Management Module or through IBM Director Console.

#### Blade error LED:

This amber LED lights when a system error has occurred in the blade server.

#### Power control button:

Press this button to turn the blade server on or off. The power control button only has effect if local power control is enabled for the blade server. Local power control is enabled and disabled through the BladeCenter Advanced Management Module Web interface.

#### Media tray select button:

This button associates the shared BladeCenter unit media tray (DVD/CD drive and USB ports) with the blade server. The LED on the button flashes while the request is being processed, then lights when the ownership of the media tray has been transferred to the blade server.

It can take approximately 20 seconds for the operating system on the blade server to recognize the media tray.

## Power on LED:

This green LED indicates the power status of the blade server as follows:

- Flashing rapidly The service processor on the blade server is communicating with the BladeCenter Advanced Management Module.
- Flashing slowly The blade server has power but is not turned on.
- Lit continuously (steady) The blade server has power and is turned on.
- Not lit. Either the BladeCenter unit is powered off, or a power failure has occurred on the blade server or the BladeCenter unit.

#### **NMI reset button**

If the operating system has been installed, pressing this with a paper clip or pin causes the operating system to call the system debugger.

**Note:** The blade error LED, information LED, and location LED can be turned off through the BladeCenter Management Module Web interface. For additional information about errors, see "Problems indicated by the front panel LEDs" on page 60.

## System board LEDs

The BladeCenter QS21 has status LEDs on the system board to indicate the health of various components. Some are within the light box while others are in different location. A lit LEDs indicates an error condition. Complete information about the LEDs can be found in the *Problem Determination and Service Guide*.

To find out what if any errors have occurred on the system board, you must:

- 1. Remove the blade server from the BladeCenter unit
- 2. Open the cover
- 3. Press the light path diagnostics switch

This lights any error LEDs that were turned on during processing. It also lights a green LED to indicate the capacitor is charged and the light path diagnostics system is operating.

Figure 5 on page 13 shows the location of the light path LEDs and the diagnostics switch.



Figure 5. System-board LEDs

Pressing the light path diagnostics switch lights the LED(s) to indicate where an error has occurred.

## System board internal and expansion card connectors

The following illustration shows the location of the connectors for user-installable options.



Figure 6. Locations of the expansion option connectors on the system board

## Chapter 3. Installing the blade server

If you have options to install in the blade server, you should install them now. See Chapter 4, "Installing and removing replaceable units," on page 19 and the *BladeCenter QS21 Problem Determination and Service Guide* for further information, then continue with the instructions in this chapter.

## Installation guidelines

The BladeCenter QS21 is a hot-swappable device: you can install or remove the blade server while the BladeCenter unit is running. Additionally, the BladeCenter QS21 can operate alongside different blade servers in the same BladeCenter unit.

Attention: If you plan to remove a blade server and reinstall it, be sure to note the number of the bay that contains the blade server before you remove it. You must reinstall the blade server in the same bay from which it was removed. Reinstalling a blade server into a different bay than the one from which it was removed could have unexpected consequences, such as incorrect reconfiguration of the blade server. Some blade server configuration information and update options are established according to bay number.

If you reinstall the blade server into a different bay, you might have to reconfigure the blade server.

## Statement 21:



## **CAUTION:**

Hazardous energy is present when the blade server is connected to the power source. Always replace the blade cover before installing the blade server.

For information about the design of the BladeCenter unit, including the hot-swap blade bays, see the documentation that comes with the BladeCenter unit.

While you can install or remove the blade server without removing power from the BladeCenter unit, you must turn off the blade server before removing it from the BladeCenter unit.

The maximum number of blade servers that the BladeCenter unit supports varies by the wattage of the power supplies that are installed in the BladeCenter unit. For more information about determining the power requirements for the blade server, see the *IBM BladeCenter Power Module Upgrade Guidelines*.

## Installing the BladeCenter QS21



Figure 7. Inserting the blade server into the BladeCenter unit

Complete the following steps to install a blade server into the BladeCenter unit:

- 1. Read the safety information beginning on page vii and "Installation guidelines" on page 19.
- 2. If you have not done so already, install any options. See Chapter 4, "Installing and removing replaceable units," on page 19 for further information.
- 3. Select the bay for the blade server.
- 4. If the bay that you selected contains filler blades, remove the filler blades.

When you remove filler blades from a blade bay in the BladeCenter unit *do not* discard the filler blades. You need the filler blades if you ever remove the blade server.

For future use, store the filler blades in a static-protective environment.

To help ensure proper cooling, performance, and system reliability, do not operate the BladeCenter unit for more than 1 minute without a blade server or filler blades installed in each blade bay.

- 5. Make sure that the release levers on the blade server are in the open position (perpendicular to the blade server).
- 6. Slide the blade server into the bay until it stops. The spring-loaded doors further back in the bay that cover the bay opening move out of the way as you insert the blade server.
- 7. Push the release levers on the front of the blade server to the closed position.
- 8. A set of user labels comes with the blade server. Use them to write identifying information for each the blade server; then place the label on the BladeCenter unit. See your BladeCenter unit documentation for the exact location.

**Important:** Do not place the label on the blade server or in any way block the ventilation holes on the blade server.

- 9. Turn on the blade server by pressing the power-control button on the blade server control panel. The power-on LED on the blade server changes from the slowly-flashing state to a continuously lit (steady) state.
- 10. If this is the initial installation of the blade server install the operating system. Use the installation instructions that come with the operating system. For more information, see Chapter 6, "Installing the operating system," on page 53.
- 11. Check http://www.ibm.com/support/us/en/ for any software or firmware updates.
- 12. Update the firmware or software if required.

Note: You may be required to reboot the blade server.

Once you have installed the operating system and performed any required updates, the blade server is ready for use. If you have not already done so, turn on the blade server by pressing the power-control button on the blade server control panel. The power on LED on the blade server changes from the slowly-flashing state to a continuously lit (steady) state.

If you have other blade servers to install, you can do so now.

## Chapter 4. Installing and removing replaceable units

This chapter provides instructions for replacing units on the blade server. Replaceable units are components, such as memory modules, and I/O expansion cards. Some removal instructions are provided in case you need to replace one replaceable with another.

You can replace the following items:

- Battery
- Front bezel assembly (control panel)
- · Blade server cover

You can add or remove the following optional items:

- · Cisco 4X Infiniband Expansion Card for IBM BladeCenter
- InfiniBand 4X DDR Expansion Card (CFFh)
- I/O buffer DDR2 memory modules
- · SAS expansion card
- BladeCenter Expansion unit

**Note:** If you wish to install the InfiniBand 4X DDR Expansion Card (CFFh) you must install Red Hat Enterprise Linux 5.2 or higher.

## Installation guidelines

Before you begin, read the following:

- Read the safety information beginning on page vii and the guidelines in "Handling static-sensitive devices" on page 20. This information will help you work safely with the blade server and components.
- You do not have to turn off the blade server or disconnect the BladeCenter unit from power to install or replace any of the hot-swappable modules on the rear of the BladeCenter unit.
- Before you remove a hot-swappable blade server from the BladeCenter unit, you
  must shut down the operating system on it by typing the shutdown -h now
  command or choosing the shut down option from your GUI. See "Turning off the
  blade server" on page 10 for details. You do not have to shut down the
  BladeCenter unit itself.
- Blue on a component indicates touch points, where you can grip the component to remove it from or install it in the blade server or BladeCenter unit, open or close a latch, and so on.
- Orange on a component or an orange label on or near a component indicates that the component can be hot-swapped. You can remove or install the component while the blade server or BladeCenter unit is running providing the blade server or BladeCenter unit and operating system support the hot-swappable capability. Orange can also indicate touch points on hot-swappable components. See the instructions for removing or installing a specific hot-swappable component for any additional procedures that you might have to perform before you remove or install the component.

## System reliability guidelines

To help ensure proper cooling and system reliability, make sure that:

• The ventilation holes on the blade server are not blocked.

- Each of the blade bays on the front of the BladeCenter unit has a blade server or filler blade installed. Do not operate the BladeCenter unit for more than 1 minute without a blade server or filler blade installed in each blade bay.
- You have followed the reliability guidelines in the documentation that comes with the BladeCenter unit.

## Handling static-sensitive devices

**Attention:** Static electricity can damage electronic devices and your system. To avoid damage, keep static-sensitive devices in their static-protective packages until you are ready to install them.

To reduce the possibility of electrostatic discharge, observe the following precautions:

- Limit your movement. Movement can cause static electricity to build up around you.
- Handle the device carefully, holding it by its edges or its frame.
- · Do not touch solder joints, pins, or exposed printed circuitry.
- · Do not leave the device where others can handle and damage it.
- While the device is still in its static-protective package, touch it to an *unpainted* metal part of the BladeCenter chassis for at least 2 seconds. This drains static electricity from the package and from your body.
- Remove the device from its package and install it directly into the blade server or BladeCenter unit without setting the device down. If it is necessary to set down the device, put it back into its static-protective package. Do not place the device on the blade server cover or on a metal surface.
- Take additional care when handling devices during cold weather. Heating reduces indoor humidity and increases static electricity.
- Wear an electrostatic-discharge wrist strap, if one is available.
## Removing the blade server from the BladeCenter unit

#### Attention:

- To maintain proper system cooling, do not operate the BladeCenter unit for more than 1 minute without a blade server or filler blades installed in each blade bay.
- Note the number of the bay that contains the blade server before you remove it. You must reinstall the blade server in the same bay from which it was removed. Reinstalling a blade server into a different bay than the one from which it was removed could have unexpected consequences, such as incorrect reconfiguration of the blade server. Some blade server configuration information and update options are established according to bay number.

If you reinstall the blade server into a different bay, you might have to reconfigure the blade server.

## Removing the blade server

The blade server is a hot-swappable device, and the blade bays in the BladeCenter unit are hot-swappable bays. Therefore, you can install or remove the blade server without removing power from the BladeCenter unit. However, you must turn off the blade server before removing it from the BladeCenter unit.

Complete the following steps to remove the blade server:



Figure 8. Removing the blade server

- 1. Read the safety information beginning on page vii and "Installation guidelines" on page 19.
- 2. If the blade server is operating, the power on LED is lit continuously (steady). Before you remove a blade server from the BladeCenter unit, you must shut down the operating system on it by typing the shutdown -h now command or choosing the shut down option from your GUI. See "Turning off the blade server" on page 10 for details. You do not have to shut down the BladeCenter unit itself.
- 3. Open the two release levers as shown in the illustration. The blade server moves out of the bay approximately 0.6 cm (0.25 inch).
- 4. Pull the blade server out of the bay.
- 5. Place either a filler blade or a new blade server in the bay within 1 minute.

## Opening and removing the blade server cover

You must open the blade server cover to access, install or remove any of the replaceable items except the front bezel assembly.



Figure 9. Opening the blade server cover

Complete the following steps to open the blade server cover:

- 1. Read the safety information beginning on page vii and "Installation guidelines" on page 19.
- 2. Carefully place the blade server on a flat, static-protective surface, with the cover side up.
- Press the blue blade cover release on each side of the blade server and lift the outer cover open (see Figure 9).
- 4. If you want to remove the cover, carefully lift it from the cover pins and set it aside (see Figure 9).

Statement 21:



#### CAUTION:

Hazardous energy is present when the blade server is connected to the power source. Always replace the blade cover before installing the blade server.

## Removing the BladeCenter PCI Express I/O Expansion Unit

You must remove BladeCenter PCI Express I/O Expansion Unit, if installed, to access, install or remove any of the replaceable items except the front bezel assembly.



Figure 10. Removing the expansion unit

Complete the following steps to remove BladeCenter PCI Express I/O Expansion Unit:

- 1. Read the safety information beginning on page vii and "Installation guidelines" on page 19.
- 2. Carefully place the blade server on a flat, static-protective surface, with the expansion unit side facing up.
- Press the blue blade cover release on each side of the blade server and lift the expansion unit (see Figure 10).
- 4. To remove the expansion unit, carefully lift it from the cover pins and set it aside.

#### Statement 21:



#### CAUTION: Hazardous energy is present when the blade server is connected to the power source. Always replace the blade cover before installing the blade server.

## Installing the optional InfiniBand card

The InfiniBand card connects to the high-speed connector on the system board using the two expansion card locator pins to assist with fitting and locking in place. Use the blue handling areas to handle the card, and, when it has been placed in position, to lock it into place.

**Note:** If you wish to install the InfiniBand 4X DDR Expansion Card (CFFh) you must install Red Hat Enterprise Linux 5.2 or higher.



Figure 11. InfiniBand card handling areas

Complete the following steps to install the InfiniBand card:

- 1. Shut down the BladeCenter QS21.
- 2. Remove the BladeCenter QS21 from BladeCenter unit.
- 3. Remove the top cover.
- 4. Locate the high-speed connector at location J200 on the system board.



Figure 12. Expansion card connector, locator pins, and ball stud

- 5. Remove the connector cover.
- 6. Locate the expansion card locator pins at the back of the system board.
- 7. Locate the connector and ball socket on the InfiniBand card.



Figure 13. InfiniBand card reverse view

8. Slide the InfiniBand card locator pin holes over the expansion card locator pins. The card rests on the locator pins.



Figure 14. Positioning the InfiniBand card

- 9. Check that the ball socket on the card is over the corresponding ball stud on the main board then carefully press the InfiniBand card into position. Use the blue areas only to avoid damage to the card.
- 10. Check that the blue locking clip has locked into position.
- 11. If you do not want to install any other options, replace the cover and insert the BladeCenter QS21 into the BladeCenter unit.

**Attention:** The connectors on the system board and the InfiniBand card are not designed for repeated removal or replacement of components. Avoid removing the InfiniBand card once it is in position,

## Adding I/O DDR2 memory modules

This section describes how to add extra I/O DDR2 memory. There are two slots per Cell/B.E. companion chip allowing up to 1 GB of memory for each Cell/B.E. companion chip for I/O buffering.



Figure 15. DIMM slot location

You must add memory as pairs of dual inline memory modules (DIMMs). You may fit one or more memory modules for each buffer, but each I/O buffer must use the same type of memory module and have the same amount of memory. The minimum amount of memory you can add is 512 MB per buffer, or one module per buffer. If you fit a single pair of DIMMs you must use slots JDIM00 and JDIM11.

The BladeCenter QS21 supports VLP DDR2 512 MB DIMMs only.

**Note:** The DIMMs are used as memory for the I/O buffers only. You cannot increase the size of system memory which is fixed at 1GB for each Cell/B.E. processor.

To install extra I/O buffer memory, complete the following steps:

- 1. Shut down the BladeCenter QS21.
- 2. Remove the BladeCenter QS21 from the BladeCenter unit.
- 3. Open the top cover.
- 4. Locate the DIMM slots in which you want to insert the I/O DDR2 memory. modules.



Figure 16. DIMM slot location

There are four DIMM slots, two for each Cell/B.E. companion chip. If this is the first pair of DIMMs you are installing, use slots 00 and 11. Slots 00 and 11 are the two outer slots as shown in Figure 16. For a second pair of DIMMs, use the remaining slots 01 and 10.

- 5. Remove the DIMM fillers from the slots where you want to insert the DIMMs. Retain the DIMM fillers. You need them if you remove any DIMMs from the blade server as they are an important part of the blade server cooling system.
- 6. Place the DIMM in the slot, contact side down. Check the orientation of the module. The central locating pin in the slot should match the corresponding cut-out on the module.
- 7. Carefully press the module into place until the retaining clips snap into position. Make sure that the clips are locked properly.



Figure 17. DIMM retaining clips

- 8. Repeat steps 6 and 7 until you have installed all the optional DIMMs.
- 9. Ensure that all unused DIMM slots are fitted with DIMM fillers.
- 10. If you do not want to install any other options, replace the cover and insert the BladeCenter QS21 into the BladeCenter unit.

## Installing the SAS expansion card

The BladeCenter QS21 does not have any built-in disk storage. The SAS expansion card allows you to connect storage to the BladeCenter QS21. Use the blue handling areas to handle the card.



Figure 18. SAS expansion card handling areas

Complete the following steps to install the SAS expansion card:

- 1. Shut down the BladeCenter QS21.
- 2. Remove the BladeCenter QS21 from the BladeCenter unit.
- 3. Open the top cover.
- 4. Locate the two SAS expansion card connectors at locations J22 and JFC\_18 and the ball stud on the system board.



Ball stud

Figure 19. SAS expansion card connector and ball stud location

5. Locate the connectors and the ball socket on the SAS card.



Figure 20. SAS expansion card reverse side

6. Align the connectors on the system board with the connector on the SAS card.



Figure 21. SAS expansion card location

- 7. Using the blue handling areas, carefully push the card down to insert it into the connectors. Ensure that the ball stud on the system board engages with the ball socket on the SAS expansion card.
- 8. If you do not want to install any other options, replace the cover and insert the BladeCenter QS21 into the BladeCenter unit.

## Installing the BladeCenter PCI Express I/O Expansion Unit

#### Important:

- A BladeCenter QS21 with the BladeCenter PCI Express I/O Expansion Unit installed takes up two contiguous slots in the BladeCenter chassis
- You must remove any expansion card using the high-speed connector before installing the expansion unit.



Figure 22. Installing the expansion unit

Complete the following steps to install the BladeCenter PCI Express I/O Expansion Unit:

- 1. Read the safety information beginning on page vii and "Installation guidelines" on page 19.
- 2. Remove the blade server cover and set it aside. See "Opening and removing the blade server cover" on page 22 for further information.
- 3. Remove the connector cover or any optional card from the high-speed connector. Figure 12 on page 24 shows the location of the high-speed connector.
- 4. Lower the expansion unit so that the slots at the rear slide down onto the cover pins at the rear of the blade server, as shown in Figure 22 on page 29.
- 5. Carefully close the expansion unit as shown in Figure 22 on page 29 until it clicks into place.

## Removing the blade-server front bezel assembly

Before you can replace a defective system board assembly or blade server front bezel assembly, you must first remove the blade server front bezel assembly. Figure 23 shows how to remove the front bezel assembly from a blade server.



Figure 23. Removing the front bezel assembly

Complete the following steps to remove the front bezel assembly:

- 1. Read the safety information beginning on page vii and "Installation guidelines" on page 19.
- 2. Open the blade server cover.
- 3. Carefully disconnect the control panel cable from the control panel connector.
- 4. Press the front bezel release on both sides of the system board and pull the front bezel assembly away from the blade server.
- 5. Store the front bezel assembly in a safe place.

## **Replacing the battery**

IBM has designed this product with your safety in mind. The lithium battery must be handled correctly to avoid possible danger. If you replace the battery, you must adhere to the following instructions.

Note: In the U. S., call 1-800-IBM-4333 for information about battery disposal.

If you replace the original lithium battery with a heavy-metal battery or a battery with heavy-metal components, be aware of the following environmental consideration. Batteries and accumulators that contain heavy metals must not be disposed of with normal domestic waste. They will be taken back free of charge by the manufacturer, distributor, or representative, to be recycled or disposed of in a proper manner.

To order replacement batteries, call 1-800-IBM-SERV within the United States, and 1-800-465-7999 or 1-800-465-6666 within Canada. Outside the U.S. and Canada, call your IBM authorized reseller or IBM marketing representative.

**Note:** After you replace the battery, the blade server is automatically reconfigured. However, you must reset the system date and time through the operating system that you installed.

Statement 2:



#### CAUTION:

When replacing the lithium battery, use only IBM Part Number 43W9859 or 03N2449 or an equivalent type battery recommended by the manufacturer. If your system has a module containing a lithium battery, replace it only with the same module type made by the same manufacturer. The battery contains lithium and can explode if not properly used, handled, or disposed of.

#### Do not:

- Throw or immerse into water
- Heat to more than 100°C (212°F)
- Repair or disassemble

#### Dispose of the battery as required by local ordinances or regulations.

**Note:** See "Battery return program" on page 84 for more information about battery disposal.

Complete the following steps to replace the battery:

- 1. Read the safety information beginning on page vii and "Installation guidelines" on page 19.
- 2. Follow any special handling and installation instructions that come with the battery.
- 3. If the blade server is operating, shut down the operating system by typing the shutdown -h now command or by choosing shut down from the GUI. If the blade server was not powered off, press the power control button (behind the blade server control panel door) to turn off the blade server. See "Blade server controls and LEDs" on page 11 for more information about the location of the power control button.
- 4. Remove the blade server from the BladeCenter unit (see "Removing the blade server from the BladeCenter unit" on page 21 for information).
- 5. Carefully place the blade server on a flat, static-protective surface.
- 6. Open the blade server cover (see "Opening and removing the blade server cover" on page 22 for instructions).
- 7. Locate the battery (connector BH1) on the system board.



Figure 24. Battery location

- 8. Remove the battery:
  - a. Use one finger to press the top of the battery clip away from the battery. The battery pops up when released.



- b. Use your thumb and index finger to lift the battery from the socket.
- c. Dispose of the battery as required by local ordinances or regulations.
- 9. Insert the new battery:
  - a. Tilt the battery so that you can insert it into the socket, under the battery clip.
  - b. Press the battery down into the socket until it clicks into place. Make sure the battery clip holds the battery securely.
- Close the blade server cover (see "Closing the blade server cover" on page 36).

Statement 21:



#### CAUTION:

Hazardous energy is present when the blade server is connected to the power source. Always replace the blade cover before installing the blade server.

- 11. Reinstall the blade server into the BladeCenter unit. See Chapter 3, "Installing the blade server," on page 15 for further information.
- 12. Turn on the blade server (see "Turning on the blade server" on page 9).
- 13. Reset the system date and time through the operating system that you installed. For additional information, see your operating-system documentation.

## Finishing the installation

To complete the installation you must:

- 1. Reinstall the front bezel assembly on the blade server if removed. See "Installing the front bezel assembly" for further information.
- 2. Ensure there is a DIMM filler or a DIMM in each of the I/O buffer DIMM slots.
- 3. Replace and close the blade server cover. See "Closing the blade server cover" on page 36 for further information.

Statement 21:



#### **CAUTION:**

Hazardous energy is present when the blade server is connected to the power source. Always replace the blade cover before installing the blade server.

- 4. Reinstall the blade server into the BladeCenter unit. See Chapter 3, "Installing the blade server," on page 15 for further information.
- 5. Turn on the blade server. See "Turning on the blade server" on page 9 for further information.
- 6. If you have replaced the battery or the system board assembly, reset the system date and time through the operating system that you installed. For additional information, see your operating system documentation.
- **Note:** If you have just powered on the BladeCenter unit, wait until the power on LED on the blade server flashes slowly before powering on the blade server.

## Installing the front bezel assembly

The following illustration shows how to reinstall the front bezel assembly on the blade server.



Figure 25. Reinstalling the front bezel assembly

Complete the following steps to install the blade server front bezel assembly:

- 1. Read the safety information beginning on page vii and "Installation guidelines" on page 19.
- 2. Connect the control panel cable to the control panel connector on the system board assembly.
- 3. Carefully slide the front bezel assembly onto the blade server, as shown in Figure 25, until it clicks into place.
- **Note:** Make sure that you do not pinch any cables when you reinstall the front bezel assembly.

## Closing the blade server cover

**Important:** The blade server cannot be inserted into the BladeCenter unit until the cover is installed and closed. Do not attempt to override this protection.



Figure 26. Closing the blade server cover

Complete the following steps to close the blade server cover:

- 1. Read the safety information beginning on page vii and "Installation guidelines" on page 19.
- 2. If you removed the front bezel assembly, replace it now. See "Installing the front bezel assembly" on page 34 for instructions, and Figure 26.
- 3. Lower the cover so that the slots at the rear slide down onto the pins at the rear of the blade server, as shown Figure 26. Before closing the cover, make sure that all components are installed and seated correctly and that you have not left loose tools or parts inside the blade server.
- 4. Carefully close the cover as shown in Figure 26 until it clicks into place.

## Input/output connectors and devices

The BladeCenter unit contains the input/output connectors that are available to the blade server. See the documentation that comes with the BladeCenter unit for information about the input/output connectors.

# Chapter 5. Configuring the blade server

This chapter describes how to:

- · Communicate with a newly-installed blade server.
- Use System Management Services (SMS) to view and update the system firmware revision number. This does not require the operating system to be installed.
- Update the baseboard management controller (BMC) firmware using the Advanced Management Module.
- Update the system firmware using the command-line utility.
- Configure the Ethernet gigabit controllers and in preparation for a network installation of the operating system.
- **Note:** You can update the BMC firmware through the Advanced Management Module Web interface without booting the operating system. However, to update the system firmware you must boot the operating system first. For information about installing the operating system, see Chapter 6, "Installing the operating system," on page 53.

## Communicating with the blade server

The operating system does not have to be booted before you can communicate with the BladeCenter QS21. You can access it through:

#### Advanced Management Module

The Web-based management and configuration program. This is your main access method to the blade server.

#### The command-line interface

See "Using the command-line interface" on page 38 for further information.

#### Serial over LAN (SOL)

This is similar to the serial interface, but allows you to connect to the blade server over the network. See "Using Serial over LAN" on page 38 for further information.

#### The serial interface

You can connect a PC or compatible terminal directly to the BladeCenter H or HT unit using a special cable. See "Using the serial interface" on page 39 for further information.

**Note:** The BladeCenter H and HT Serial Breakout cables are not supplied with the unit and must be ordered separately

#### System Management Services (SMS)

The SMS utility allows you to view and update the VPD, change the boot device and set network parameters. See "Using the SMS utility program" on page 39 for further information.

## **Using the Advanced Management Module**

The Advanced Management Module is the main means of administering the BladeCenter system. Use the Advanced Management Module Web-based management and configuration program to:

- Configure the BladeCenter unit
- Update and configure BladeCenter components including the BladeCenter QS21

- · Monitor the current system status
- · Check the event log for system and other errors

### Using the Web interface

Complete the following steps to start the Web-based management and configuration program:

 Open a Web browser. In the address or URL field, type the Internet protocol (IP) address or host name that is assigned for the Management Module remote connection. The default IP address is:

192.168.70.125

The Enter Network Password window opens.

2. Type your user name and password. Before you log in to the Advanced Management Module for the first time, contact your system administrator regarding whether your organization has assigned a user name and password to you. Use the initial (default) user name and password the first time that you log in to the Advanced Management Module. If you have an assigned user name and password, use them for all subsequent logins. All login attempts are documented in the event log.

The initial user ID and password for the Advanced Management Module are:

#### User ID

USERID (all capital letters)

#### Password

- PASSW0RD (note the number zero, not the letter O, in PASSW0RD)
- 3. Follow the instructions that appear on the screen. Be sure to set the timeout value that you want for your Web session.

The BladeCenter management and configuration window opens.

For additional information, see the *IBM BladeCenter Advanced Management Module User's Guide*.

#### Using the command-line interface

The IBM BladeCenter Advanced Management Module also provides a command-line interface to provide direct access to BladeCenter management functions. You can use this as an alternative to using the BladeCenter Management Module Web interface.

Through the command-line interface, you can issue commands to control the power and configuration of the blade server and other components in the BladeCenter unit. For information and instructions, see the *IBM BladeCenter Management Module Command-Line Interface Reference Guide*.

### **Using Serial over LAN**

To establish a Serial over LAN (SOL) connection to the blade server, you must configure the SOL feature for the blade server and start an SOL session as described in the *IBM BladeCenter Serial over LAN Setup Guide*. In addition, the Advanced Management Module must be configured as described in the *IBM BladeCenter Management Module User's Guide*, and the BladeCenter unit must be configured as described in the *IBM BladeCenter Serial over LAN Setup Guide*.

## Using the serial interface

Use the serial interface to:

- Observe firmware progress.
- Access the Linux terminal in order to configure Linux.

You can connect a PC serially through the BladeCenter unit using a specific UART cable. To connect to the serial console, plug the serial cable into the BladeCenter unit and connect the other end to a serial device or computer with a serial port. For more information, see the documentation that comes with your BladeCenter unit.

Set the following parameters for the serial connection on the terminal client:

- 115200 baud
- 8 data bits
- No parity
- · One stop bit
- No flow control

By default, the blade server sends output over SOL and to the serial port on the BladeCenter unit. However, the default for input is to use SOL. If you wish to use a device connected to the serial port for input you must press any key on that device while the blade server boots.

### Using the SMS utility program

The Advanced Management Module is the main means of administering the BladeCenter unit and the BladeCenter servers. However, another utility is provided which in some cases can give more information than that displayed in the Advanced Management Module. This is the System Management Services (SMS) utility program.

The SMS utility program allows you to view and update the VPD, change the boot list and set network parameters.

#### Starting SMS

Complete the following steps to start SMS:

- 1. Using a Telnet or SSH client, connect to the Advanced Management Module external Ethernet interface IP address.
- 2. When prompted, enter a valid user ID and password. The default management module user ID is USERID, and the default password is PASSW0RD, where the 0 is a zero.

**Note:** The user ID and password may have been changed. If so, check with the system administrator for a valid id and password.

3. Power cycle the blade server and start an SOL console session by using the power -cycle -c command.

For example, to power cycle and start an SOL remote text console with a blade server that is in the first bay of the BladeCenter unit, issue the command:

power -cycle -c -T system:blade[1]

To open a console session with a blade server that is already powered on, use the command:

console -T system:blade[1]

- After approximately 30 seconds, you see a sequence of checkpoint codes displayed on the console. These codes are generated by the Power On Self Test (POST).
- 5. When the POST menu and indicators displays a screen similar to:

```
QS21 Firmware Starting
Check ROM = OK
Build Date = Apr 24 2007 09:32:34
FW Version = "QB-1.6.0-0"
Press "F1" to enter Boot Configuration (SMS)
Initializing memory configuration...
MEMORY
Modules
          = Elpida 512MB, 3200 MHz
XDRlibrary = v0.32, Bin A/C, RevB, DualDD
Calibrate = Done
Test
           = Done
SYSTEM INFORMATION
Processor = Cell/B.E.(TM) DD3.2 @ 3200 MHz
I/O Bridge = Cell BE companion chip DD2.x
Timebase = 26666 kHz (internal)
SMP Size = 2 (4 threads)
Boot-Date = 2007-06-08 11:20
Memory
         = 2048MB (CPU0: 1024MB, CPU1: 1024MB)
```

Press F1 to display the SMS menu.

#### Viewing FRU information

The VPD on each blade server contains details about the machine type or model, serial number and the universal unique ID.

Complete the following steps to see this information:

1. Start SMS by completing the above steps. The SMS menu appears:

PowerPC Firmware Version HEAD SLOF-SMS 1.6 (c) Copyright IBM Corp. 2000,2005,2007 All rights reserved.	
<ul> <li>Main Menu</li> <li>Select Language</li> <li>Setup Remote IPL (Initial Program Load)</li> <li>Change SCSI Settings</li> <li>Select Console</li> <li>Select Boot Options</li> <li>Firmware Boot Side Options</li> <li>Progress Indicator History</li> <li>FRU Information</li> <li>Change SAS Boot Device</li> </ul>	
Navigation Keys:	
X = eXit System Management Services	
Type menu item number and press Enter or select Navigation key:	

2. Type 8 to select FRU Information. A screen similar to the following appears:

PowerPC Firmware Version HEAD SLOF-SMS 1.6 (c) Copyright IBM Corp. 2000,2005,2007 All rights reserved.
FRU Information
Machine Type and Model: 079232x
Machine Serial Number: ABCDEFG
Universal Unique ID: 12345678-1234-1234-1234-123456789ABC
Navigation Keys: M = return to Main Menu ESC key = return to previous screen X = eXit System Management Services
Select Navigation key :

Note: You cannot change the FRU information from this screen, only view it.

## Updating the system and BMC firmware

The firmware consists of two distinct packages:

- A firmware package for the baseboard management controller (BMC). This is referred to as the BMC firmware.
- A firmware package for the basic input/output system (BIOS) which runs on the Cell/B.E. processor. This is referred to as system firmware.
  - **Note:** The user and operating system interfaces of the system firmware are based on the Open Firmware standard. Detailed system information is provided through the Open Firmware device tree. You can use the client interface and Run-Time Abstraction Services (RTAS) to run management functions.

#### **BMC firmware**

- · Communicates with advanced management module
- · Controls power on
- Initializes the board, including the Cell/B.E. processors and clock chips
- · Monitors the physical board environment

#### System firmware

- · Takes over when the BMC has successfully initialized the board
- Acts as the basic input/output system (BIOS)
- · Includes boot-time diagnostics and power-on self test
- Prepares the system for the operating system boot

The packages are delivered separately and do not follow the same versioning scheme.

IBM provides two basic update options for updating or "flashing" the firmware: online and offline. The offline method requires you to use an alternate bootable media to restart the server and perform the firmware update. For greater

convenience and flexibility, IBM now also provides online updates that you can install while the operating system is running. The online method allows you to run the update at any time, with the flexibility to restart the server at a time when it is most convenient to do so. As a best practice, use the online update packages to perform all of your basic update functions

IBM periodically makes updates to both BMC and system firmware. These may be downloaded from http://www.ibm.com/support/us/en/.

**Note:** To avoid problems and to maintain proper system performance, always make sure that both the BMC firmware and the system firmware are at the same level for all BladeCenter QS21 servers within the BladeCenter unit.

### Updating steps

Complete the following steps to update the BMC and system firmware images:

- 1. Check the revision level of the firmware on the blade server and the level of the updates on http://www.ibm.com/support/us/en/. If the level on the Web site is higher than the version currently installed, continue with the updating steps.
- 2. Download the firmware updates.
- 3. Boot the operating system if it is not running already.
- 4. Update the BMC firmware using the update package or the Management Module. See "Updating the BMC firmware" on page 43 for further information.
- 5. Restart the blade server. This boots the blade server with the new BMC firmware.
- 6. Update the system firmware image. See "Installing the system firmware" on page 46 for further information.
- 7. The system reboots. This boots the blade server with the new system firmware.
- 8. Shut down the blade server.
- **Note:** There may be instances where you must update the BMC firmware before updating the system firmware. Check the *readme* file that comes with each firmware package for more information.

## Determining current blade server firmware levels

Complete the following steps to view the current firmware code levels for both the BMC and the system firmware:

- 1. Access and log on to the Advanced Management Module Web interface as described in the *Management Module User's Guide*.
- 2. From the Monitors menu section, select Firmware VPD:

2			10.128.6.254	BladeCenter Manag	ement Module - Mo	ozilla Firefox						6
<u>File Edit V</u> iew <u>G</u> o <u>B</u> ookmarks <u>T</u> o	ools	Help										
🖕 • 🛶 - 🧾 🔕 😭 🗋 http	p://mm	06/private/mair	n.ssi						•	🔘 Go	G,	
🗅 SUSE Linux 🛛 Entertainment 📄 Na	ews	🗀 Internet Seai	rch 🗀 Reference	🗀 Maps and Dir	ections 📋 Sho	opping 🗀	People and	Compani				
	-			-								1
LEM. Blade	Cer	iter <sub>e</sub> H A	dvanced N	lanagem	ent Mod	ule						6///
Bay 1: mm06												
User: USERID Blade	Cent	er Firmware	Vital Product Da	ata								
Monitors Use	e the fo	ollowing links to	jump down to diffe	rent sections on t	his page.							
A System Status	Blade	Firmware Vital	Product Data									
Event Log	VO MO	dule Firmware	Vital Product Data									
LEDs	Mana	gement Module	Firmware Vital Proc	duct Data								
Power Management	Fan-p	ack Firmware	/ital Product Data									
Hardware VPD	Blowe	r Firmware Vita	I Product Data									
Firmware VPD												
Remote Chassis Blade	Firm	ware Vital P	roduct Data									
Blade Tasks												
Power/Restart B	ay(s)	Name	Firmwar	re Type	Build ID	Released	Revis	sion				
On Demand 1	1	SN#Y1S0MA	731223 BIOS		QB0102000	03-02-20	007 1					
Remote Control			Blade sy	/s. mgmt. proc.	BNBT06b	n/a	1.0	)5				
Firmware Update												D
Configuration To r	reread	firmware Vital	Product Data for a b	lade, select the	plade, and click	Reload V	/PD".					
Serial Over LAN This	s proce	ess may take a	while.									
I/O Module Tasks	_											
Admin/Power/Restart Tar	rget A	II Blades	-	Reload VPD								
Configuration												
Firmware Update I/O Mo	odule	Firmware V	ital Product Data									
MM Control												
General Settings	Зау	Туре	Firmware Type	Build ID	Released	Revision	n					
Login Profiles 1	1	Ethernet SM	Boot ROM	WMZ03011	05/01/2006	0102						
Alerts			Main Application 1	WMZ03011	05/01/2006	0102						
Serial Port			Main Application 2	WMZ03011	05/01/2006	0102	-					
Port Assignments					1							
Network Interfaces												
Network Protocols Manag	geme	ent Module F	irmware Vital Pr	oduct Data								
Security	2 9 1/	Name	Eirmware Tur	Build ID	Eile Name		Delesced	Perision				
Firmware Update	ay	mm06	AMAM firmeria	BRETIST	CNETCA	IS DUT	02 27 07	37				
Configuration Mamt		111106	Awiwi nimiWah	DFE(25)	CNETCMU	13.CN1	02-27-07	37				
Configuration Wizard	2		Management	Moaule 2 is not	installed.							
Restart MM	_											
Service Tools Fan-p	ack F	irmware Vit	al Product Data									
×												
P P	Bay	Firmware Tvn	e Revision									

The **Blade Server Firmware Vital Product Data (VPD)** window shows the build identifier, release, and revision level of both the system firmware/BIOS and the BMC firmware. In the example above, the system firmware or BIOS version is QB01020000 and the BMC firmware is BNBT06b.

Compare this information to the firmware information provided at http://www.ibm.com/support/us/en/. If the two match, then the blade server has the latest firmware. If not, download the firmware package from the IBM Support Web site. See "Updating the BMC firmware" or the IBM Support Web site for installation instructions.

You can also view the firmware level from within the operating system by using the following command:

xxd /proc/device-tree/openprom/ibm,fw-vernum\_encoded

Output is similar to:

0000000: 5142 3031 3031 3030 3000 00 Q

QB0101000..

where QB0101000 is the system firmware version.

**Note:** The system firmware version displayed by the BladeCenter Advanced Management Module might be different from the version displayed by your operating system. Cross-reference information is given in the firmware information at http://www.ibm.com/support/us/en/, and in the *readme* file which comes with the firmware image.

### Updating the BMC firmware

You can update the BMC firmware from the Linux prompt using the update package, if you have installed RHEL 5.2, or from Advanced Management Module.

The Linux executable package allows you to run the firmware update without exiting the Linux environment. In addition, when you run it with the -x (extract) option, the package allows you to extract the Linux update files to a specified location.

### Using the BMC update package

If you have not done so already you must install RHEL 5.2 or later before you can update the BMC firmware from the Linux command prompt.

Complete the following steps to update the BMC firmware from the Linux command prompt:

- 1. Check the README that comes with the BMC firmware as it contains specific information about that particular firmware release.
- 2. Boot the blade server and the operating system.
- 3. Download the package from the IBM support site at http://www.ibm.com/support/ us/en/. The update package has a .sh extension.
- 4. Change to the directory where you have downloaded the package.
- 5. Run the package using the -s option.
- 6. Reboot the blade server.

#### Using the Advanced Management Module

Complete the following steps to update the BMC firmware:

- 1. Download the BMC firmware image file from http://www.ibm.com/support/us/en/ to a suitable location on a server that is accessible on the network. The BMC firmware image file name has the format BNBT<version number>.pkt.
- 2. Power off the blade server you want to update.
- 3. Log in to the Advanced Management Module Web interface.
- 4. Click **Firmware Update** from the Blade Tasks submenu at the left of your screen. The following screen appears:



- 5. Choose the blade server you want to update (target) and browse to the firmware image file.
- 6. Click on Update.
- 7. The validity of the image is checked, then the following screen appears:



#### Click Continue.

8. The next screen shows the firmware update progress:



When the update is finished, a confirmation message appears and an entry is placed in the Advanced Management Module log.

- 9. Power up and boot the blade server.
- **Note:** BladeCenter QS21 firmware contains a proprietary implementation of Cell/B.E. hardware initialization code.

### Installing the system firmware

System firmware can only be installed after the operating system has booted. If the operating system is not installed or cannot boot, then no upgrade or recovery is possible. See the other sections of the manual Chapter 7, "Solving problems," on page 59 for further information about troubleshooting the BladeCenter QS21 blade server.

You can update the system firmware:

- Through IBM Director. See the IBM Director documentation on the *IBM Director* CD for further information.
- Using the update package available from http://www.ibm.com/support/us/en/. See "Updating the system firmware automatically" on page 48 for further information on how to perform an update.
- Using the update\_flash script available on supported Linux operating systems. This requires the system firmware image file. See "The firmware update package" on page 47 for information about how to extract the file.
- Updating the firmware manually. See "Installing the firmware manually" on page 48 for further information.

For all the above options Linux needs to have a current version of rtas\_flash device driver installed. This is normally installed with the operating system. If it is not, see the installation guide for the *Software Development Kit for Multicore Acceleration* for instructions about how to get this device driver and install it.

**Note:** You may have to update the BMC before updating the system firmware. See the *README* file that comes with the package.

## The firmware update package

You can update firmware using the update packages available from http://www.ibm.com/support/us/en/. These can be installed either through IBM Director or by executing the .sh file contained in the package. This section describes how to use the update package to install the firmware update or extract the firmware image for manual installation.

To install the firmware package using IBM Director, see the documentation on the *IBM Director* CD.

**Note:** The blade server must be configured and have a running Linux operating system before the package can be extracted or installed.

The update package consists of 4 files:

- A file containing the change history for the BladeCenter QS21 system firmware. This has a .chg extension.
- A file containing the update package. This has an .sh extension.
- A readme file for the update package. This contains specific installation and configuration information.
- An XML file. This file is for use by IBM Systems Management tools, including IBM Director Update Manager, UpdateXpress CD, and UpdateXpress System Pack Installer.

#### Using the package

The package consists of a file with a .sh extension that runs from the Linux prompt. It has a number of options. To see what options are available, run the package without any options or with the -h switch:

# ./ibm\_fw\_bios\_qb-1.9.1-2\_linux\_cell.sh

In this example, ibm\_fw\_bios\_qb-1.9.1-3\_linux\_cell.sh is the name of the firmware update package. The file name changes according to the version of the firmware.

A screen similar to the following appears:

```
Usage:

-x /someDirectory - Extract the payload to <some directory>

-xr /someDirectory - Extract the payload plus PkgSdk files to <some directory>

-xd /dev/fd0 - Create a DOS bootable diskette - Internel floppy drive

-xd /dev/sda - Create a DOS bootable diskette - External USB floppy drive

-u - Perform update unattended

-h - Display this help screen

++debug - Display helpful debug information

Note:

All other command line arguments are passed to the

payload executable
```

The -xd options are not supported on the BladeCenter QS21 blade server.

#### The -x option

This enables to extract another executable file, in this example ibm\_fw\_bios\_qb-1.9.1-2.sh which in turn may be run to create the .bin file required if you wish to update the firmware manually. See "Installing the firmware manually" for further information.

#### The -u option

This performs an unattended and automatic update of the system firmware. The blade server reboots automatically as part of the update process.

#### Updating the system firmware automatically

Complete the following steps to update the firmware automatically using the update package:

- 1. Check the README before attempting to update the system firmware as it contains specific information about the particular firmware release.
- 2. Download the update package from http://www.ibm.com/support/us/en/. The update package has a .sh extension.
- 3. Change to the directory where you have downloaded the package.
- 4. Run the package with the -u option. Using the example from above, at the command prompt enter:

```
./ibm_fw_bios_qb-1.9.1-2_linux_cell.sh -u
```

5. Check the system firmware images to confirm the update has succeeded. See "Determining current blade server firmware levels" on page 42 for instructions.

### Installing the firmware manually

If you cannot update the firmware using the update\_flash script, it is possible to update the firmware manually. You can use rtas\_flash over /proc.

Complete the following steps to install the firmware manually:

- 1. Download the update package from http://www.ibm.com/support/us/en/.
- 2. Extract the system firmware image package. At the command prompt enter: ./<update package> -x <target directory>

For example, to extract the image package ibm\_fw\_bios\_qb-1.9.1-2.sh from ibm\_fw\_bios\_qb-1.9.1-2\_linux\_cell.sh in the directory /temp/fwimage enter: ./ibm\_fw\_bios\_qb-1.9.1-2\_linux\_cell.sh -x /temp/fwimage

If the directory does not exist the firmware package creates it.

- 3. Change to the directory containing the firmware image package.
- 4. Extract the firmware image. At the command prompt enter:

./<image package> -x

For example, to extract the image file QB-1.9.1-2-boot\_rom.bin from ibm\_fw\_bios\_qb-1.9.1-2.sh enter:

./ibm\_fw\_bios\_qb-1.9.1-2.sh -x

- 5. Ensure the rtas\_flash driver is loaded. To do this, run lsmod.
- If the module is not yet in the kernel, invoke the following to load it: modprobe rtas flash
- 7. To update your current firmware, copy the image file to /proc/ppc64/rtas/ firmware\_update and reboot manually:

cp <image-file> /proc/ppc64/rtas/firmware\_update
shutdown -r now

For example, to copy the image file cp QB-1.9.1-2-boot\_rom.bin to /proc/ppc64/rtas/firmware\_update enter:

cp QB-1.9.1-2-boot\_rom.bin /proc/ppc64/rtas/firmware\_update
shutdown -r now

8. Once the system reboots, update the system firmware images. See "Updating the system firmware images" for instructions.

## Updating the system firmware images

Once the system firmware is updated, the BladeCenter QS21 boots from the new firmware. However, there are always two copies of the system firmware image on the blade server:

- **TEMP** This is the firmware image normally used in the boot process. When the firmware is updated, it is the TEMP image that is replaced.
- **PERM** This is a backup copy of the system firmware boot image. The blade server only boots from this image if the TEMP image is corrupt. See "Recovering the system firmware code" on page 63 for further information about how to recover from a corrupt TEMP image.

Once you have updated the system firmware and booted the blade server, you should copy the TEMP image to the PERM image. This ensures that the PERM and TEMP images are at the same revision level. The TEMP and PERM images should always be at the same revision level.

There are two commands you can use to update an old image on PERM.

• From the Linux prompt issue the following command:

update\_flash -c

**Note:** The script checks whether the board has booted from the TEMP image. If not, the script does not complete.

• From the Linux prompt issue the following command:

echo 0 > /proc/rtas/manage\_flash

For more information on booting from the TEMP or PERM images, see "Recovering the system firmware code" on page 63.

## Updating the optional expansion card firmware

If you have installed the SAS optional expansion card or the high-speed InfiniBand expansion card you may have to update the firmware. See the documentation that comes with the components for instructions about how to update the firmware.

IBM periodically makes updates available for both SAS and InfiniBand expansion cards. These may be downloaded from http://www.ibm.com/support/us/en/.

### Integrating the Gigabit Ethernet controller into the BladeCenter

One dual-port Gigabit Ethernet controller is integrated on the blade server system board. Each controller port provides a 1000-Mbps full-duplex interface connecting to one of the Ethernet Switch Modules in BladeCenter unit I/O bays 1 and 2 of the BladeCenter H unit or the BladeCenter HT unit. These enable simultaneous transmission and reception of data on the Ethernet local area network (LAN).

Each Ethernet-controller port on the system board is routed to a different switch module in I/O bay 1 or bay 2. The routing from the Ethernet-controller port to the I/O bay varies according to whether an Ethernet adapter is enabled and the operating system that is installed. See "Blade server Ethernet controller enumeration" on page 52 for information about how to determine the routing from the Ethernet-controller ports to I/O bays for your blade server.

You do not have to set any jumpers or configure the controller for the blade server operating system. However, you must install a device driver to enable the blade server operating system to address the Ethernet-controller ports. For device drivers and information about configuring your Ethernet controller ports, see the Ethernet software documentation that comes with your blade server, or contact your IBM marketing representative or authorized reseller. For updated information about configuring the controllers, go to the Barcelona Computing Centre Web site at http://www.bsc.es/projects/deepcomputing/linuxoncell/.

**Note:** If your blade server contains a different type of optional Ethernet-compatible switch module in I/O bay 1 than the switch modules that are mentioned in this section, see the documentation that comes with the Ethernet switch module that you are using.

### Updating the Ethernet controller firmware

To update the Ethernet controller firmware, you must download an update package from http://www.ibm.com/support/us/en/. This section describes how to use the update package to install the firmware update.

The update package consists of four files:

- A file containing the change history for the QS22 Ethernet Controller firmware. This has a .chg extension.
- A file containing the update package. This has an .sh extension.
- A readme file for the update package. This contains specific installation and configuration information.
- An XML file. This file is for use by IBM Systems Management tools, including IBM Director Update Manager, UpdateXpress CD, and UpdateXpress System Pack Installer.

### Using the update package

The package consists of an file with a .sh extension that runs from the Linux prompt. It has a number of options. To see what options are available, run the package without any options or with the -h switch:

# ./brcm\_fw\_nic\_2.0.3-e-1\_rhel5\_cell.sh

In the example shown above, brcm\_fw\_nic\_2.0.3-e-1\_rhel5\_cell.sh is the name of the firmware update package. The file name changes according to the version of the firmware.

A screen similar to the following appears:

```
Usage:

-x /someDirectory - Extract the payload to <some directory>

-xr /someDirectory - Extract the payload plus PkgSdk files to <some directory>

-xd /dev/fd0 - Create a DOS bootable diskette - Internel floppy drive

-xd /dev/sda - Create a DOS bootable diskette - External USB floppy drive

-u - Perform update unattended

-h - Display this help screen

++debug - Display helpful debug information
```

The -xd and -x options are not supported on BladeCenter QS21.

The -u option performs an unattended and automatic update of the firmware. The blade server reboots automatically as part of the update process.

### Firmware update steps

Complete the following steps to update the firmware automatically:

- 1. Check the README before attempting to update the system firmware as it contains specific information about the particular firmware release.
- 2. Download the update package from http://www.ibm.com/support/us/en/. The update package has a .sh extension.
- 3. Change to the directory where you have downloaded the package.
- 4. Run the package with the -u option. Using the example from above, at the command prompt enter:

./ brcm\_fw\_nic\_2.0.3-e-1\_rhel5\_cell.sh -u

During the update process, messages similar to the following appear on the console:

[root@c4b14 brcm-2.0.3 IBM Ethernet Firmware	-ppc]# . Update T	/ brcm_f ool, Ver	w_nic_2 sion 1.	.0.3-e-1_ 0.2	_rhel5_cell	.sh -u
Warning. No Broadcom N	etXtreme	II adap	ters fo	und.		
ADAPTER MAC	BOOT	IPMI	ASF	PXE	UMP	
001A640E030C (5704s) 001A640E030D (5704s)	3.21 NA	2.20 NA	NA NA	NA NA	NA NA	
Updating Broadcom NetX Updating 001A640E030C Updating 001A640E030C Error! Firmware not de	treme ad using fi using fi tected o	apters. le 16A8b le 16A8i n device	c.bin pmi.bin 001A64	> ( > ( 0E030D.	Jpdate succ Jpdate succ	cessful cessful
Warning. No Broadcom N	etXtreme	II adap	ters fo	und.		
ADAPTER MAC	BOOT	IPMI	ASF	PXE	UMP	
001A640E030C (5704s) 001A640E030D (5704s)	3.38 NA	2.47 NA	NA NA	NA NA	NA NA	
One or more errors occ	urred du	ring the	firmwa	re update	e process.	See /var

**Note:** The error message shown above is correct as it refers to an adapter not available on BladeCenter QS21.

## Blade server Ethernet controller enumeration

The enumeration of the Ethernet controller or controller ports in a blade server is operating system dependent. You can verify the Ethernet controller or controller port designations that a blade server uses through your operating system settings.

The routing of an Ethernet controller or controller port to a particular BladeCenter unit I/O bay depends on the type of Ethernet expansion card that is installed. You can verify which Ethernet-controller port in this blade server is routed to which I/O bay by using the following test:

- 1. Install only one Ethernet switch module or pass-thru module, in I/O bay 1.
- Make sure that the ports on the switch module or pass-thru module are enabled (Switch Tasks → Management → Advanced Switch Management in the BladeCenter Management Module Web interface).
- 3. Enable only one of the Ethernet-controller ports on the blade server. Note the designation that the blade server operating system has for the controller port.
- 4. Ping an external computer on the network connected to the Ethernet switch module. If you can ping the external computer, the Ethernet-controller port that you enabled is associated with the switch module in I/O bay 1. The other Ethernet-controller port in the blade server is associated with the switch module in I/O bay 2.

Communications from optional I/O expansion cards are routed to I/O bays 3 and 4. If you have installed an I/O expansion card on the blade server you can verify which controller port on an expansion card is routed to which I/O bay by performing the same test, using a controller on the expansion card and a compatible switch module or pass-thru module in I/O bay 3 or 4.

## Finishing the configuration

You do not have to set any passwords to use the blade server. If you change the battery or replace the system-board assembly, you must reset the date and time through your operating system.

For information about setting up your network configuration for remote management, see the *IBM BladeCenter Planning and Installation Guide* or the *Installation and User's Guide* for your BladeCenter unit. You can find this documentation at http://www.ibm.com/support/us/en/.

# Chapter 6. Installing the operating system

BladeCenter QS21 supports the following operating systems:

- Red Hat Enterprise Linux 5.1
- Red Hat Enterprise Linux 5.2

If you download Linux distributions, ensure that you download the version compatible with Cell/B.E.

Fedora (Fedora 7 and later) can be installed and supported from the Open Source only. You can view the current support levels in the Information Center topic Specified operating environments for Cell Broadband Engine solution.

For general information on installing Linux, see the installation instructions that come with the distribution or are available at http://www.redhat.com/.

For additional instructions specific to your blade server, check for QS21 documentation on the BladeCenter support Web site at http://www.ibm.com/ systems/bladecenter/support/.

If you need to install Linux on numerous blade servers, consider using DIM (Distributed Image Management for Linux Clusters). DIM is a sophisticated cluster management system especially for large and very large number of nodes. For more information on DIM see http://www.alphaworks.ibm.com/tech/dim/.

**Note:** IBM may add support for later versions of the operating systems or other operating systems. You can check the IBM support Web site or the Information Center topic Specified operating environments for Cell Broadband Engine solution to see the currently supported operating systems and levels.

### Preparing a boot device

BladeCenter QS21 does not come with any onboard hard disks or other storage. Instead, you must allocate storage to BladeCenter QS21 as a resource. You can allocate:

- Networked storage
- · SAS attached storage
- **Note:** A remote SAS storage must boot before BladeCenter QS21 attempts to boot the operating system from it.

### Using a boot device on the network

You cannot directly install Linux on a network device attached to BladeCenter QS21. First you need to create an initial installation on a 64-bit POWER<sup>™</sup> based system with local storage. You can then create multiple copies of the root file system on an NFS server. To be able to boot a particular blade server from a copy, adapt the instance specifics to the blade server and export the adapted copy for NFS mounting.

Figure 27 on page 54 illustrates the main steps for creating a network installation that BladeCenter QS21 can boot from.



Figure 27. Installation overview for NLS boot device

For details see the *IBM Software Development Kit for Multicore Acceleration Version 3.0.0 Installation Guide.* 

**Note:** Be aware that your BladeCenter QS21 has two Ethernet controllers and can be connected to two Ethernet switches. As the blade center performs a network boot from the controller that acquires the IP address, first make sure that your Linux configuration supports this. If your Linux environment requires a static IP address for a particular Ethernet port, you must set up your DHCP environment accordingly.

## Configuring a SAS boot device

If you have installed the optional SAS expansion card you can attach supported local storage to it and configure the storage accordingly. See the documentation that comes with the SAS expansion card for further information.

BladeCenter QS21 supports IBM System Storage DS3200 (DS3200) including the IBM System Storage EXP3000 expansion option as SAS attached storage.

You must configure storage on your DS3200 storage system before you can use it as a SAS boot device. Also configure any options, such as RAID arrays, before installing the operating system. For the configuration you use a management station that runs a Storage Manager. Use the Storage Manager for the operating system on your management station:

Linux IBM System Storage DS3000 Storage Manager

Windows Simplicity Storage Manager

For installation instructions, see the documentation that comes with your Storage Manager.

The descriptions in this section are based on the System Storage DS3000 Storage Manager. The Simplicity Storage Manager, might have a slightly different user interface.

Figure 28 on page 55 shows a schematic setup with a network connection between the workstation that runs the Storage Manager and the DS3200 storage system.



Figure 28. DS3200 setup for BladeCenter QS21

The SAS expansion card is attached to the PCI-X connector of the blade server. One or two SAS cables connect the SAS switch at the rear of the BladeCenter unit to the DS3200 storage system. Production environments, typically, have multiple storage systems and a more complex SAS fabric, including two switches to provide redundancy.

Perform the following steps to configure a boot device:

- 1. Start your Storage Manager. For details on steps 2 to 6 see the documentation that comes with the Storage Manager.
- 2. Make the DS3200 storage system accessible to the Storage Manager by performing a discovery.
- 3. Assign a name to the DS3200 storage system.
- 4. Make the storage system accessible to the blade server by configuring host access for the blade server.
- 5. Create a logical drive and map it to the blade server. Note the logical unit number (LUN) you assign when you map the new logical drive to the blade server. You need this LUN when defining the logical drive as a boot device for the blade server.
- 6. Find out the SAS address for the boot device.
  - a. Click the Summary tab.
  - b. Click Storage System Profile.
  - c. In the Storage Systems Profile notebook, click the Controllers tab.
  - d. Scroll to the information for host interface Sas.
  - e. The SAS address for the boot device is specified as the World-wide identifier of the Sas host interface.
- 7. Configure the SAS drive as a boot device by performing the following steps from an SMS session with your blade server:
  - a. Select Change SAS Boot Device on the SAS main menu.
  - b. Select Change SAS Boot Device Address on the SAS Settings menu.
  - c. Type the address of step 6e and press Enter.
  - d. Return to the SAS Settings menu.
  - e. Select Change SAS Boot Device LUN Id on the SAS Settings menu.
  - f. Type the LUN you assigned in step 5 and press Enter. Omit any colons that were shown in the Storage Manager window to separate pairs of hexadecimal digits.

You are now ready to install the operating system.

### Preparing the installation source

This section applies if you install the operating system directly on the blade server, for example on SAS-attached storage. If you perform an initial installation on an alternative POWER-based system, as suggested in "Using a boot device on the network" on page 53, see the installation instructions for that system.

Before you install the operating system on the blade server, make sure that the blade server is turned on. You must first provide an SOL or make a direct serial connection to the blade server before installing your operating system. If you have not already done so, configure the SOL feature on the blade server to establish an SOL connection and enable the SOL feature; then, start an SOL session. For instructions, see the *IBM BladeCenter Serial over LAN Setup Guide* and the *BladeCenter Management Module Command-Line Interface Reference Guide*. For information about SOL commands, see the documentation for your operating system.

You can install over the network, from the CD/DVD drive on the media tray, or from an ISO image.

### Installing over the network

To install over the network, the installation packages must be copied to a server that the BladeCenter QS21 can access through the network. You can also install from a CD/DVD drive connected to a server that the BladeCenter QS21 can access through the network.

If you plan to install the operating system through the Ethernet network, see:

- "Integrating the Gigabit Ethernet controller into the BladeCenter" on page 49
- "Blade server Ethernet controller enumeration" on page 52
- The documentation that comes with the Ethernet switch module that you are using.

Note: A network boot uses the DHCP, BOOTP, and TFTP protocols.

### Installing from the media tray

The BladeCenter QS21 does not come with a built-in CD/DVD drive. Instead, you must use the media tray on the BladeCenter unit.

To allocate the media tray to the blade server, press the media tray select button which is on the front panel of the blade server. Alternatively, you can use the Advanced Management Module to allocate the media tray to the blade server.

### Installing using an ISO image

You can install an operating system from an ISO image of the installation media. Use the Advanced Management Module to mount the ISO image on your blade server. For details see *IBM BladeCenter Management Module User's Guide*.

## Post installation configuration

After you install the operating system on the blade server, you must install any service packs or update packages that come with the operating system. For additional information, see http://www.ibm.com/support/us/en/, the instructions that come with your operating-system documentation and the service packs or update
packages. Some options have device drivers that you must install. See the documentation that comes with the options for information about installing any required device drivers.

If your operating system does not have the required device drivers, contact your IBM marketing representative or authorized reseller, or see your operating system documentation for additional information.

If you want to use the Wake on LAN feature, ensure that it is active. You might have to activate it with ethtool.

# Chapter 7. Solving problems

This chapter provides basic troubleshooting information to help you solve some common problems that might occur while setting up your blade server.

A problem with the BladeCenter QS21 can relate either to the BladeCenter QS21 or the BladeCenter unit.

A problem with the blade server exists if the BladeCenter unit contains more than one blade server and only one of the blade servers has the symptom. If all of the blade servers have the same symptom, then the problem relates to the BladeCenter unit. For more information, see the documentation that comes with your BladeCenter unit.

**Note:** The BladeCenter QS21 is supported in the BladeCenter H Type 8852 unit and the BladeCenter HT Type 8740 and 8750 (enterprise environment only) unit. However you can put other blade servers compatible with the BladeCenter units in the same unit as a BladeCenter QS21.

### **Prerequisites**

Before you start problem determination or servicing, check that:

- The BladeCenter QS21 is inserted correctly into the BladeCenter unit
- · All components are connected correctly
- The BladeCenter QS21 has the latest firmware updates. These include:
  - BMC
  - System
  - Gigabit Ethernet controller
  - SAS expansion card (if installed)
  - InfiniBand high-speed expansion card (if installed)

### **Basic checks**

If you install the blade server in the BladeCenter unit and the blade server does not start, always perform the following basic checks before continuing with more advanced troubleshooting:

- Make sure that the BladeCenter unit is correctly connected to a power source.
- Reseat the blade server in the BladeCenter unit (see Chapter 3, "Installing the blade server," on page 15).
- If the power on LED is flashing slowly, the blade server may be turned off. To turn on the blade server, see "Turning on the blade server" on page 9 for further information.
- If you have just added a new optional device or component, make sure that it is correctly installed and compatible with the blade server and its components. If the device or component is not compatible, remove it from the blade server, reinstall the blade server in the BladeCenter unit, and then restart the blade server.
- Use Advanced Management Module to check that the blade server appears in the list of blade servers available.

### **Troubleshooting charts**

The following tables list problem symptoms and suggested solutions. If you cannot find the problem in the troubleshooting charts, or if carrying out the suggested steps do not solve the problem, have the blade server serviced.

If you have problems with an adapter, monitor, keyboard, mouse, or power module, see the *Problem Determination and Service Guide* that comes with your BladeCenter unit for more information.

If you have problems with an Ethernet switch module, I/O adapter, or other optional device that can be installed in the BladeCenter unit, see the *Problem Determination and Service Guide* or other documentation that comes with the device for more information.

## Problems indicated by the front panel LEDs

The state of the LEDs on the front of the blade can help in isolating problems.

The table below gives an explanation and a suggested action, if required, for each



Figure 29. Power-control button and LEDS

LED.

Table 1. Explanation of LEDs and their states

LED	State	Explanation	Suggested action
Blade error LED	Amber	A system error has occurred on the blade server.	Check the BladeCenter error log, see <i>QS21 Problem</i> <i>Determination and Service</i> <i>Guide</i> .
Information LED	Amber	Information about a system error has been placed in the Advanced Management Module Event Log. The information LED remains on until turned off by Advanced Management Module or through IBM Director Console.	Check Advanced Management Module to see what the problem is. See the <i>BladeCenter Management</i> <i>Module User's Guide</i> for further information about the error.

Table 1.	Explanation	of LEDs	and their	states	(continued)
----------	-------------	---------	-----------	--------	-------------

LED	State	Explanation	Suggested action
Activity LED	Green	There is network activity.	No action required. For further information about troubleshooting networks, see "Network connection problems" on page 62.
Power-on LED	Flashing rapidly	The service processor on the blade server is communicating with the BladeCenter Management Module.	No action required
	Flashing slowly	The blade server has power but is not turned on.	Turn on if required
	Lit continuously (steady)	The blade server has power and is turned on.	No action required
	Not lit.	Blade server not powered.	<ol> <li>Reseat blade server.</li> <li>Check if BladeCenter power supplies numbers 3 and 4 are installed and powered. If they are not, install and power them or use slots 1-5.</li> <li>Go to "Power problems"</li> </ol>
			3. Go to Power problems

## **Power problems**

Power symptom	Suggested action
The blade server does not turn on.	<ol> <li>Make sure that:         <ul> <li>The power-on LED on the front of the BladeCenter unit is lit.</li> <li>The LEDs on all the BladeCenter power modules are lit.</li> <li>The power-on LED on the blade-server control panel is flashing slowly.</li> <li>The power-on LED flashes rapidly for a short period to indicate it is communicating with Advanced Management Module. If the power-on LED to flash rapidly and continues to do so, the blade server is not communicating with the management module; reseat the blade server and reboot.</li> <li>If the power LED is off, either the blade bay is not receiving power, the blade server is defective, the Advanced Management Module firmware is an earlier version and does not support this function, or the LED information panel is loose or defective.</li> <li>Local power control for the blade server is enabled. Check using the Advanced Management Module Web interface. The blade server might have been instructed through the Advanced Management Module to turn on.</li> </ul> </li> </ol>
	2. If you have just installed a new option in the blade server, remove it, and restart the blade server. If the blade server now powers on, troubleshoot the option. See the documentation that comes with the option for further information.
	3. Try another blade server in the blade bay. If it works, you may need to have a trained service technician replace the system blade assembly.

#### Power throttling

Be aware that the BladeCenter unit automatically reduces the BladeCenter QS21 processor speed if certain conditions are met. One such condition is temperature thresholds being exceeded, for example, when the blade server is running in

acoustic mode. This throttling occurs independent of your power configuration. Full processor speed is restored automatically when the conditions that have caused the throttling have been resolved.

# Network connection problems

Network connection symptom	Suggested action
One or more blade servers are unable to communicate with the network.	<ul> <li>Make sure that:</li> <li>The switch modules for the network interface being used are installed in the correct BladeCenter bays and are configured and operating correctly.</li> <li>The settings in the switch module are correct for the blade server (settings in the switch module are blade server specific).</li> </ul>
	For additional information, see:
	Chapter 5, "Configuring the blade server," on page 37
	• The <i>Problem Determination and Service Guide</i> that comes with your BladeCenter unit
	Other product-specific documentation that comes with the switch module
	<b>Note:</b> For the latest editions of the IBM BladeCenter documentation, go to http://www.ibm.com/support/us/en/.
	If the problem remains, see QS21 Problem Determination and Service Guide.
	If all the blades cannot communicate with the network, check the network itself for problems.

## Service processor problems

Service processor symptom	Suggested action
Service processor reports a general monitor failure.	<ol> <li>If the blade server is operating, shut down the operating system.</li> <li>If the blade server was not turned off, press the power-control button (behind the blade server control-panel door) to turn off the server.</li> <li>Remove the blade server from the BladeCenter unit.</li> <li>Wait 30 seconds and reinstall the blade server into the BladeCenter unit.</li> <li>Restart the blade server.</li> <li>If the problem remains, see QS21 Problem Determination and Service Guide</li> </ol>

#### Recovering the system firmware code

The system firmware is contained in two separate images in the flash memory of the blade server: temporary and permanent. These images are referred to as TEMP and PERM, respectively. The system normally starts from the TEMP image, and the PERM image serves as a backup. If the TEMP image becomes damaged, such as from a power failure during a firmware update, the system automatically starts from the PERM image.

If the TEMP image is damaged, you can recover the TEMP image from the PERM image. See "Recovering the TEMP image from the PERM image" for further information.

#### Checking the boot image

To check whether the system has started from the PERM image, enter:

cat /proc/device-tree/openprom/ibm,fw-bank

A P is returned if the system has started from the PERM image.

### Booting from the TEMP image

To initiate a boot from the TEMP image after the system has booted from the PERM side, complete the following steps:

- 1. Turn off the blade server.
- 2. Restart the blade system management processor from the Advanced Management Module.
- 3. Turn on the blade server.

**Note:** If the temp side is corrupted the boot times out, and an automatic reboot occurs after switching to the PERM side.

If the blade server does not restart, you must replace the system board assembly. Contact a service support representative for assistance.

### Recovering the TEMP image from the PERM image

To recover the TEMP image from the PERM image, you must copy the PERM image into the TEMP image. To perform the copy, complete the following steps:

1. Copy the perm image to the temp image. Using the Linux operating system, type the following command:

update\_flash -r

- 2. Shut down the blade server using the operating system.
- 3. Restart the blade system management processor from the management module.
- 4. Turn on the blade server.

You might need to update the firmware code to the latest version. See "Updating the system and BMC firmware" on page 41 for more information on updating the firmware code.

#### System firmware startup messages

The system firmware displays the progress of the startup process on the serial console from the time that ac power is connected to the system until the operating system login prompt is displayed following a successful operating system startup.

If a serial console is not connected, you can use the Advanced Management Module to monitor the logs and display informational and error messages.

If the firmware encounters an error during the startup process, a message describing the error together with an error code is displayed on the serial console.

There are two types of error, where xxx represents the number of the error code:

- **Cxxx** This is an internal checkpoint. If the system stops during the startup process a checkpoint may be displayed.
- **Exxx** This type of error means that there is a failure that does not allow the firmware to continue the startup process. Check the error codes in the *QS21 Problem Determination and Service Guide*. If these do not help resolve the problem, contact a service support representative.

There are cases where a message that is informational only is displayed on the serial console.

**Wxxx** This is a warning message. The firmware allows the startup process to continue, but indicates there maybe a problem. A warning message can be combined with an error message to give more complete information about an error.

Descriptions for each of the error codes are not included in this document. See the *Problem Determination and Service Guide* for your blade server for further information.

# Appendix A. Using the SMS utility

Use the System Management Services (SMS) utility to perform a variety of configuration tasks on the BladeCenter QS21 blade server.

### Starting the SMS utility

Start the SMS utility to configure the blade server.

- 1. Establish an SOL session with the blade server. See the *BladeCenter Management Module Command-Line Interface Reference Guide* or the *BladeCenter Serial-Over-LAN Setup Guide* for more information.
- 2. Turn on or restart the blade server.
- 3. When the boot process starts, you see a screen similar to the following:

```
QS21 Firmware Starting
Check ROM = OK
Build Date = Apr 24 2007 09:32:34
FW Version = "QB-1.6.0-0"
Press "F1" to enter Boot Configuration (SMS)
Initializing memory configuration...
MEMORY
          = Elpida 512MB, 3200 MHz
Modules
XDRlibrary = v0.32, Bin A/C, RevB, DualDD
Calibrate = Done
           = Done
Test
SYSTEM INFORMATION
Processor = Cell/B.E.(TM) DD3.2 @ 3200 MHz
I/O Bridge = Cell BE companion chip DD2.x
Timebase = 26666 kHz (internal)
SMP Size = 2 (4 threads)
Boot-Date = 2007-06-08 11:20
          = 2048MB (CPU0: 1024MB, CPU1: 1024MB)
Memorv
```

Press F1 to enter the SMS menu.

### The SMS utility menu

Select SMS tasks from the SMS utility main menu. Choices on the SMS utility main menu depend on the version of the firmware in the blade server. Some menu choices might differ slightly from these descriptions.

Powe Vers SLO	erPC Firmware sion HEAD F-SMS 1.6 (c) Copyright IBM Corp. 2000,2005,2007 All rights reserved.
Mair	n Menu
1.	Select Language
2.	Setup Remote IPL (Initial Program Load)
3.	Change SCSI Settings
4.	Select Console
5.	Select Boot Options
6.	Firmware Boot Side Options
7.	Progress Indicator History
8.	FRU Information
9.	Change SAS Boot Device

#### **Change SCSI Settings**

Select this choice to view and change the addresses of the SCSI controllers that are attached to the blade server.

#### Select Console

Select this choice to select the console on which the SMS menus are displayed.

#### **Select Boot Options**

Select this choice to view and set various options regarding the installation devices and boot devices.

If a device that you are trying to select (such as a USB CD drive in the BladeCenter media tray) is not displayed in the Select Device Type menu, select List all Devices and select the device from that menu.

#### Select Language

Select this choice to change the language that is used to display the SMS menus. A screen similar to the following appears:

PowerPC Firmware Version HEAD SLOF-SMS 1.6 (c) Copyright IBM Corp. 2004	0,2005,2007 All rights reserved.
Select Language 1. ISO8859-1 English (United States)	*
Navigation Keys: M = return to Main Menu ESC key = return to previous screen	N = Next page of list X = eXit System Management Services
Type menu item number and press Enter or	select Navigation key :

At present, English (United States) is the only available language.

#### Setup Remote IPL (Initial Program Load)

Select this to configure a network adapter for networks that use static IP addresses or TFTP only. By default the BladeCenter QS21 uses DHCP, in which case no changes should be made.

The screen is a similar to:

```
PowerPC Firmware
Version HEAD
SLOF-SMS 1.6 (c) Copyright IBM Corp. 2000,2005,2007 All rights reserved.
NIC Adapters (NET)
1. /axon@10000000000/plb5/plb4/pcix@4000004600000000/ethernet@1
2. /axon@1000000000/plb5/plb4/pcix@4000004600000000/ethernet@1,1
Navigation Keys:
M = return to Main Menu
ESC key = return to previous screen X = eXit System Management Services
Type menu item number and press Enter or select Navigation key :
```

To view the Network Parameters screen type the number of the adapter you wish to configure and press **Enter**. A screen similar to the following appears:



Type the number of the menu item and press Enter.

#### **IP** Parameters

This allows you to configure IP for the network adapter to use static IP addresses or TFTP. You should not change these setting if you use DHCP, which is the default.

PowerPC Firmware Version HEAD SLOF-SMS 1.6 (c) Copyright IBM Corp.	2000,2005,2007 All rights reserved.
IP Parameters NET /axon@10000000000/plb5/plb4/pcix 1. Client IP Address 2. Server IP Address 3. Gateway IP Address 4. Subnet Mask	<pre>@4000004600000000/ethernet@1 [000.000.000.000] [000.000.000.000] [000.000.000.000] [255.255.255.000]</pre>
Navigation Keys: M = return to Main Menu ESC key = return to previous screen	X = eXit System Management Services
Type menu item number and press Ente	r or select Navigation key :

Select an item from the list and enter the appropriate address and subnet mask. Press **Enter** when you have finished each item. To save the information and return to the Main Menu, press **M**. If you wish to cancel and return to the main menu, press **Esc**.

## **Adapter Configuration**

This allows you to set network parameters for the adapter.

PowerPC Firmware Version HEAD SLOF-SMS 1.6 (c) Copyright IBM Corp. 2000,2005,2007 All rights reserved.
Adapter Configuration NET /axon@1000000000/plb5/plb4/pcix@4000004600000000/ethernet@1 1. Speed, Duplex 2. Spanning Tree Enabled 3. Protocol
Navigation Keys: M = return to Main Menu ESC key = return to previous screen X = eXit System Management Services
Type menu item number and press Enter or select Navigation key :

Do not change these settings unless required by your network. The defaults are:

- · Speed: detected automatically
- Spanning Tree Enabled: disabled
   Only change this if your network uses the Spanning-Tree Protocol link management protocol.
- Protocol: standard.
   IEE 802.3 is the only other option.

### **Ping Test**

This enables you to verify the static IP addresses you have set.

```
PowerPC Firmware
 Version HEAD
 SLOF-SMS 1.6 (c) Copyright IBM Corp. 2000,2005,2007 All rights reserved.
_____
                                                                                                                                                                                   _____
 Ping Test
 NET /axon@1000000000/plb5/plb4/pcix@4000004600000000/ethernet@1
 Speed, Duplex: auto, auto

        Splicht
        Jup Hold
        Splicht
        <
                                                                                   [255.255.255.000]
  Subnet Mask
 Protocol: Standard
 Spanning Tree Enabled: No
 Connector Type:
 1. Execute Ping Test
                                                                 _____
Navigation Keys:
 M = return to Main Menu
ESC key = return to previous screen X = eXit System Management Services
                                    -----
 Type menu item number and press Enter or select Navigation key :
```

Type **1** to ping each IP address in turn.

### **Advanced Setup: DHCP**

You do not need to use this option unless your network requires a specific block size or filename.



### **Change SCSI Settings**

At present the BladeCenter QS21 does not support SCSI so this option is not available.

#### **Select Console**

You do not have to use this option as, by default, the current session is the active session, and BladeCenter QS21 does not support more than one session.

## **Select Boot Options**

Use this screen to select the device from which to install the operating system, the boot device and the boot device order. If you wish to install or boot from the BladeCenter unit media tray, you must first allocate it to the blade server using the Advanced Management Module.

#### Select Install/Boot Device

To select the installation or boot device, type **1** and press **Enter**. The screen that appears is similar to the following:

PowerPC Fir Version HEA SLOF-SMS 1.	mware D 6 (c) Copyright IBM Corp. 2000,2005,2007 All rights reserved.
Select Devi Number	ce Device Name NET /axon@10000000000/p1b5/p1b4/pcix@40000046000000000/ethernet@1 CDROM/p1b5/p1b4/pcix@4000004600000000/usb@1/hub@1/hub@2/cdrom@3
Navigation M = return ESC key = r	Keys: to Main Menu return to previous screen X = eXit System Management Services
Type menu i	tem number and press Enter or select Navigation key :

Only available boot devices are displayed. If you wish to boot from the CD/DVD drive in the media tray, first allocated it to the blade server using the Advanced Management Module, as otherwise, it is not shown as an available option.

#### **Configure Boot Device Order**

When booting the operating system, the blade server cycles through the boot devices in list order until it finds a boot device. If it does not, an error is generated and placed in the Advanced Management Module. You may only list boot devices if they are allocated or available to the blade server. For example, to include the CD/DVD drive in the BladeCenter media tray in the list, first been allocate it to the blade server using Advanced Management Module. To select boot device order, type **2** and press **Enter**. A screen similar to the following appears:

```
PowerPC Firmware
Version HEAD
SLOF-SMS 1.6 (c) Copyright IBM Corp. 2000,2005,2007 All rights reserved.
                     _____
Configure Boot Device Order
 1. Select 1st Boot Device
 2. Select 2nd Boot Device
 3. Select 3rd Boot Device
 4. Select 4th Boot Device
 5. Display Current Setting
 6. Restore Default Setting
Navigation Keys:
M = return to Main Menu
ESC key = return to previous screen X = eXit System Management Services
     _____
Type menu item number and press Enter or select Navigation key :
```

To set the boot device order, type the menu number according to the order you want for a particular device. For example, to choose the first boot device, type **1** and press **Enter**. A screen showing all the available boot devices appears:

PowerPC Firmware Version HEAD SLOF-SMS 1.6 (c) Cop	vright IBM Corp. 2000,2005,2007 All rights reserved.	
Select Device Number Position 1. 2. 1	Device Name Not Specified NET /axon@10000000000/p1b5/p1b4/pcix@400000460000000000/ethernet1	
Navigation Keys: M = return to Main M ESC key = return to	enu previous screen X = eXit System Management Services	
Type menu item number and press Enter or select Navigation key :		

The screen shows the current position in the list for the displayed boot devices. To alter the position, choose a device, type the number and press **Enter**. To save your selection, press **M** to return to the menu.

### **Firmware Boot Side Options**

Normally the BladeCenter QS21 boots from the Temporary side and you should not change this. However, there may be occasions, for example boot failure, where you must change the setting.

PowerPC Firmware Version HEAD SLOF-SMS 1.6 (c) Copyright IBM Corp. 2000,2005,2007 All rights reserved.
Firmware Boot Side Options Menu
Firmware Boot Side for next boot: Temporary
1. Permanent 2. Temporary
Navigation Keys: M = return to Main Menu ESC key = return to previous screen X = eXit System Management Services
Type menu item number and press Enter or select Navigation key :

### **Progress Indicator History**

This shows the messages from the present and previous attempts to boot the blade. It also shows messages from the last occasion the blade could not boot from the Temporary side, if any.

PowerPC Firmware Version HEAD SLOF-SMS 1.6 (c) Copyright IBM Corp. 2000,2005,2007 All rights reserved.
View Progress Indicator History <ol> <li>Current Boot Progress Indicator</li> <li>Previous Boot Progress Indicator</li> <li>Previous Failover Permanent Side Boot</li> </ol>
Navigation Keys: M = return to Main Menu ESC key = return to previous screen X = eXit System Management Services
Type menu item number and press Enter or select Navigation key :

The screen below shows an example of a successful previous boot:

PowerPC Firmware Version HEAD SLOF-SMS 1.6 (c) Copyright IBM Corp. 2000,2005,2007 All rights reserved.
Progress Indicator History
Creating common NVRAM partition C0880
Could not find SAS partition in NVRAM - created. Adapters on 000001460ec00000
00 0800 (D) : 14e4 16a8 network [ ethernet ] 00 0900 (D) : 14e4 16a8 network [ ethernet ]
Adapters on 000001a040000000 00 0000 (B) : 1014 032c pci
Adapters on 000001a240000000 00 0000 (B) : 1014 032c pci
Navigation Keys: M = return to Main Menu N = Next page of list ESC key = return to previous screen X = eXit System Management Services
Type menu item number and press Enter or select Navigation key :

Press  ${\bf N}$  to scroll through the boot history. When you have finished, press  ${\bf Esc}$  to return to the menu.

## **FRU** information

The VPD on each blade server contains details about the machine type or model, serial number and the universal unique ID.

The screen is similar to the following:

### Adding FRU information

When you replace a FRU details are not recorded in the VPD. You must enter them manually through SMS.

When the system firmware detects an FRU replacement part during boot the process stops to allow you to enter the machine type or model and serial number. Boot does not continue until the information is provided.

To enter new FRU information, complete the following steps:

- 1. Using a Telnet or SSH client, connect to the Advanced Management Module external Ethernet interface IP address.
- When prompted, enter a valid user ID and password. The default management module user ID is USERID, and the default password is PASSW0RD, where the 0 is a zero.
  - **Note:** The userid and password may have been changed. If so, check with the system administrator for a valid user id and password.
- Power cycle the blade and start an SOL console by using the power -cycle -c command. See "Using the SMS utility program" on page 39 for further information.
- 4. The following screen appears:

```
PowerPC Firmware
Version HEAD
SLOF-SMS 1.6 (c) Copyright IBM Corp. 2000,2005,2007 All rights reserved.
------
Enter Type Model Number
(Must be 7 characters, only A-Z, a-z, 0-9 allowed. Press Esc to skip)
```

Type the model number according to the instructions on the screen and press **Enter** to continue.

5. You must confirm the model number:

```
PowerPC Firmware
Version HEAD
SLOF-SMS 1.6 (c) Copyright IBM Corp. 2000,2005,2007 All rights reserved.
Number entered is: 1234567
Accept number?
(Enter 'y' or 'Y' to accept or 'n' or 'N' to decline)
Select Navigation key :
```

Type **y** or **Y** and press **Enter** to confirm the number.

6. At the following screen, type the serial number:

Press Enter to continue.

7. You must now confirm the serial number:

```
PowerPC Firmware
Version HEAD
SLOF-SMS 1.6 (c) Copyright IBM Corp. 2000,2005,2007 All rights reserved.
Number entered is: ABCDEFG
Accept number?
(Enter 'y' or 'Y' to accept or 'n' or 'N' to decline)
Select Navigation key :
```

Type **y** or **Y** and press **Enter** to confirm the number.

## **SAS Settings**

Use this option to configure or change the SAS settings if you have installed the IBM BladeCenter Boot Disk System.

**Note:** You must use this option when configuring an IBM BladeCenter Boot Disk System for the first time.

Choose **1** to set or change the SAS Boot Device Address. A screen similar to the following appears:

PowerPC Firmware Version HEAD SLOF-SMS 1.6 (c) Copyright IBM Corp. 2000,2005,2007 All rights reserved.
Change SAS Boot Device Address
Current SAS Disk Address (Default = $0$ ) : $0$
Navigation Keys: M = return to Main Menu ESC key = return to previous screen X = eXit System Management Services
Type SAS Address in hexadecimal and press Enter or select navigation key:

The SAS address can be obtained from the Storage System Profile utility. See the documentation that comes with your IBM BladeCenter Boot Disk System for more information about the Storage System Profile utility.

Once you have typed the address, press  ${\it Enter}$  to add the address, then  ${\it M}$  to return to the SAS Settings menu.

Choose **2** to set or change the SAS Boot Device LUN ID. A screen similar to the following appears:

The LUN Id can be obtained from the Storage System Profile utility. See the documentation that comes with your IBM BladeCenter Boot Disk System for more information about the Storage System Profile utility.

# Appendix B. Getting help and technical assistance

If you need help, service, or technical assistance or just want more information about IBM products, you will find a wide variety of sources available from IBM to assist you. This appendix contains information about where to go for additional information about IBM and IBM products, what to do if you experience a problem with your BladeCenter product or optional device, and whom to call for service, if it is necessary.

#### Before you call

Before you call, make sure that you have taken these steps to try to solve the problem yourself:

- · 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. Information about diagnostic tools is in the *Hardware Maintenance Manual and Troubleshooting Guide* or *Problem Determination and Service Guide* on the IBM *Documentation* CD that comes with your system.
- Go to http://www.ibm.com/systems/bladecenter/support/ to check for information to help you solve the problem.

You can solve many problems without outside assistance by following the troubleshooting procedures that IBM provides in the online help or in the documentation that is provided with your IBM product. The documentation that comes with BladeCenter systems also describes the diagnostic tests that you can perform. Most BladeCenter systems, operating systems, and programs come with documentation that contains troubleshooting procedures and explanations of error messages and error codes. If you suspect a software problem, see the documentation for the software.

#### Using the documentation

Information about your IBM BladeCenter system and preinstalled software, if any, or optional device is available in the documentation that comes with the product. That documentation can include printed documents, online documents, readme files, and help files. See the troubleshooting information in your system documentation for instructions for using the diagnostic programs. The troubleshooting information or the diagnostic programs might tell you that you need additional or updated device drivers or other software. IBM maintains pages on the World Wide Web where you can get the latest technical information and download device drivers and updates. To access these pages, go to http://www.ibm.com/systems/bladecenter/support/ and follow the instructions. Also, some documents are available through the IBM Publications Center at http://www.ibm.com/shop/publications/order/.

### Getting help and information from the World Wide Web

On the World Wide Web, the IBM Web site has up-to-date information about IBM systems, optional devices, services, and support. The address for IBM BladeCenter information is http://www.ibm.com/systems/bladecenter/.

You can find service information for IBM systems and optional devices at http://www.ibm.com/systems/support/.

#### Software service and support

Through IBM Support Line, you can get telephone assistance, for a fee, with usage, configuration, and software problems with BladeCenter products. For information about which products are supported by Support Line in your country or region, see http://www.ibm.com/services/sl/products/.

For more information about Support Line and other IBM services, see http://www.ibm.com/services/us/, or see http://www.ibm.com/planetwide/ for support telephone numbers. In the U.S. and Canada, call 1-800-IBM-SERV (1-800-426-7378).

#### Hardware service and support

You can receive hardware service through IBM Services or through your IBM reseller, if your reseller is authorized by IBM to provide warranty service. See http://www.ibm.com/planetwide/ for support telephone numbers, or in the U.S. and Canada, call 1-800-IBM-SERV (1-800-426-7378).

In the U.S. and Canada, hardware service and support is available 24 hours a day, 7 days a week. In the U.K., these services are available Monday through Friday, from 9 a.m. to 6 p.m.

# **Appendix C. Notices**

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#### Important notes

Processor speed indicates the internal clock speed of the microprocessor; other factors also affect application performance.

CD or DVD drive speed is the variable read rate. Actual speeds vary and are often less than the possible maximum.

When referring to processor storage, real and virtual storage, or channel volume, KB stands for 1024 bytes, MB stands for 1 048 576 bytes, and GB stands for 1 073 741 824 bytes.

When referring to hard disk drive capacity or communications volume, MB stands for 1 000 000 bytes, and GB stands for 1 000 000 bytes. Total user-accessible capacity can vary depending on operating environments.

Maximum internal hard disk drive capacities assume the replacement of any standard hard disk drives and population of all hard disk drive bays with the largest currently supported drives that are available from IBM.

Maximum memory might require replacement of the standard memory with an optional memory module.

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#### Product recycling and disposal

This unit must be recycled or discarded according to applicable local and national regulations. IBM encourages owners of information technology (IT) equipment to responsibly recycle their equipment when it is no longer needed. IBM offers a variety of product return programs and services in several countries to assist equipment owners in recycling their IT products. Information on IBM product recycling offerings can be found on IBM's Internet site at http://www.ibm.com/ibm/environment/products/index.shtml.

Esta unidad debe reciclarse o desecharse de acuerdo con lo establecido en la normativa nacional o local aplicable. IBM recomienda a los propietarios de equipos de tecnología de la información (TI) que reciclen responsablemente sus equipos cuando éstos ya no les sean útiles. IBM dispone de una serie de programas y servicios de devolución de productos en varios países, a fin de ayudar a los propietarios de equipos a reciclar sus productos de TI. Se puede encontrar información sobre las ofertas de reciclado de productos de IBM en el sitio web de IBM http://www.ibm.com/ibm/environment/products/index.shtml.



**Notice:** This mark applies only to countries within the European Union (EU) and Norway.

This appliance is labeled in accordance with European Directive 2002/96/EC concerning waste electrical and electronic equipment (WEEE). The Directive determines the framework for the return and recycling of used appliances as applicable throughout the European Union. This label is applied to various products to indicate that the product is not to be thrown away, but rather reclaimed upon end of life per this Directive.

#### 注意:このマークは EU 諸国およびノルウェーにおいてのみ適用されます。

この機器には、EU諸国に対する廃電気電子機器指令 2002/96/EC(WEEE) のラベルが貼られています。この指令は、EU諸国に適用する使用済み機器の回収とリサイクルの骨子を定めています。このラベルは、使用済みになった時に指令に従って適正な処理をする必要があることを知らせるために種々の製品に貼られています。

**Remarque :** Cette marque s'applique uniquement aux pays de l'Union Européenne et à la Norvège.

L'etiquette du système respecte la Directive européenne 2002/96/EC en matière de Déchets des Equipements Electriques et Electroniques (DEEE), qui détermine les dispositions de retour et de recyclage applicables aux systèmes utilisés à travers l'Union européenne. Conformément à la directive, ladite étiquette précise que le produit sur lequel elle est apposée ne doit pas être jeté mais être récupéré en fin de vie.

In accordance with the European WEEE Directive, electrical and electronic equipment (EEE) is to be collected separately and to be reused, recycled, or recovered at end of life. Users of EEE with the WEEE marking per Annex IV of the WEEE Directive, as shown above, must not dispose of end of life EEE as unsorted municipal waste, but use the collection framework available to customers for the return, recycling, and recovery of WEEE. Customer participation is important to minimize any potential effects of EEE on the environment and human health due to the potential presence of hazardous substances in EEE. For proper collection and treatment, contact your local IBM representative.

#### Battery return program

This product may contain a sealed lead acid, nickel cadmium, nickel metal hydride, lithium, or lithium ion battery. Consult your user manual or service manual for specific battery information. The battery must be recycled or disposed of properly. Recycling facilities may not be available in your area. For information on disposal of batteries outside the United States, go to http://www.ibm.com/ibm/environment/ products/index.shtml or contact your local waste disposal facility.

In the United States, IBM has established a return process for reuse, recycling, or proper disposal of used IBM sealed lead acid, nickel cadmium, nickel metal hydride, and battery packs from IBM equipment. For information on proper disposal of these batteries, contact IBM at 1-800-426-4333. Have the IBM part number listed on the battery available prior to your call.

For Taiwan: Please recycle batteries.



For the European Union:



Notice: This mark applies only to countries within the European Union (EU).

Batteries or packaging for batteries are labeled in accordance with European Directive 2006/66/EC concerning batteries and accumulators and waste batteries and accumulators. The Directive determines the framework for the return and recycling of used batteries and accumulators as applicable throughout the European Union. This label is applied to various batteries to indicate that the battery is not to be thrown away, but rather reclaimed upon end of life per this Directive. Les batteries ou emballages pour batteries sont étiquetés conformément aux directives européennes 2006/66/EC, norme relative aux batteries et accumulateurs en usage et aux batteries et accumulateurs usés. Les directives déterminent la marche à suivre en vigueur dans l'Union Européenne pour le retour et le recyclage des batteries et accumulateurs usés. Cette étiquette est appliquée sur diverses batteries pour indiquer que la batterie ne doit pas être mise au rebut mais plutôt récupérée en fin de cycle de vie selon cette norme.

バッテリーあるいはバッテリー用のパッケージには、EU 諸国に対する廃電気電子機器 指令 2006/66/EC のラベルが貼られています。この指令は、バッテリーと蓄電池、およ び廃棄バッテリーと蓄電池に関するものです。この指令は、使用済みバッテリーと蓄電 池の回収とリサイクルの骨子を定めているもので、EU 諸国にわたって適用されます。 このラベルは、使用済みになったときに指令に従って適正な処理をする必要があること を知らせるために種々のバッテリーに貼られています。

In accordance with the European Directive 2006/66/EC, batteries and accumulators are labeled to indicate that they are to be collected separately and recycled at end of life. The label on the battery may also include a chemical symbol for the metal concerned in the battery (Pb for lead, Hg for mercury, and Cd for cadmium). Users of batteries and accumulators must not dispose of batteries and accumulators as unsorted municipal waste, but use the collection framework available to customers for the return, recycling, and treatment of batteries and accumulators. Customer participation is important to minimize any potential effects of batteries and accumulators of hazardous substances. For proper collection and treatment, contact your local IBM representative.

#### For California:

Perchlorate material – special handling may apply. See http://www.dtsc.ca.gov/hazardouswaste/perchlorate/.

The foregoing notice is provided in accordance with California Code of Regulations Title 22, Division 4.5 Chapter 33. Best Management Practices for Perchlorate Materials. This product/part may include a lithium manganese dioxide battery which contains a perchlorate substance.

#### **Electronic emission notices**

#### Federal Communications Commission (FCC) statement

**Note:** This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. IBM is not responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

#### Industry Canada Class A emission compliance statement

This Class A digital apparatus complies with Canadian ICES-003.

#### Avis de conformité à la réglementation d'Industrie Canada

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

#### Australia and New Zealand Class A statement

**Attention:** This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

#### United Kingdom telecommunications safety requirement

**Notice to Customers** 

This apparatus is approved under approval number NS/G/1234/J/100003 for indirect connection to public telecommunication systems in the United Kingdom.

### Deutschsprachiger EU Hinweis: Hinweis für Geräte der Klasse A EU-Richtlinie zur Elektromagnetischen Verträglichkeit

Dieses Produkt entspricht den Schutzanforderungen der EU-Richtlinie 2004/108/EG zur Angleichung der Rechtsvorschriften über die elektromagnetische Verträglichkeit in den EU-Mitgliedsstaaten und hält die Grenzwerte der EN 55022 Klasse A ein.

Um dieses sicherzustellen, sind die Geräte wie in den Handbüchern beschrieben zu installieren und zu betreiben. Des Weiteren dürfen auch nur von der IBM empfohlene Kabel angeschlossen werden. IBM übernimmt keine Verantwortung für die Einhaltung der Schutzanforderungen, wenn das Produkt ohne Zustimmung der IBM verändert bzw. wenn Erweiterungskomponenten von Fremdherstellern ohne Empfehlung der IBM gesteckt/eingebaut werden.

EN 55022 Klasse A Geräte müssen mit folgendem Warnhinweis versehen werden:

"Warnung: Dieses ist eine Einrichtung der Klasse A. Diese Einrichtung kann im Wohnbereich Funk-Störungen verursachen; in diesem Fall kann vom Betreiber verlangt werden, angemessene Maßnahmen zu ergreifen und dafür aufzukommen."

#### Deutschland: Einhaltung des Gesetzes über die elektromagnetische Verträglichkeit von Geräten

Dieses Produkt entspricht dem "Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG)". Dies ist die Umsetzung der EU-Richtlinie 2004/108/EG in der Bundesrepublik Deutschland.

#### Zulassungsbescheinigung laut dem Deutschen Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG) (bzw. der EMC EG Richtlinie 2004/108/EG) für Geräte der Klasse A

Dieses Gerät ist berechtigt, in Übereinstimmung mit dem Deutschen EMVG das EG-Konformitätszeichen - CE - zu führen.

Verantwortlich für die Konformitätserklärung des EMVG ist die IBM Deutschland GmbH, 70548 Stuttgart.

Generelle Informationen:

Das Gerät erfüllt die Schutzanforderungen nach EN 55024 und EN 55022 Klasse A.

#### **European Union EMC Directive conformance statement**

This product is in conformity with the protection requirements of EU Council Directive 2004/108/EC on the approximation of the laws of the Member States relating to electromagnetic compatibility. IBM cannot accept responsibility for any failure to satisfy the protection requirements resulting from a nonrecommended modification of the product, including the fitting of non-IBM option cards.

This product has been tested and found to comply with the limits for Class A Information Technology Equipment according to CISPR 22/European Standard EN 55022. The limits for Class A equipment were derived for commercial and industrial environments to provide reasonable protection against interference with licensed communication equipment.

**Attention:** This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

European Community contact: IBM Technical Regulations Pascalstr. 100, Stuttgart, Germany 70569 Telephone: 0049 (0)711 785 1176 Fax: 0049 (0)711 785 1283 E-mail: tjahn@de.ibm.com

#### Taiwanese Class A warning statement

警告使用者: 這是甲類的資訊產品,在 居住的環境中使用時,可 能會造成射頻干擾,在這 種情況下,使用者會被要 求採取某些適當的對策。

台灣IBM 產品服務聯絡方式: 台灣國際商業機器股份有限公司 台北市松仁路7號3樓 電話:0800-016-888

## Japanese Voluntary Control Council for Interference (VCCI) statement

この装置は、情報処理装置等電波障害自主規制協議会(VCCI)の基準に 基づくクラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を 引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求 されることがあります。

Korean Class A warning statement

이기기는 업무용으로 전자파 적합등록을 받은 기기 이오니, 판매자 또는 사용자는 이점을 주의하시기 바라며, 만약 잘못 구입하셨을 때에는 구입한 곳에 서 비업무용으로 교환하시기 바랍니다.

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