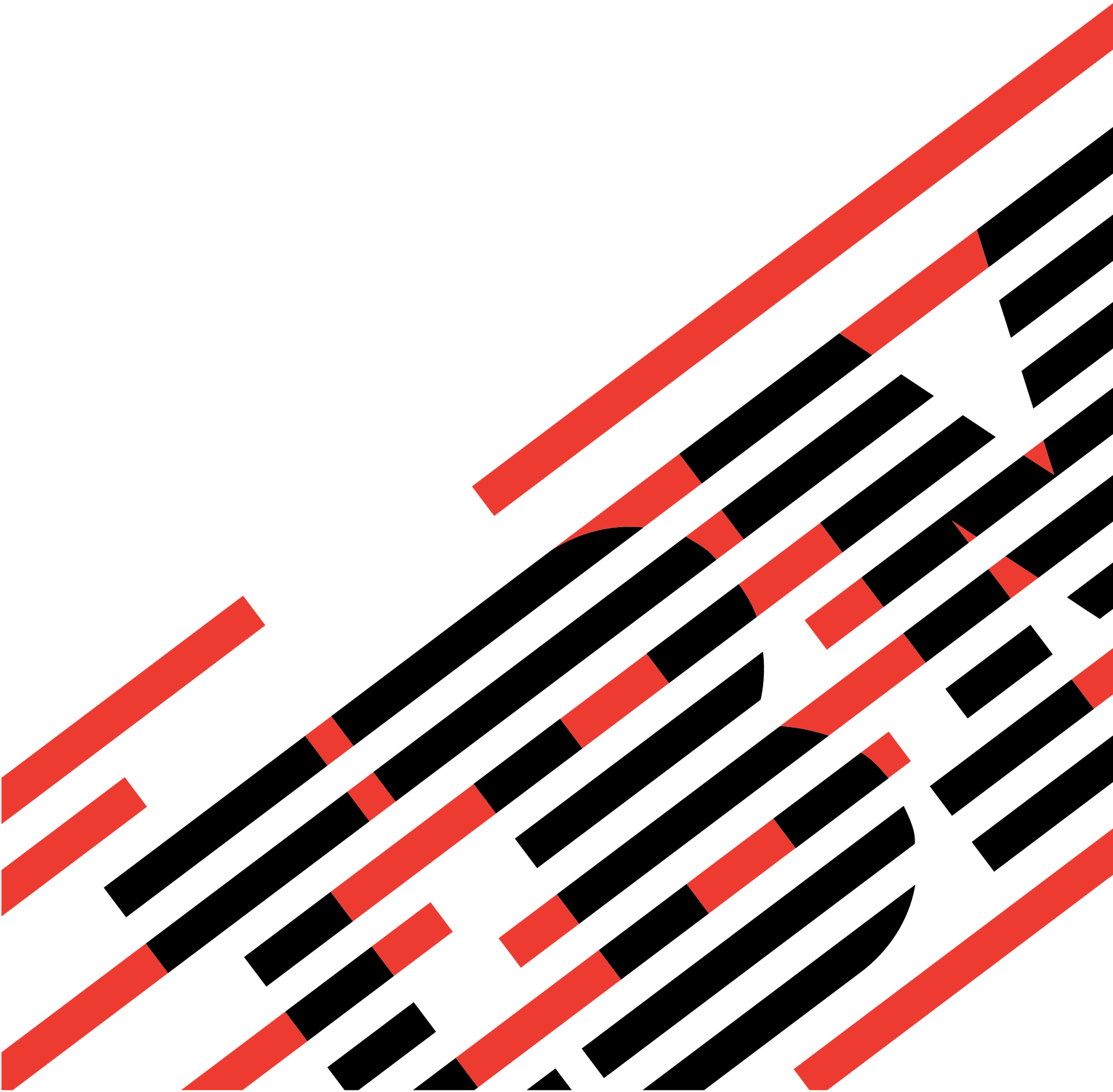
IBM

eserver

BladeCenter

Serial over LAN Setup Guide



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Serial over LAN Setup Guide

Note: Before using this information and the product it supports, read the general information in Appendix A, “Getting help and technical assistance,” on page 45 and Appendix B, “Notices,” on page 47.

Fourth Edition (November 2004)

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Chapter 1. Introduction

The IBM® @server® BladeCenter™ management module command-line interfaces provide access to the text-console command prompt on each blade server through a Serial over LAN (SOL) connection, enabling the blade servers to be managed from a remote location. This document explains how to update and configure BladeCenter components for SOL operation using the BladeCenter management-module Web interface. You can also perform many configuration procedures using the management-module command-line interface or the simple network management protocol (SNMP). See the *IBM @server BladeCenter Management Module Command-Line Interface Reference Guide* for information about the management-module command-line interface and instructions about how to use it. All IBM @server BladeCenter unit types, including the IBM @server BladeCenter T unit, are referred to throughout this document as the BladeCenter unit. Unless stated otherwise, all descriptions and instructions in this document apply to all BladeCenter unit configurations.

In the BladeCenter environment, the integrated system management processor (ISMP) and network interface controller (NIC) on each blade server routes the serial data from the blade server serial communications port to the network infrastructure of the BladeCenter unit, including an Ethernet-compatible I/O module that supports SOL communication. BladeCenter components are configured for SOL operation through the BladeCenter management module. The management module also acts as a proxy in the network infrastructure to couple a client running a Telnet session with the management module to an SOL session running on a blade server, enabling the Telnet client to interact with the serial port of the blade server over the network. Because all SOL traffic is controlled by and routed through the management module, administrators can segregate the management traffic for the BladeCenter unit from the data traffic of the blade servers.

To start an SOL connection with a blade server, you must first start a Telnet command-line interface session with the management module. When this Telnet command-line interface session is running, you can start a remote-console SOL session with any blade server in the BladeCenter unit that is set up and enabled for SOL operation. You can establish up to 20 separate Telnet sessions with a BladeCenter management module. For a BladeCenter unit, this enables you to have 14 simultaneous SOL sessions active (one for each of up to 14 blade servers) with 6 additional command-line interface sessions available for BladeCenter unit management. For a BladeCenter T unit, this enables you to have 8 simultaneous SOL sessions active (one for each of up to 8 blade servers) with 12 additional command-line interface sessions available for BladeCenter unit management. If security is a concern, you can use Secure Shell (SSH) sessions to establish secure Telnet command-line interface sessions with the BladeCenter management module before starting an SOL console redirect session with a blade server.

The most recent versions of all BladeCenter documentation is available from the IBM Web site. Complete the following steps to check for updated BladeCenter documentation and technical updates:

1. Go to http://www.ibm.com/pc/support/.
2. In the **Learn** section, click **Online publications**.
3. On the “Online publications” page, in the **Brand** field, select **Servers**.
4. In the **Family** field, select your BladeCenter unit type.
5. Click **Continue**.

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Hardware and firmware requirements

The BladeCenter unit must be correctly configured before you can use the command-line interface and SOL. This section describes the hardware and software that are required for the command-line interface and SOL.

Hardware requirements

The following hardware is required for SOL operation. Compatibility between BladeCenter components that are used for SOL is listed in Table 1 on page 3.

- An SOL-capable blade server. (The IBM @server BladeCenter HS20 Type 8678 blade server does not support SOL operation.) You can use the console command to control a blade server through SOL only on blade server types that support SOL functionality that have the required firmware levels (see Table 2 on page 4).
- An SOL-capable Ethernet I/O module installed in I/O-module bay 1. As of the date of this document, the only I/O modules that support SOL operation are:
  - IBM 4-Port Gb Ethernet Switch Module for BladeCenter
  - Nortel Networks Layer 2-7 GbE Switch Module for IBM @server BladeCenter
  - Cisco Systems Intelligent Gigabit Ethernet Switch Module for the IBM @server BladeCenter
- For the IBM @server BladeCenter HS20 Type 8832 and Type 8843 blade servers:
  - SOL uses the first network interface, Ethernet 1 (eth1 or Planar Ethernet 1), of the blade server to communicate. When this network interface attempts to boot through PXE or DHCP, the network interface is reset, causing the current SOL session to be dropped and have a new status of Not Ready. If you require booting through PXE or DHCP, use the second network interface, Ethernet 2 (eth2 or Planar Ethernet 2), of the blade server and install an SOL-capable Ethernet I/O module in I/O-module bay 1.
  - For the BladeCenter HS20 Type 8832 blade server, jumper J28 must be installed in the correct position. See “HS20 Type 8832 SOL jumper placement” on page 26 for information.
- For the IBM @server BladeCenter JS20 Type 8842 blade server, SOL uses the first network interface, Ethernet 1 (eth1 or Planar Ethernet 1), of the blade server to communicate. When this network interface attempts to use BOOTP, the network interface is reset, causing the current SOL session to be dropped and have a new status of Not Ready. If you require BOOTP, use the second network interface, Ethernet 2 (eth2 or Planar Ethernet 2), of the blade server and install an SOL-capable Ethernet I/O module in I/O-module bay 1.

Table 1. SOL hardware compatibility

I/O Module	Blade server			
	BladeCenter HS20 Type 8832 blade server	BladeCenter HS20 Type 8843 blade server	BladeCenter HS40 Type 8839 blade server	BladeCenter JS20 Type 8842 blade server
IBM 4-Port Gb Ethernet Switch Module for BladeCenter	•	•	•	•
Nortel Networks Layer 2-7 GbE Switch Module for IBM @server BladeCenter	•	•	•	•
Cisco Systems Intelligent Gigabit Ethernet Switch Module for the IBM @server BladeCenter	•	•	•	•

Firmware requirements

Make sure that you are using the latest versions of device drivers, firmware, and BIOS for your blade server, management module, and other BladeCenter components. Go to the IBM Support Web site, http://www.ibm.com/pc/support/, for the latest information about upgrading the device drivers, firmware, and BIOS for BladeCenter components. The latest instructions are in the documentation that comes with the updates.

The following table lists the firmware levels that are required for BladeCenter components to support SOL operation.

Table 2. Firmware levels required for SOL

Component		Firmware level
IBM @server BladeCenter Management Module		1.08 or later
IBM @server BladeCenter T Management Module		All firmware versions support SOL
BladeCenter HS20 Type 8832 blade server	IBM @server BladeCenter HS20 Type 8832 blade server BIOS	1.03 or later
	IBM @server BladeCenter HS20 Type 8832 blade server diagnostics	1.02 or later
	IBM @server BladeCenter HS20 Type 8832 blade server ISMP	1.03 or later
	IBM @server BladeCenter HS20 Type 8832 blade server Broadcom Ethernet Controller Boot ROM	3.21 or later
	IBM @server BladeCenter HS20 Type 8832 blade server Broadcom Ethernet Controller Firmware	2.2 or later
	IBM @server BladeCenter HS20 Type 8832 blade server Broadcom Ethernet Controller Diagnostic Utility	1.06 or later
	IBM @server BladeCenter HS20 Type 8832 blade server Broadcom Ethernet Controller Linux Device Driver	7.1.22 or later
BladeCenter HS40 Type 8839 blade server	IBM @server BladeCenter HS40 Type 8839 blade server BIOS	See the IBM Support Web site [1]
	IBM @server BladeCenter HS40 Type 8839 blade server BMC	See the IBM Support Web site [1]
	IBM @server BladeCenter HS40 Type 8839 blade server PLD	See the IBM Support Web site [1]
	IBM @server BladeCenter HS40 Type 8839 blade server Intel™ Ethernet Controller Linux Device Driver	See the IBM Support Web site [1]
BladeCenter JS20 Type 8842 blade server	IBM @server BladeCenter JS20 Type 8842 blade server open firmware (BIOS)	See the IBM Support Web site [1]
	IBM @server BladeCenter JS20 Type 8842 blade server ISMP	See the IBM Support Web site [1]
	IBM @server BladeCenter JS20 Type 8842 blade server Broadcom Ethernet Controller Firmware	See the IBM Support Web site [1]
	IBM @server BladeCenter JS20 Type 8842 blade server Broadcom Ethernet Controller Linux Device Driver	See the IBM Support Web site [1]
BladeCenter HS20 Type 8843 blade server		All firmware versions support SOL
IBM 4-Port Gb Ethernet Switch Module for BladeCenter		1.04 or later
Nortel Networks Layer 2-7 GbE Switch Module for IBM @server BladeCenter		See the IBM Support Web site [1]
Cisco Systems Intelligent Gigabit Ethernet Switch Module for the IBM @server BladeCenter		All firmware versions support SOL
Note 1: Go to the IBM Support Web site, http://www.ibm.com/pc/support/, for the latest information about firmware levels that support SOL.		

Checking firmware versions

Complete the following steps to view the firmware levels that are installed in the BladeCenter components:

1. Start the BladeCenter management-module Web interface (see “Starting the BladeCenter management-module Web interface” on page 7).
2. In the navigation pane, click **Monitors → Firmware VPD**.

The Firmware VPD choice identifies the firmware type, build ID, release date, and revision number for the firmware that is installed in each blade server, I/O module, and management module in the BladeCenter unit. The vital product data (VPD) for the firmware in the management modules also includes the file name of the firmware components. (Selecting the Firmware VPD choice takes up to 30 seconds to refresh and display information.)

Important: To avoid problems and to maintain proper system performance, always make sure that the blade server firmware code, service processor code, and diagnostic firmware code levels are consistent for all blade servers within the BladeCenter unit.

Compare the installed firmware version to the information in Table 2 on page 4 and to the firmware information on the IBM Support Web site at http://www.ibm.com/pc/support/. If the firmware versions match, your blade server has the firmware code needed to use the SOL feature. If installed firmware versions do not meet at least the minimum requirements, download the latest firmware code from the IBM Support Web site and install it following the firmware update instructions for each BladeCenter component in Chapter 3, “Component-specific configuration,” on page 23.

Chapter 2. General configuration

Note: The sample screens that appear in this document might differ slightly from the screens displayed by your system. Screen content varies based on the type of BladeCenter unit that you are using and the options that are installed.

This section provides instructions for configuring the BladeCenter unit to operate using SOL. You must perform the following configuration procedures:

- Configure the BladeCenter unit for SOL operation (see “Configuring the global SOL settings for the BladeCenter unit” on page 10).
- Configure BladeCenter components for SOL operation (see Chapter 3, “Component-specific configuration,” on page 23).
- Configure the operating system that is installed on each blade server to enable SOL (see “Linux configuration” on page 11 and “Microsoft Windows 2003 Standard Edition configuration” on page 19).
- If secure SOL sessions are required, install and configure SSH for SOL (see “Installing and configuring SSH for SOL” on page 21).
- Enable blade servers for SOL operation (see “Completing the SOL configuration” on page 21).

Perform the SOL configuration that is shared by all BladeCenter components using the management-module Web interface. The management-module Web interface supports only configuration and monitoring of the command-line interface and SOL and cannot be used to start command-line interface or SOL sessions.

You can also perform some SOL configuration using the management-module command-line interface or the Simple Network Management Protocol (SNMP). See the *IBM @server BladeCenter Management Module Command-Line Interface Reference Guide* for information about the management-module command-line interface and instructions for using it.

Starting the BladeCenter management-module Web interface

Complete the following steps to start the BladeCenter management-module Web interface:

1. Open a Web browser. In the address or URL field, type the IP address or host name that is assigned for the management-module remote connection.

   The Enter Network Password window opens.
2. Type your user name and password. If you are logging in to the management module for the first time, you can obtain your user name and password from your system administrator. All login attempts are documented in the event log.

   The initial user ID and password for the management module are:

   - User ID: USERID (all capital letters)
   - Password: PASSW0RD (note the zero, not O, in PASSW0RD)
3. Follow the instructions on the screen. Be sure to set the timeout value that you want for your Web session.

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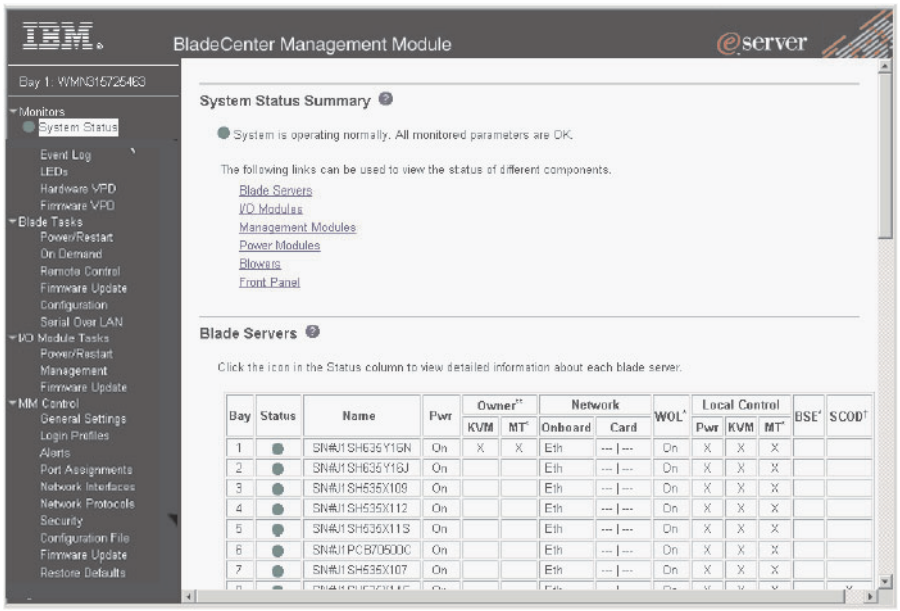
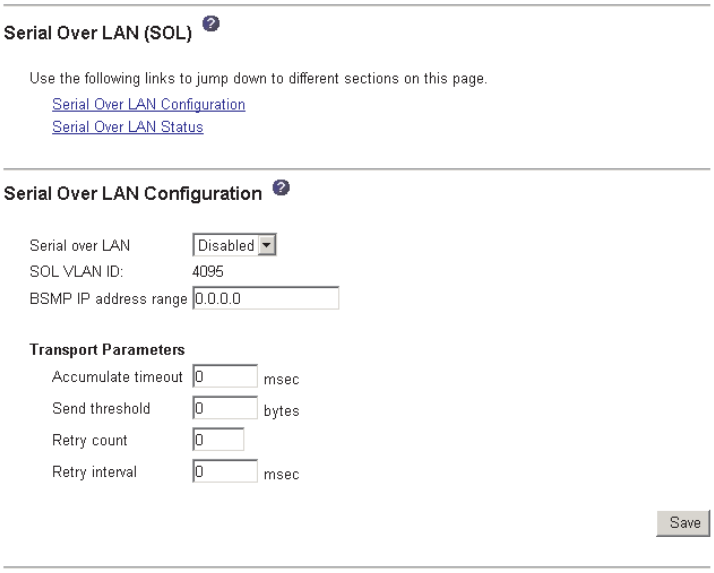
The BladeCenter management-module Web interface window opens.



Global SOL settings and status

This section describes the part of the BladeCenter management-module Web interface that the procedures in this document use to configure global Serial over LAN (SOL) settings.

Select **Serial Over LAN** under **Blade Tasks** to view and change the global SOL settings that are used by all blade servers in the BladeCenter unit. Select this choice also to enable or disable SOL for each blade server.



Unless otherwise noted, the default management-module SOL settings provide the best overall SOL performance. You can modify these settings to meet requirements that are specific to your BladeCenter unit or network configuration. The default SOL values are:

- Serial Over Lan: Enabled

  Use this field to enable or disable SOL globally for the BladeCenter unit. Enabling or disabling SOL globally does not affect the SOL session status for each blade server.

- SOL VLAN ID
  - For the IBM 4-Port Gb Ethernet Switch Module for BladeCenter and the Nortel Networks Layer 2-7 GbE Switch Module for IBM @server BladeCenter the SOL VLAN ID must be set to 4095.
  - For the Cisco Systems Intelligent Gigabit Ethernet Switch Module for the IBM @server BladeCenter the SOL VLAN ID can be set to any value between 3 and 1001: it *cannot* be set to the default value of 4095.

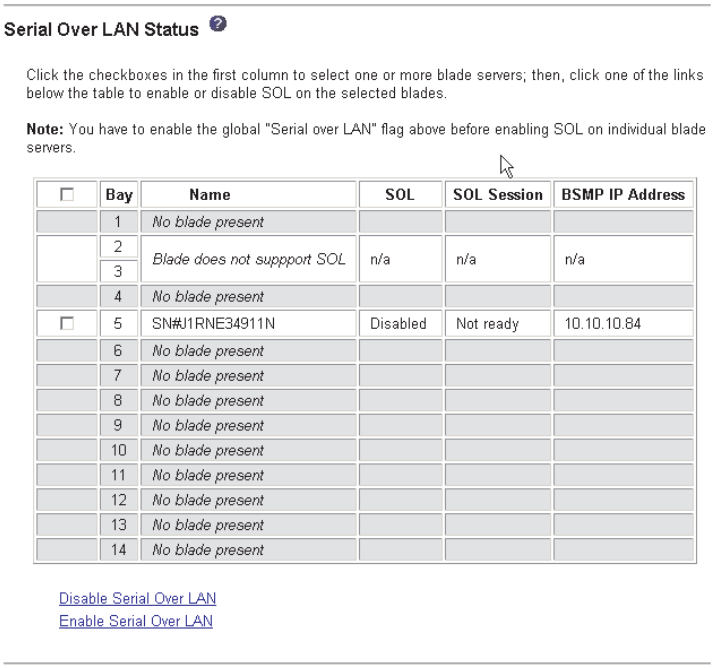
    Write down this value for use when configuring the Cisco Systems Intelligent Gigabit Ethernet Switch Module.

- BSMP IP Address Range: *x.x.x.x*

  This is a mandatory field where *x.x.x.x* is the base IP address for blade servers in the BladeCenter unit. The IP address that SOL uses to communicate with the blade system management processor (BSMP) of each blade server is based on the IP address that is set in this field. For example, if the value that you enter is 10.1.1.1, the blade server in blade bay 1 will have IP address 10.1.1.1, the blade server in blade bay 2 will have IP address 10.1.1.2, and so on.

- Accumulate timeout: 25 (default value is 5)
- Send threshold: 250
- Retry count: 3
- Retry interval: 2500 (default value is 250)

Use the Serial Over LAN Status table to monitor the SOL status for each blade server and to enable or disable SOL for each blade server. SOL must be enabled both globally for the BladeCenter unit and individually for each blade server where you plan to start an SOL session. SOL is enabled globally and on blade servers by default.



Serial Over LAN Status

Click the checkboxes in the first column to select one or more blade servers; then, click one of the links below the table to enable or disable SOL on the selected blades.

Note: You have to enable the global "Serial over LAN" flag above before enabling SOL on individual blade servers.

	Bay	Name	SOL	SOL Session	BSMP IP Address
	1	*No blade present*			
	2	*Blade does not suppport SOL*	n/a	n/a	n/a
	3				
	4	*No blade present*			
☐	5	SN#J1RNE34911N	Disabled	Not ready	10.10.10.84
	6	*No blade present*			
	7	*No blade present*			
	8	*No blade present*			
	9	*No blade present*			
	10	*No blade present*			
	11	*No blade present*			
	12	*No blade present*			
	13	*No blade present*			
	14	*No blade present*			

Disable Serial Over LAN
Enable Serial Over LAN

The SOL Session status has three possible states:

Not ready
This status indicates that no SOL session is available between the management module and the blade server. It might indicate that there was an SOL session setup failure that must be investigated.

Ready This status indicates that an SOL session is established between the management module and the blade server. This SOL session is available to connect to a Telnet session, if one is requested by the user.

Active This status indicates that there is an SOL session between the management module and the blade server and that this session is currently connected to a Telnet session.

Configuring the global SOL settings for the BladeCenter unit

Complete the following steps to configure the global SOL settings for the BladeCenter unit:

1. Start the BladeCenter management-module Web interface (see “Starting the BladeCenter management-module Web interface” on page 7).
2. In the navigation pane, click **Blade Tasks → Serial Over LAN**. In the management-module information page that opens, make sure that the settings match the default values that are listed starting on page 9 or are set to the values that are required by your network configuration.

Linux configuration

For SOL operation on the BladeCenter HS20 Type 8832 or Type 8843 blade server and the BladeCenter HS40 Type 8839 blade server, you must configure the Linux operating system to expose the Linux initialization (booting) process. This enables users to log in to the Linux console using an SOL session and directs Linux output to the serial console. See the documentation for your specific Linux operating-system type for information and instructions. You do not have to configure the Linux operating system when using a BladeCenter JS20 Type 8842 blade server.

Complete one of the following procedures to enable SOL sessions for your Linux operating system. You must be logged in as a root user to perform these procedures.

Red Hat Enterprise Linux ES 2.1 configuration

Note: This procedure is based on a default installation of Red Hat Enterprise Linux ES 2.1. The file names, structures, and commands might be different for other versions of Red Hat Linux.

Complete the following steps to configure the general Linux parameters for SOL operation when using the Red Hat Enterprise Linux ES 2.1 operating system.

Note: Hardware flow control prevents character loss during communication over a serial connection. You must enable it when using a Linux operating system.

1. Add the following line to the end of the `# Run gettys in standard runlevels` section of the /etc/inittab file. This enables hardware flow control and enables users to log in through the SOL console.

   ```
   7:2345:respawn:/sbin/agetty -h ttyS1 19200 vt102
   ```

2. Add the following line at the bottom of the /etc/securetty file to enable a user to log in as the root user through the SOL console:

   ```
   ttyS1
   ```

LILO configuration

If you are using LILO, complete the following steps:

1. Complete the following steps to modify the /etc/lilo.conf file:
   a. Add the following text to the end of the first `default=linux` line

      ```
      -Monitor
      ```

   b. Comment out the `map=/boot/map` line by adding a `#` at the beginning of this line.
   c. Comment out the `message=/boot/message` line by adding a `#` at the beginning of this line.
   d. Add the following line before the first `image=...` line:

      ```
      # This will allow you to only Monitor the OS boot via SOL
      ```

   e. Add the following text to the end of the first `label=linux` line

      ```
      -Monitor
      ```

   f. Add the following line to the first `image=...` section. This enables SOL.

      ```
      append="console=ttyS1,19200n8 console=tty1"
      ```

   g. Add the following lines between the two `image=...` sections:

      ```
      # This will allow you to Interact with the OS boot via SOL
      image=/boot/vmlinuz-2.4.9-e.12smp
      ```

```
label=linux-Interact
initrd=/boot/initrd-2.4.9-e.12smp.img
read-only
root=/dev/hda6
append="console=tty1 console=ttyS1,19200n8 "
```

The following samples show examples of the original content of the /etc/lilo.conf file and the content of this file after modification.

Original /etc/lilo.conf contents

```
prompt
timeout=50
default=linux
boot=/dev/hda
map=/boot/map
install=/boot/boot.b
message=/boot/message
linear
image=/boot/vmlinuz-2.4.9-e.12smp
    label=linux
    initrd=/boot/initrd-2.4.9-e.12smp.img
    read-only
    root=/dev/hda6
image=/boot/vmlinuz-2.4.9-e.12
    label=linux-up
    initrd=/boot/initrd-2.4.9-e.12.img
    read-only
    root=/dev/hda6
```

Modified /etc/lilo.conf contents

```
prompt
timeout=50
default=linux-Monitor
boot=/dev/hda
#map=/boot/map
install=/boot/boot.b
#message=/boot/message
linear
# This will allow you to only Monitor the OS boot via SOL
image=/boot/vmlinuz-2.4.9-e.12smp
    label=linux-Monitor
    initrd=/boot/initrd-2.4.9-e.12smp.img
    read-only
    root=/dev/hda6
    append="console=ttyS1,19200n8 console=tty1"
# This will allow you to Interact with the OS boot via SOL
image=/boot/vmlinuz-2.4.9-e.12smp
    label=linux-Interact
    initrd=/boot/initrd-2.4.9-e.12smp.img
    read-only
    root=/dev/hda6
    append="console=tty1 console=ttyS1,19200n8 "
image=/boot/vmlinuz-2.4.9-e.12
    label=linux-up
    initrd=/boot/initrd-2.4.9-e.12.img
    read-only
    root=/dev/hda6
```

2. Run the **lilo** command to store and activate the LILO configuration.

When the Linux operating system starts, a `LILO boot:` prompt is displayed instead of the graphical user interface. Pressing Tab while at this prompt will install all of the boot options that are listed. To load the operating system in interactive mode, type `linux-Interact` and then press Enter.

GRUB configuration

If you are using GRUB, complete the following steps to modify the /boot/grub/grub.conf file:

1. Comment out the `splashimage=...` line by adding a `#` at the beginning of this line.
2. Add the following line before the first `title=...` line:

   ```
   # This will allow you to only Monitor the OS boot via SOL
   ```

3. Append the following text to the first `title=...` line:

   ```
   SOL Monitor
   ```

4. Append the following text to the `kernel/...` line of the first `title=...` section:

   ```
   console=ttyS1,19200 console=tty1
   ```

5. Add the following five lines between the two `title=...` sections:

   ```
   # This will allow you to Interact with the OS boot via SOL
   ```

```
title Red Hat Linux (2.4.9-e.12smp) SOL Interactive
    root (hd0,0)
    kernel /vmlinuz-2.4.9-e.12smp ro root=/dev/hda6 console=tty1
console=ttyS1,19200
    initrd /initrd-2.4.9-e.12smp.img
```

Note: The entry beginning with `kernel /vmlinuz...` is shown with a line break after `console=tty1`. In your file, the entire entry must all be on one line.

The following samples show examples of the original content of the /boot/grub/grub.conf file and the content of this file after modification.

Original /boot/grub/grub.conf contents

```
#grub.conf generated by anaconda
#
# Note that you do not have to rerun grub after making changes to this file
# NOTICE:  You have a /boot partition.  This means that
#          all kernel and initrd paths are relative to /boot/, eg.
#          root (hd0,0)
#           kernel /vmlinuz-version ro root=/dev/hda6
#           initrd /initrd-version.img
#boot=/dev/hda
default=0
timeout=10
splashimage=(hd0,0)/grub/splash.xpm.gz
title Red Hat Enterprise Linux ES (2.4.9-e.12smp)
    root (hd0,0)
    kernel /vmlinuz-2.4.9-e.12smp ro root=/dev/hda6
    initrd /initrd-2.4.9-e.12smp.img
title Red Hat Enterprise Linux ES-up (2.4.9-e.12)
    root (hd0,0)
    kernel /vmlinuz-2.4.9-e.12 ro root=/dev/hda6
    initrd /initrd-2.4.9-e.12.img
```

Modified /boot/grub/grub.conf contents

```
#grub.conf generated by anaconda
#
# Note that you do not have to rerun grub after making changes to this file
# NOTICE:  You have a /boot partition.  This means that
#          all kernel and initrd paths are relative to /boot/, eg.
#          root (hd0,0)
#          kernel /vmlinuz-version ro root=/dev/hda6
#          initrd /initrd-version.img
#boot=/dev/hda
default=0
timeout=10
# splashimage=(hd0,0)/grub/splash.xpm.gz
# This will allow you to only Monitor the OS boot via SOL
title Red Hat Enterprise Linux ES (2.4.9-e.12smp) SOL Monitor
    root (hd0,0)
    kernel /vmlinuz-2.4.9-e.12smp ro root=/dev/hda6 console=ttyS1,19200 console=tty1
    initrd /initrd-2.4.9-e.12smp.img
# This will allow you to Interact with the OS boot via SOL
title Red Hat Linux (2.4.9-e.12smp) SOL Interactive
    root (hd0,0)
    kernel /vmlinuz-2.4.9-e.12smp ro root=/dev/hda6 console=tty1 console=ttyS1,19200
    initrd /initrd-2.4.9-e.12smp.img
title Red Hat Enterprise Linux ES-up (2.4.9-e.12)
    root (hd0,0)
    kernel /vmlinuz-2.4.9-e.12 ro root=/dev/hda6
    initrd /initrd-2.4.9-e.12.img
```

You must reboot the Linux operating system after completing these procedures for the changes to take effect and to enable SOL. For some blade servers, you must also install device drivers for your Ethernet controller:

- If you are using a BladeCenter HS20 Type 8832 or Type 8843 blade server, you must also install the Broadcom Ethernet Controller Device Driver for Linux Operating Systems. See “Installing the Broadcom Ethernet controller device driver for Linux operating systems” on page 28 for instructions.
- If you are using a BladeCenter HS40 Type 8839 blade server, you must also install the Intel Ethernet Controller Device Driver for Linux Operating Systems. See “Installing the Intel Ethernet controller device driver for Linux operating systems” on page 30 for instructions.

SUSE SLES 8.0 configuration

Note: This procedure is based on a default installation of SUSE SLES 8.0. The file names, structures, and commands might be different for other versions of SUSE LINUX.

Complete the following steps to configure the general Linux parameters for SOL operation when using the SUSE SLES 8.0 operating system.

Note: Hardware flow control prevents character loss during communication over a serial connection. You must enable it when using a Linux operating system.

1. Add the following line to the end of the `# getty-programs for the normal runlevels` section of the /etc/inittab file. This enables hardware flow control and enables users to log in through the SOL console.

   ```
   7:2345:respawn:/sbin/agetty -h ttyS1 19200 vt102
   ```

2. Add the following line after the `tty6` line at the bottom of the /etc/securetty file to enable a user to log in as the root user through the SOL console:

   ```
   ttyS1
   ```

3. Complete the following steps to modify the /boot/grub/menu.lst file:
   a. Comment out the `gfxmenu...` line by adding a `#` in front of the word `gfxmenu`.
   b. Add the following line before the first `title...` line:

      ```
      # This will allow you to only Monitor the OS boot via SOL
      ```

   c. Append the following text to the first `title...` line:

      ```
      SOL Monitor
      ```

   d. Append the following text to the `kernel...` line of the first `title...` section:

      ```
      console=ttyS1,19200 console=tty1
      ```

   e. Add the following four lines between the first two `title...` sections:

      ```
      # This will allow you to Interact with the OS boot via SOL
      title linux SOL Interactive
         kernel (hd0,1)/boot/vmlinuz root=/dev/hda2 acpi=oldboot vga=791
      console=tty1 console=ttyS1,19200
         initrd (hd0,1)/boot/initrd
      ```

      Note: The entry beginning with `kernel (hd0,1)` is shown with a line break after `vga=791`. In your file, the entire entry must all be on one line.

      The following samples show the original content of the /boot/grub/menu.lst file and the content of this file after modification.

Original /boot/grub/menu.lst contents	Notes

`gfxmanu (hd0,1)/boot/message`
`color white/blue black/light-gray`
`default 0`
`timeout 8`
 	
`title linux`
`  kernel (hd0,1)/boot/vmlinuz root=/dev/hda2 acpi=oldboot vga=791`
`  initrd (hd0,1)/boot/initrd`
`title floppy`
`  root`
`  chainloader +1`
`title failsafe`	

Original /boot/grub/menu.lst contents	Notes
kernal (hd0,1)/boot/vmlinuz.shipped root=/dev/hda2 ide=nodma apm=off vga=normal nosmp disableapic maxcpus=0 3 initrd (hd0,1)/boot/initrd.shipped	1
Note 1: The entry beginning with `kernel (hd0,1)` is shown with a line break after `nosmp`. In your file, the entire entry must all be on one line.	

Modified /boot/grub/menu.lst contents	Notes
#gfxmanu (hd0,1)/boot/message color white/blue black/light-gray default 0 timeout 8 # This will allow you to only Monitor the OS boot via SOL title linux SOL Monitor kernel (hd0,1)/boot/vmlinuz root=/dev/hda2 acpi=oldboot vga=791 console=ttyS1,19200 console=tty1 initrd (hd0,1)/boot/initrd # This will allow you to Interact with the OS boot via SOL title linux SOL Interactive kernel (hd0,1)/boot/vmlinuz root=/dev/hda2 acpi=oldboot vga=791 console=tty1 console=ttyS1,19200 initrd (hd0,1)/boot/initrd title floppy root chainloader +1 title failsafe kernel (hd0,1)/boot/vmlinuz.shipped root=/dev/hda2 ide=nodma apm=off vga=normal nosmp disableapic maxcpus=0 3 initrd (hd0,1)/boot/initrd.shipped	1
Note 1: The entry beginning with `kernel (hd0,1)` is shown with a line break after `nosmp`. In your file, the entire entry must all be on one line.	

You must reboot the Linux operating system after completing these procedures for the changes to take effect and to enable SOL. For some blade servers, you must also install device drivers for your Ethernet controller:

- If you are using a BladeCenter HS20 Type 8832 or Type 8843 blade server, you must also install the Broadcom Ethernet Controller Device Driver for Linux Operating Systems. See “Installing the Broadcom Ethernet controller device driver for Linux operating systems” on page 28 for instructions.
- If you are using a BladeCenter HS40 Type 8839 blade server, you must also install the Intel Ethernet Controller Device Driver for Linux Operating Systems. See “Installing the Intel Ethernet controller device driver for Linux operating systems” on page 30 for instructions.

Microsoft Windows 2003 Standard Edition configuration

Note: This procedure is based on a default installation of the Microsoft Windows 2003 operating system.

Complete the following steps to configure the Windows® 2003 operating system for SOL operation. You must be logged in as a user with administrator access to perform this procedure.

1. Complete the following steps to determine which boot entry ID to modify:
   a. Type `bootcfg` at a Windows command prompt; then press Enter to display the current boot options for your system.
   b. In the **Boot Entries** section, locate the boot entry ID for the section with an OS friendly name of Windows Server 2003, Standard. Write down the boot entry ID for use in the next step.
2. To enable the Microsoft® Windows Emergency Management System (EMS), at a Windows command prompt, type

   `bootcfg /EMS ON /PORT COM2 /BAUD 19200 /ID boot_id`

   where *boot_id* is the boot entry ID from step 1b; then, press Enter.
3. Complete the following steps to verify that the EMS console is redirected to the COM2 serial port:
   a. Type `bootcfg` at a Windows command prompt; then, press Enter to display the current boot options for your system.
   b. Verify the following changes to the bootcfg settings:
      - In the **Boot Loader Settings** section, make sure that **redirect** is set to **COM2** and that **redirectbaudrate** is set to **19200**.
      - In the **Boot Entries** section, make sure that the `OS Load Options:` line has `/redirect` appended to the end of it.

   The following samples show examples of the original bootcfg program output and the output after modification.

Original bootcfg program output

```
Boot Loader Settings
----------------------------
timeout: 30
default: multi(0)disk(0)rdisk(0)partition(1)\WINDOWS
Boot Entries
----------------
Boot entry ID: 1
OS Friendly Name: Windows Server 2003, Standard
Path: multi(0)disk(0)rdisk(0)partition(1)\WINDOWS
OS Load Options: /fastdetect
```

Modified bootcfg program output

```
Boot Loader Settings
----------------------------
timeout: 30
default: multi(0)disk(0)rdisk(0)partition(1)\WINDOWS
redirect: COM2
redirectbaudrate: 19200
Boot Entries
----------------
Boot entry ID: 1
OS Friendly Name: Windows Server 2003, Standard
Path: multi(0)disk(0)rdisk(0)partition(1)\WINDOWS
OS Load Options: /fastdetect /redirect
```

You must reboot the Windows 2003 operating system after completing this procedure for the changes to take effect and to enable SOL.

Installing and configuring SSH for SOL

Complete the following steps to install and configure Secure Shell Server (SSH) for SOL:

1. Start the BladeCenter management-module Web interface (see “Starting the BladeCenter management-module Web interface” on page 7).
2. If you have not previously installed a security key file, complete the following steps. Otherwise, go to step 3.
   a. In the navigation pane, click **MM Control → Security**.
   b. Download the latest version of the SSH security key file from the IBM Support Web site, http://www.ibm.com/pc/support/. Navigate to the **Install SSL/SSH** section and click **BladeCenter firmware update**.
   c. Click **Browse** and select the file that was downloaded in step 2b.
   d. Click **Install SSL/SSH**.
   e. Scroll to the **Install SSL/SSH** section and click **Configure and enable**.
3. Complete the following steps to generate the SSH Server Private Key:
   a. In the navigation pane, click **MM Control → Security**.
   b. Scroll to the **SSH Server Key Management** section and click **Generate SSH Server Private Key**.
   c. Click **OK** to confirm.
4. Complete the following steps to enable SSH:
   a. Scroll to the **Secure Shell (SSH) Server** section.
   b. Select **Enabled** for the **SSH Server** option; then, click **Save**.
   c. Click **OK** to confirm.
5. Complete the following steps to restart the management module. Restarting the management module ends the current BladeCenter management-module Web interface session.
   a. In the navigation pane, click **MM Control → Restart MM**.
   b. Click **Restart**.
   c. Click **OK** to confirm.
   d. Click **Yes** to restart the management module and end the session.

You can now use an SSH client to start a secure Telnet session with the management module and secure SOL sessions with the blade servers.

Completing the SOL configuration

Complete the following steps to complete the SOL configuration for your BladeCenter unit:

1. Make sure that the global SOL parameters are correct for your BladeCenter unit (see “Global SOL settings and status” on page 8).
2. Make sure that the SOL settings for individual BladeCenter components are correct (see Chapter 3, “Component-specific configuration,” on page 23).
3. Start the BladeCenter management-module Web interface (see “Starting the BladeCenter management-module Web interface” on page 7).
4. Complete the following steps to enable SOL on the blade servers:
   a. In the navigation pane, click **Blade Tasks → Serial Over LAN**; then, scroll to the **Serial Over LAN Status** section.

b. Select each blade server that will have SOL enabled; then click **Enable Serial Over LAN**.

   The **SOL** column of the table will show a status of Enabled for each of the blade servers that was selected. The **SOL Session** column of the table indicates a status of Not Ready for each of the blade servers that was selected.

To disable SOL for a blade server, complete step 4b and click **Disable Serial Over LAN** instead of **Enable Serial Over LAN**.

Note: The blade server SOL status periodically updates itself automatically; however, you can refresh the window for an immediate display of updated status.

5. Complete the following steps to power-on or restart the blade servers on which SOL was enabled:
   a. In the navigation pane, click **Blade Tasks → Power/Restart**.
   b. Select each blade server on which SOL was enabled; then, click either **Power On Blade** or **Restart Blade**, depending on the current status of the blade servers.
   c. Click **OK** twice to confirm.
6. Complete the following steps to check the SOL status of the blade servers:
   a. In the navigation pane, click **Blade Tasks → Serial Over LAN**; then, scroll to the **Serial Over LAN Status** section.
   b. Make sure that the **SOL Session** column of the table shows a status of Ready.

      For the BladeCenter HS20 Type 8832 blade server, if the SOL Session column does not show a status of Ready, make sure that the J28 jumper on the blade server is in the correct position. See “HS20 Type 8832 SOL jumper placement” on page 26 for information.

Chapter 3. Component-specific configuration

This section provides instructions for configuring BladeCenter components for SOL operation. Use it in addition to the information in Chapter 2, “General configuration,” on page 7. It is divided into the following subsections:

- “Configuring the management module”
- “Configuring the IBM @server BladeCenter HS20 Type 8832 and Type 8843 blade servers” on page 25
- “Configuring the IBM @server BladeCenter HS40 Type 8839 blade server” on page 28
- “Configuring the IBM @server BladeCenter JS20 Type 8842 blade server” on page 30
- “Configuring the IBM 4-Port Gb Ethernet Switch Module for BladeCenter” on page 32
- “Configuring the Nortel Networks Layer 2-7 GbE Switch Module for IBM @server BladeCenter” on page 33
- “Configuring the Cisco Systems Intelligent Gigabit Ethernet Switch Module for the IBM @server BladeCenter” on page 33

Configuring the management module

Before you configure the management module for SOL operation, review the following information:

- Make sure that the management-module external network interface (eth0) configuration is valid for your production network. This configuration can be obtained from a DHCP server or set statically.
- The management-module internal network interface (eth1) and the Ethernet I/O module configuration can be different from that of the management-module external network interface (eth0); however, the management-module internal network interface (eth1) and the Ethernet I/O module configuration must be in the same subnet. The management-module internal interface (eth1) is exposed to the external network through the management module, so it must not conflict with any other addresses on your production network. If you use a configuration for the Ethernet I/O module that is not valid for your production network, you will not be able to update the firmware or manage your Ethernet I/O module through a Telnet or Web interface.
- Telnet sessions with the BladeCenter management module do not have a timeout value set by default. If no timeout value is set, Telnet sessions will remain active indefinitely. See the *IBM @server BladeCenter Management Module Command-Line Interface Reference Guide* for information about configuring the Telnet session timeout value for the management module.
- The SOL blade system management processor (BSMP) address range can include any valid IP addresses that do not conflict with any of the IP addresses of the blade servers. The BSMP address range is used for internal communication between the blade server and the I/O module and is not exposed to the external network.

Complete the following steps to update the management-module firmware and configure the management module to enable SOL:

1. Start the BladeCenter management-module Web interface (see “Starting the BladeCenter management-module Web interface” on page 7).

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2. Complete the following steps to update the BladeCenter management module firmware:
   a. Download the latest management-module firmware from the IBM Support Web site, http://www.ibm.com/pc/support/; then, uncompress and store the firmware update files in a temporary location on the client computer.
   b. Complete the following steps for each of the packet (.pkt) files that are used to update the management-module firmware:
      1) In the navigation pane, click **MM Control → Firmware Update**.
      2) Click **Browse**; then, select the first firmware update packet (.pkt) file to update, which you obtained in step 2a, and click **Open**.
      3) Click **Update**; then, click **Continue** to confirm.

         A message is displayed when the update is complete.
      4) Repeat these steps for each of the remaining firmware update packet files.
   c. Complete the following steps to restart the management module. Restarting the management module ends the current BladeCenter management-module Web interface session. Do not restart the management module until all of the firmware update packet files are installed.
      1) In the navigation pane, click **MM Control → Restart MM**.
      2) Click **Restart**.
      3) Click **OK** to confirm.
      4) Click **Yes** to restart the management module and end the session. You must wait approximately 10 seconds for the management module to restart before attempting start the BladeCenter management-module Web interface.
3. Start the BladeCenter management-module Web interface (see “Starting the BladeCenter management-module Web interface” on page 7).
4. Complete the following steps to enable SOL for the management module:
   a. Complete the following steps to configure the internal network interface (eth1) settings:
      1) In the navigation pane, click **MM Control → Network Interfaces**.
      2) Scroll to the **Internal Ethernet Interface (eth1)** section.
      3) Make sure that **Interface** is set to **Enabled**.
      4) Set the **Static IP Configuration** fields to the values that are required for your physical network. The values must be in the following formats:
         - **IP address**: *x.x.x.x*
         - **Subnet mask**: *x.x.x.x*
         - **Gateway address**: *x.x.x.x*

         The static IP configuration values specify valid IP addresses of the form *x.x.x.x*, where each *x* is a number from 0 to 255.
      5) Click **Save**; then, click **OK** or **Yes** to confirm. Do not restart the management module.
   b. Complete the following steps to configure the Ethernet I/O module network settings:
      1) In the navigation pane, click **I/O Module Tasks → Management**.
      2) Scroll to the **Bay 1 (Ethernet SM)*** section.

3) Set the values in the **New Static IP Configuration** fields, if they are not already correct as listed in the **Current IP Configuration** section. The values must be in the following formats:
   - **IP address**: *x.x.x.x*
   - **Subnet mask**: *x.x.x.x*
   - **Gateway address**: *x.x.x.x*

   The static IP configuration values specify valid IP addresses of the form *x.x.x.x*, where each *x* is a number from 0 to 255.

   If you changed any values, click **Save**.

c. Complete the following steps to configure the Serial over LAN settings:
   1) In the navigation pane, click **Blade Tasks → Serial Over LAN**.
   2) Scroll to the **Serial Over LAN Configuration** section and set the values as follows:
      - Set the **Serial Over LAN** field to **Enabled**.
      - Set the **BSMP IP address range** field to the base IP address for blade servers installed in the BladeCenter unit. Valid IP addresses are of the form *x.x.x.x*, where each *x* is a number from 0 to 255.
      - Set the **Accumulate timeout** field to 25 (the default value is 5).
      - Set the **Send threshold** field (the default value is 250).
      - Set the **Retry count** field (the default value is 3).
      - Set the **Retry interval** field to 2500 (the default value is 250).
   3) Click **Save**.

   Do not attempt to enable or disable SOL on any of the blade servers that are listed in the **Serial Over LAN Status** section.

5. Complete the following steps to restart the management module. Restarting the management module ends the current BladeCenter management-module Web interface session.
   a. In the navigation pane, click **MM Control → Restart MM**.
   b. Click **Restart**.
   c. Click **OK** to confirm.
   d. Click **Yes** to restart the management module and end the session.

Configuring the IBM @server BladeCenter HS20 Type 8832 and Type 8843 blade servers

Note: If an SOL session for the BladeCenter HS20 Type 8832 or Type 8843 blade server displays only a flashing cursor in a blank screen, this indicates an interruption in the flow of serial data. Press Ctrl+q to resume serial data flow.

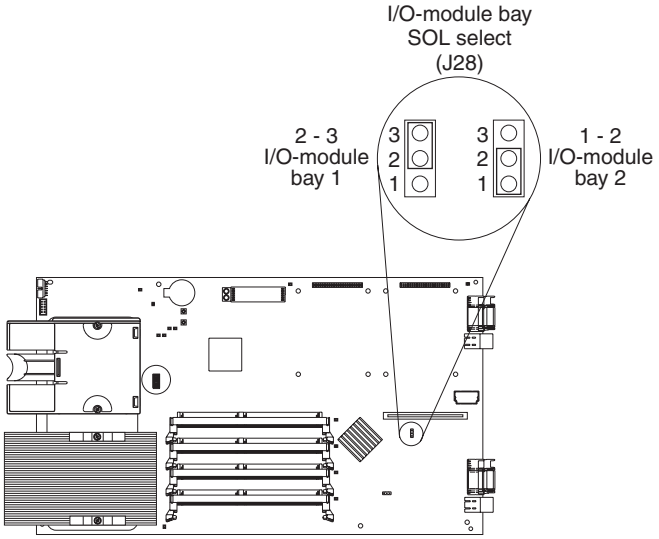
The following sections describe the SOL configuration that is required for the BladeCenter HS20 Type 8832 and Type 8843 blade servers. You must perform the following procedures:

- "HS20 Type 8832 SOL jumper placement" on page 26 (Type 8832 blade server only)
- "Updating and configuring the BIOS" on page 26
- "Updating the integrated systems management processor firmware" on page 27
- "Updating the Broadcom Ethernet controller firmware" on page 28

- “Installing the Broadcom Ethernet controller device driver for Linux operating systems” on page 28

HS20 Type 8832 SOL jumper placement

For SOL operation with the HS20 Type 8832 blade server, jumper J28 on the blade server must be installed on pins 2 and 3. This is the default jumper position that directs SOL data to I/O-module bay 1 in the BladeCenter unit.



Updating and configuring the BIOS

Note: If you update the blade server BIOS using Update*X*press, the blade server will maintain any BIOS settings that might have been set previously using the Configuration/Setup Utility program; the blade server will *not* revert to the BIOS default settings when you use Update*X*press.

Complete the following steps to update and configure the BladeCenter HS20 Type 8832 or Type 8843 blade server BIOS to enable SOL:

1. Complete the following steps to update the blade server BIOS:
   a. Download the latest version of BIOS for your blade server type from the IBM Support Web site, http://www.ibm.com/pc/support/.
   b. Update the blade server BIOS, following the instructions that come with the update file that you downloaded.
2. Complete the following steps to configure the blade server BIOS settings:
   a. Restart the blade server and press F1 when prompted to start the Configuration/Setup Utility program.
   b. Select **Devices and I/O Ports**; then, make sure that the values are set as follows:
      - **Serial Port A**: Auto-configure
      - **Serial Port B**: Auto-configure
   c. Select **Remote Console Redirection**; then, make sure that the values are set as follows:
      - **Remote Console Active**: Enabled
      - **Remote Console COM Port**: COM 2
      - **Remote Console Baud Rate**: 19200

- **Remote Console Data Bits**: 8
- **Remote Console Parity**: None
- **Remote Console Stop Bits**: 1
- **Remote Console Text Emulation**: ANSI
- **Remote Console Keyboard Emulation**: ANSI
- **Remote Console Active After Boot**: Enabled
- **Remote Console Flow Control**: Hardware

d. Press Esc twice to exit the **Remote Console Redirection** and **Devices and I/O Ports** sections of the Configuration/Setup Utility program.

Note: Do not use Planar Ethernet 1 for PXE/DHCP booting or installation. See “Hardware and firmware requirements” on page 2 for information.

e. Select **Start Options**; then, set **Planar Ethernet PXE/DHCP** to one of the following settings:
   - **Disabled**
   - **Planar Ethernet 2**. If you set **Planar Ethernet PXE/DHCP** to **Planar Ethernet 2**, you must also set **Run PXE only on selected Planar NIC** to **Enabled**.

f. Press Esc to exit the **Start Options** section of the Configuration/Setup Utility program.

g. Select **Save Settings**; then, press Enter.

h. Press Enter to confirm.

i. Select **Exit Setup**; then, press Enter.

j. Make sure that **Yes, exit the Setup Utility** is selected; then, press Enter.

Updating the integrated systems management processor firmware

Complete the following procedure to update the BladeCenter HS20 Type 8832 or Type 8843 blade server integrated systems management processor (ISMP) firmware. No configuration is required for the BladeCenter HS20 Type 8832 or Type 8843 blade server ISMP to enable SOL.

Attention: Do not change the BladeCenter media tray owner by pressing the button on the front of the blade server or through the BladeCenter management-module Web interface while the ISMP firmware update is in progress. This will interrupt the update procedure and might damage the blade server.

Complete the following steps to update the BladeCenter HS20 Type 8832 or Type 8843 blade server ISMP firmware:

1. Download the latest version of ISMP firmware for your blade server type from the IBM Support Web site, http://www.ibm.com/pc/support/.
2. Update the blade server ISMP firmware, following the instructions that come with the update file that you downloaded. To update the blade server ISMP firmware click **Blade Tasks → Firmware Update** in the BladeCenter management-module Web interface or use an update diskette.

Updating the Broadcom Ethernet controller firmware

The Broadcom Ethernet controller on the BladeCenter HS20 Type 8832 and Type 8843 blade servers has the following requirements for SOL operation:

- An SOL capable Ethernet I/O module must be installed in I/O module bay 1 of the BladeCenter unit (see “Hardware and firmware requirements” on page 2).
- For the BladeCenter HS20 Type 8832 blade server, the SOL jumper J28 must be placed on pins 2 and 3. This is the default jumper position. See “HS20 Type 8832 SOL jumper placement” on page 26.

Complete the following steps to update the BladeCenter HS20 Type 8832 or Type 8843 blade server Broadcom Ethernet controller firmware. You do not have to configure the Broadcom Ethernet Controllers to enable SOL.

1. Download the latest version of Broadcom Ethernet controller firmware for your blade server type from the IBM Support Web site, http://www.ibm.com/pc/support/.
2. Update the blade server Broadcom Ethernet controller firmware, following the instructions that come with the update file that you downloaded. To update the blade server Broadcom Ethernet controller firmware, use an update diskette or use the Broadcom Ethernet controller diagnostic utility, depending on the operating system that is installed on your blade server.

Installing the Broadcom Ethernet controller device driver for Linux operating systems

If you are using a Linux operating system, complete the following steps to install the BladeCenter HS20 Type 8832 or Type 8843 blade server Broadcom Ethernet controller device driver. Before performing these steps, make sure that you are logged in as a root user, that the development tools packages have already been installed, and that the kernel source package has already been installed.

1. Obtain the latest version of Broadcom Ethernet controller device-driver source package for your blade server type from the IBM Support Web site, http://www.ibm.com/pc/support/.
2. Update the blade server Broadcom Ethernet controller device drivers, following the instructions that come with the device-driver source package that you downloaded.
3. Configure the network interfaces for the Linux operating system. See the documentation for your operating system for information and instructions.

Configuring the IBM @server BladeCenter HS40 Type 8839 blade server

The following sections describe the SOL configuration that is required for the BladeCenter HS40 Type 8839 blade server. You must perform the following procedures:

- “Updating the Baseboard Management Controller firmware” on page 29
- “Updating the programmable logic device firmware” on page 29
- “Updating and configuring the BIOS” on page 29
- “Installing the Intel Ethernet controller device driver for Linux operating systems” on page 30

Updating the Baseboard Management Controller firmware

No configuration is required for the BladeCenter HS40 Type 8839 blade server BMC to enable SOL.

Complete the following steps to update the BladeCenter HS40 Type 8839 blade server BMC firmware:

1. Download the latest version of IBM @server BladeCenter HS40 Type 8839 blade server BMC firmware from the IBM Support Web site, http://www.ibm.com/pc/support/.
2. Update the blade server BMC firmware, following the instructions that come with the update images that you downloaded. To update the blade server BMC firmware, use an update diskette.

Updating the programmable logic device firmware

Important: The BladeCenter HS40 Type 8839 blade server BMC firmware must be updated before you update the programmable logic device (PLD) firmware.

Note: You might have to use a USB storage device to update the PLD firmware.

Complete the following steps to update the BladeCenter HS40 Type 8839 blade server PLD firmware:

1. Download the latest version of IBM @server BladeCenter HS40 Type 8839 blade server PLD firmware from the IBM Support Web site, http://www.ibm.com/pc/support/.
2. Update the blade server PLD firmware, following the instructions that come with the update images that you downloaded.

Updating and configuring the BIOS

Important: The BladeCenter HS40 Type 8839 blade server BMC and PLD firmware must be updated before you update the BIOS firmware.

Complete the following steps to update and configure the BladeCenter HS40 Type 8839 blade server BIOS to enable SOL:

1. Complete the following steps to update the BladeCenter HS40 Type 8839 blade server BIOS:
   a. Download the latest version of IBM @server BladeCenter HS40 Type 8839 blade server BIOS from the IBM Support Web site, http://www.ibm.com/pc/support/.
   b. Update the blade server BIOS, following the instructions that come with the update images that you downloaded.
2. Complete the following steps to configure the BladeCenter HS40 Type 8839 blade server BIOS settings:
   a. Restart the blade server and press F1 when prompted to start the Configuration/Setup Utility program.
   b. Select **Devices and I/O Ports**; then, make sure that the **Serial Ports** value is set to **Enabled**.
   c. Select **Remote Console Redirection**; then, make sure that the values are set as follows:
      - **BIOS Redirection Port**: Serial 2
      - **Baud Rate**: 19.2K

- **Flow Control**: CTS/RTS
- **Terminal Type**: VT100+

d. Press Esc twice to exit the **Remote Console Redirection** and **Devices and I/O Ports** sections of the Configuration/Setup Utility program.

e. Press F10.

f. Make sure that **OK** is selected; then, press Enter.

Installing the Intel Ethernet controller device driver for Linux operating systems

If you are using a Linux operating system, complete the following steps to install the BladeCenter HS40 Type 8839 blade server Intel Ethernet controller device driver. Before performing these steps make sure that you are logged in as a root user, that the development tools packages have already been installed, and that the kernel source package has already been installed.

1. Obtain the latest version of IBM @server BladeCenter HS40 Type 8839 blade server Intel Ethernet controller device-driver source package from the IBM Support Web site, http://www.ibm.com/pc/support/.
2. Update the blade server Intel Ethernet controller device drivers, following the instructions that come with the device-driver source package that you downloaded.
3. Configure the network interfaces for the Linux operating system. See the documentation for your operating system for information and instructions.

Configuring the IBM @server BladeCenter JS20 Type 8842 blade server

No manual configuration of the BladeCenter JS20 Type 8842 blade server open firmware (BIOS) or ISMP is required. This blade server automatically configures itself when you install it in the BladeCenter unit and is automatically reconfigured after you install new software or hardware. The BladeCenter JS20 Type 8842 blade server has built-in support for the SOL feature. You must install the Broadcom Ethernet controller device driver after you install the blade server operating system.

You must use the SOL feature to initially install and configure the operating system in the BladeCenter JS20 Type 8842 blade server. After the operating system has been completely installed and configured, you can use either Telnet or SSH sessions to communicate directly with the blade server operating system.

Note: The Broadcom Ethernet controller on the BladeCenter JS20 Type 8842 blade server might be unable to communicate for a few seconds while the blade server is restarting. If this occurs, the current SOL session will be terminated; however, the SOL session can be established again after the blade server restarts.

The following sections describe how to set up SOL for the BladeCenter JS20 Type 8842 blade server. You must perform the following procedures:

- "Updating the open firmware (BIOS)" on page 31
- "Updating the integrated systems management processor firmware" on page 31
- "Updating the Broadcom Ethernet controller firmware" on page 31
- "Installing the Broadcom Ethernet controller device driver for Linux operating systems" on page 32

Updating the open firmware (BIOS)

Note: If an SOL session is in progress, it will be terminated when the BladeCenter JS20 Type 8842 blade server open firmware is updated. The SOL session can be established again after the firmware update is complete.

Complete the following steps to update the BladeCenter JS20 Type 8842 blade server open firmware. You do not have to configure the blade server open firmware to enable SOL.

1. Download the latest version of IBM @server BladeCenter JS20 Type 8842 blade server open firmware from the IBM Support Web site, http://www.ibm.com/pc/support/.
2. Update the blade server open firmware, following the instructions that come with the update file that you downloaded.

Updating the integrated systems management processor firmware

Attention: Do not change the BladeCenter media tray owner by pressing the button on the front of the blade server or through the BladeCenter management-module Web interface while the integrated systems management processor (ISMP) firmware update is in progress. This will interrupt the update procedure and might damage the BladeCenter JS20 Type 8842 blade server.

Important: You must update the open firmware (BIOS) on the BladeCenter JS20 Type 8842 blade server before you update the ISMP firmware.

Complete the following steps to update the BladeCenter JS20 Type 8842 blade server ISMP firmware. You do not have to configure the ISMP to enable SOL.

1. Download the latest version of IBM @server BladeCenter JS20 Type 8842 blade server ISMP firmware from the IBM Support Web site, http://www.ibm.com/pc/support/.
2. Update the blade server ISMP firmware, following the instructions that come with the update file that you downloaded. To update the blade server ISMP firmware, click **Blade Tasks → Firmware Update** in the BladeCenter management-module Web interface.

Updating the Broadcom Ethernet controller firmware

The Broadcom Ethernet controller on the BladeCenter JS20 Type 8842 blade server has the following requirements for SOL operation:

- An SOL capable Ethernet I/O module must be installed in I/O module bay 1 of the BladeCenter unit (see “Hardware and firmware requirements” on page 2).
- You must not have any other Broadcom Ethernet Controller devices, such as the IBM @server BladeCenter Gigabit Ethernet Expansion Card, activated.
- The latest Broadcom Ethernet controller network device driver must be installed and both Ethernet interfaces (eth0 and eth1) must be configured before you use the Broadcom Ethernet controller diagnostic utility.

Complete the following steps to update the BladeCenter JS20 Type 8842 blade server Broadcom Ethernet controller firmware. You do not have to configure the Broadcom Ethernet controllers to enable SOL.

1. Download the latest version of IBM @server BladeCenter JS20 Type 8842 blade server Broadcom Ethernet controller firmware from the IBM Support Web site, http://www.ibm.com/pc/support/.

2. Update the blade server Broadcom Ethernet controller firmware, following the instructions that come with the update file that you downloaded.

   After installing the Broadcom Ethernet controller firmware, you must restart the blade server before you can use the SOL feature.

Installing the Broadcom Ethernet controller device driver for Linux operating systems

Complete the following steps to install the BladeCenter JS20 Type 8842 blade server Broadcom Ethernet controller device driver for Linux operating systems. Before performing these steps, make sure that you are logged in as a root user and that the development tools packages, cross-compile utilities, and the kernel source package have already been installed.

1. Obtain the latest version of IBM @server BladeCenter JS20 Type 8842 blade server Broadcom Ethernet controller device-driver source package from the IBM Support Web site, http://www.ibm.com/pc/support/.
2. Update the blade server Broadcom Ethernet controller device drivers, following the instructions that come with the device-driver source package that you downloaded.
3. Configure the network interfaces for the Linux operating system. See the documentation for your operating system for information and instructions.

Configuring the IBM 4-Port Gb Ethernet Switch Module for BladeCenter

Complete the following steps to update the firmware of the IBM 4-Port Gb Ethernet Switch Module for BladeCenter. No configuration is required for the IBM 4-Port Gb Ethernet Switch Module for BladeCenter to enable SOL.

Note: You will not be able to perform this procedure if the values for the network configuration of the IBM 4-Port Gb Ethernet Switch Module for BladeCenter are not within the same subnet as the BladeCenter management-module network interfaces (eth0 and eth1). See “Configuring the management module” on page 23 for information.

1. Obtain the latest version of IBM 4-Port Gb Ethernet Switch Module for BladeCenter firmware from the IBM Support Web site, http://www.ibm.com/pc/support/.
2. Start the BladeCenter management-module Web interface (see “Starting the BladeCenter management-module Web interface” on page 7).
3. In the navigation pane, click **I/O Module Tasks → Management**.
4. Scroll to the **Current IP Configuration** section and make sure that it contains values that are within the same subnet as the BladeCenter management-module network interfaces (eth0 and eth1). If the values are not in the same subnet, you must modify them before you continue. See “Configuring the management module” on page 23 for information.
5. Scroll to the **Bay 1 (Ethernet SM)*** section; then, click **Advanced Management**.
6. Scroll to the **Start Telnet/Web Session** section; then, click **Start Web Session**. This will start a new Web browser session and connect to the IBM 4-Port Gb Ethernet Switch Module for BladeCenter Web interface.
7. Log in to the IBM 4-Port Gb Ethernet Switch Module for BladeCenter Web interface.
8. Click **Maintenance**.
9. Click **Using Browser**.

10. Click **Upgrade Firmware/Configuration**.
11. Click **Browse**; then, select the firmware update file that you obtained in step 1.
12. Click **Start**; then, click **Yes** to confirm each time you are asked a question.
13. Close the Web browser.
14. Complete the following steps to restart the I/O module:
    a. In the navigation pane, click **I/O Module Tasks → Power/Restart**.
    b. Select your IBM 4-Port Gb Ethernet Switch Module for BladeCenter, labeled **Ethernet SM**, and click **Restart Module(s) and Run Standard Diagnostics**.
    c. Click **OK** to confirm.

Configuring the Nortel Networks Layer 2-7 GbE Switch Module for IBM @server BladeCenter

Complete the following steps to update the firmware of the Nortel Networks Layer 2-7 GbE Switch Module for IBM @server BladeCenter. No configuration is required for the Nortel Networks Layer 2-7 GbE Switch Module for IBM @server BladeCenter to enable SOL.

Notes:

- You will not be able to perform this procedure if the values for the network configuration of the Nortel Networks Layer 2-7 GbE Switch Module for IBM @server BladeCenter are not within the same subnet as the BladeCenter management-module network interfaces (eth0 and eth1). See “Configuring the management module” on page 23 for information.
- These steps require that an accessible TFTP (Trivial FTP) server is present on your production network.

1. Obtain the latest version of Nortel Networks Layer 2-7 GbE Switch Module for IBM @server BladeCenter firmware from the IBM Support Web site, http://www.ibm.com/pc/support/.
2. Update the Nortel Networks Layer 2-7 GbE Switch Module for IBM @server BladeCenter firmware, following the instructions that come with the update file that you downloaded. The Nortel Networks Layer 2-7 GbE Switch Module has multiple firmware images. These images must all be updated, in the correct order. Make sure that you restart the Nortel Networks Layer 2-7 GbE Switch Module after updating each firmware image.

Configuring the Cisco Systems Intelligent Gigabit Ethernet Switch Module for the IBM @server BladeCenter

Complete the following steps to configure the Cisco Systems Intelligent Gigabit Ethernet Switch Module for the IBM @server BladeCenter. The Cisco Systems Intelligent Gigabit Ethernet Switch Module has built-in support for the SOL feature and does not require a firmware upgrade.

Note: You will not be able to perform this procedure if the values for the network configuration of the Cisco Systems Intelligent Gigabit Ethernet Switch Module are not within the same subnet as the BladeCenter management-module network interfaces (eth0 and eth1). See “Configuring the management module” on page 23 for information.

1. Start the BladeCenter management-module Web interface (see “Starting the BladeCenter management-module Web interface” on page 7).

2. In the navigation pane, click **I/O Module Tasks → Management**.
3. Scroll to the **Current IP Configuration** section and make sure that it contains values that are within the same subnet as the BladeCenter management-module network interfaces (eth0 and eth1). If the values are not in the same subnet, you must modify them before you continue. See “Configuring the management module” on page 23 for information.
4. Scroll to the **Bay 1 (Ethernet SM)*** section; then, click **Advanced Management**.
5. Scroll to the **Start Telnet/Web Session** section; then, click **Start Telnet Session**. This will start a new Telnet session and connect to the Cisco Systems Intelligent Gigabit Ethernet Switch Module Telnet interface.
6. Log in to the Cisco Systems Intelligent Gigabit Ethernet Switch Module Telnet interface.
7. Complete the following steps to configure the VLAN ID for the Cisco Systems Intelligent Gigabit Ethernet Switch Module:
   a. Type `en` and then press Enter.
   b. Type `config t` and then press Enter.
   c. Type `vlan` *`vlan_id`*, where *vlan_id* is the VLAN ID that was set for the management module (see “Global SOL settings and status” on page 8); then, press Enter.
   d. Type `state active` and then press Enter.
   e. Type `exit` and then press Enter.
   f. Type `int gi0/15` and then press Enter.
   g. Type `sw trunk allow vlan add` *`vlan_id`*, where *vlan_id* is the VLAN ID that was set in step 7c; then, press Enter.
   h. Type `int gi0/16` and then press Enter.
   i. Type `sw trunk allow vlan add` *`vlan_id`*, where *vlan_id* is the VLAN ID that was set in step 7c; then, press Enter.
   j. Type `end` and then press Enter.
8. Complete the following steps to remove the SOL VLAN ID from the external ports of the Cisco Systems Intelligent Gigabit Ethernet Switch Module:
   a. Type `config t` and then press Enter.
   b. Type `int gi0/17` and then press Enter.
   c. Type `switchport trunk allowed vlan remove` *`vlan_id`*, where *vlan_id* is the VLAN ID that was set in step 7c; then, press Enter.
   d. Type `int gi0/18` and then press Enter.
   e. Type `switchport trunk allowed vlan remove` *`vlan_id`*, where *vlan_id* is the VLAN ID that was set in step 7c; then, press Enter.
   f. Type `int gi0/19` and then press Enter.
   g. Type `switchport trunk allowed vlan remove` *`vlan_id`*, where *vlan_id* is the VLAN ID that was set in step 7c; then, press Enter.
   h. Type `int gi0/20` and then press Enter.
   i. Type `switchport trunk allowed vlan remove` *`vlan_id`*, where *vlan_id* is the VLAN ID that was set in step 7c; then, press Enter.
   j. Type `end` and then press Enter.
   k. Type `wri` and then press Enter.

Note: For SOL operation, the internal interfaces of the Cisco Ethernet Switch Module must be set to trunk mode. Trunk mode is the default configuration. If SOL sessions do not go into a Ready state, perform the procedure in step 9 to configure trunk mode.

9. Complete the following steps to configure the internal interfaces of the Cisco Systems Intelligent Gigabit Ethernet Switch Module for trunk mode:
   a. Type `config t` and then press Enter.
   b. Type `int gi0/1` and then press Enter.
   c. Type `switchport mode trunk` and then, press Enter.
   d. Type `int gi0/2` and then press Enter.
   e. Type `switchport mode trunk` and then, press Enter.
   f. Type `int gi0/3` and then press Enter.
   g. Type `switchport mode trunk` and then, press Enter.
   h. Type `int gi0/4` and then press Enter.
   i. Type `switchport mode trunk` and then, press Enter.
   j. Type `int gi0/5` and then press Enter.
   k. Type `switchport mode trunk` and then, press Enter.
   l. Type `int gi0/6` and then press Enter.
   m. Type `switchport mode trunk` and then, press Enter.
   n. Type `int gi0/7` and then press Enter.
   o. Type `switchport mode trunk` and then, press Enter.
   p. Type `int gi0/8` and then press Enter.
   q. Type `switchport mode trunk` and then, press Enter.
   r. Type `int gi0/9` and then press Enter.
   s. Type `switchport mode trunk` and then, press Enter.
   t. Type `int gi0/10` and then press Enter.
   u. Type `switchport mode trunk` and then, press Enter.
   v. Type `int gi0/11` and then press Enter.
   w. Type `switchport mode trunk` and then, press Enter.
   x. Type `int gi0/12` and then press Enter.
   y. Type `switchport mode trunk` and then, press Enter.
   z. Type `int gi0/13` and then press Enter.
   aa. Type `switchport mode trunk` and then, press Enter.
   ab. Type `int gi0/14` and then press Enter.
   ac. Type `switchport mode trunk` and then, press Enter.
   ad. Type `end` and then press Enter.
   ae. Type `wri` and then press Enter.
10. Type `exit` and then press Enter to close the Cisco Systems Intelligent Gigabit Ethernet Switch Module Telnet interface session.
11. Close the window in which the Telnet session was running.

Chapter 4. Using SOL

The IBM @server management module command-line interface provides a convenient method for entering commands that manage and monitor BladeCenter components. This section contains the following information about using the command-line interface:

- "Starting an SOL session"
- "Ending an SOL session" on page 39
- "Restarting a blade server through SOL" on page 39
- "Mounting and unmounting media for Linux operating systems" on page 40

See the documentation for your operating system for information about commands that you can enter through an SOL connection.

Starting an SOL session

Start an SOL session from a client computer through the management-module command-line interface by establishing a Telnet connection to the IP address of the management module or by establishing a Secure Shell (SSH) connection. You can establish up to 20 separate Telnet sessions with a BladeCenter management module. For a BladeCenter unit, this enables you to have 14 simultaneous SOL sessions active (one for each of up to 14 blade servers) with 6 additional command-line interface sessions available for BladeCenter unit management. For a BladeCenter T unit, this enables you to have 8 simultaneous SOL sessions active (one for each of up to 8 blade servers) with 12 additional command-line interface sessions available for BladeCenter unit management. See the *IBM @server BladeCenter Management Module Command-Line Interface Reference Guide* for information about the management-module command-line interface.

The following sections are in this chapter:

- "Starting a command-line Telnet connection"
- "Starting a command-line Secure Shell (SSH) connection" on page 38
- "Starting an SOL session from the command-line interface" on page 38
- "Ending an SOL session" on page 39

Starting a command-line Telnet connection

Note: Telnet sessions with the BladeCenter management module have a default timeout value of 120 seconds (2 minutes). If there is no Telnet or SOL traffic within the timeout interval, the Telnet session and any SOL session associated with this Telnet session will terminate. See the *IBM @server BladeCenter Management Module Command-Line Interface Reference Guide* for information about configuring the Telnet session timeout value.

To log on to the management module using Telnet, complete the following steps:

1. Open a command-line window on the network-management workstation, type `telnet 192.168.70.125`, and press Enter. The IP address 192.168.70.125 is the default IP address of the management module; if a new IP address has been assigned to the management module, use that one instead. You can also substitute a valid host name instead of using an IP address.

   A command-prompt window opens.

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2. At the login prompt, type the management-module user ID. At the password prompt, type the management-module password. The user ID and password are case sensitive and are the same as those that are used for management-module Web access.

   A command prompt is displayed. You can now enter commands for the management module.

Starting a command-line Secure Shell (SSH) connection

To log on to the management module using SSH, complete the following steps:

1. Make sure that the SSH service on the network-management workstation is enabled. See your operating-system documentation for instructions.
2. Make sure that the SSH server on the BladeCenter management module is enabled. See the *IBM @server BladeCenter Management Module User's Guide* for instructions.
3. Start a SSH session to the management module using the SSH client of your choice. For example, if you are using the cygwin client, open a command-line window on the network-management workstation, type `ssh -x 192.168.70.125`, and press Enter. The IP address 192.168.70.125 is the default IP address of the management module; if a new IP address has been assigned to the management module, use that one instead.

   A command prompt window opens.
4. Type the management-module user ID when prompted. At the password prompt, type the management-module password. The user ID and password are case sensitive and are the same as those that are used for management-module Web access.

   A command prompt is displayed. You can now enter commands for the management module.

Starting an SOL session from the command-line interface

After an SOL session is started, all commands are sent to the operating system on the blade server specified by the **console** command until the SOL session is ended, regardless of the persistent command target that was in effect before the SOL session. During an SOL session, no BladeCenter command-line interface commands are valid. If a blade server is restarted while an SOL session is in progress, the SOL session resumes when the blade server restarts. Restarting the management module will end all SOL sessions that are running.

The BladeCenter management module automatically stores the previous 8 KB (kilobytes) of serial data that was transmitted by each blade server even when SOL sessions are not active. When an SOL session is established, all of the previous serial data, up to 8 KB, is automatically displayed. If no previous data is available when the SOL session is started, the cursor will remain on the command line until new serial data is transmitted. If a management module fails, all Telnet and SOL sessions are terminated, and their caches are lost, even if failover to a redundant management module is successful.

See the *IBM @server BladeCenter Management Module Command-Line Interface Reference Guide* for information about configuring a blade server for SOL using the management module command-line interface. See your operating-system documentation for information about commands that you can enter using an SOL command-line interface.

Note: Serial over LAN (SOL) must be enabled for both the BladeCenter unit and the blade server before you can start an SOL session with the blade server. See Chapter 2, “General configuration,” on page 7 and Chapter 3, “Component-specific configuration,” on page 23 for information about enabling SOL.

After you start a Telnet or SSH session to the BladeCenter management module (see the *IBM @server BladeCenter Management Module Command-Line Interface Reference Guide*), you can start an SOL session to any individual blade server that supports SOL using the **console** command. Because you can start up to 20 separate Telnet or SSH sessions to the BladeCenter management module, you can have up to 14 simultaneous SOL sessions with blade servers and 6 command-line interface sessions with other BladeCenter components active at the same time. available for BladeCenter unit management. For a BladeCenter T unit, you can have up to 8 simultaneous SOL sessions with blade servers and 12 command-line interface sessions with other BladeCenter T components active at the same time.

To start an SOL session from the command line, type the following command, indicating the target blade server:

```
console -T system:blade[x]
```

where *x* is the blade bay where the blade server is installed. (A blade server that occupies more than one blade bay is identified by the lowest bay number that it occupies.)

For example, to start an SOL connection to the blade server in blade bay 5, type

```
console -T system:blade[5]
```

Note: If an SOL session for the BladeCenter HS20 Type 8832 or Type 8843 blade server displays only a flashing cursor in a blank screen, this indicates an interruption in the flow of serial data. Press Ctrl+q to resume serial data flow.

Ending an SOL session

To end an SOL session, press Esc followed by an open parenthesis:

Esc (

When the SOL session ends, the command-line interface returns to the persistent command target that was in effect before the SOL session. If you want to end the Telnet or SSH command-line session, type `exit`.

Note: Exiting an SOL session does not stop the flow of serial data.

Restarting a blade server through SOL

You can restart a blade server during an SOL session by typing a specific key sequence. This makes it possible to restart the blade server without ending the SOL session so that you can use the restart command in the management-module command-line interface.

Type the following key sequence (Esc R Esc r Esc R) to restart a blade server during an SOL session:

1. Press Esc.
2. Type a capital R by pressing Shift and r at the same time.
3. Press Esc.

4. Press r.
5. Press Esc.
6. Type a capital R by pressing Shift and r at the same time.

The blade server that is hosting this SOL session restarts, returning to the SOL session that is already in progress.

Mounting and unmounting media for Linux operating systems

The following sections describe how to mount and unmount media using the Linux operating system for each blade server type.

For BladeCenter units that do not have a diskette drive, you can mount only optical drive media.

Mounting and unmounting media for the BladeCenter HS20 Type 8832 and Type 8843 blade servers and the BladeCenter HS40 Type 8839 blade server

The following sections describe how to mount and unmount media using the Red Hat Enterprise Linux ES 2.1 and SUSE SLES 8.0 operating systems for the BladeCenter HS20 Type 8832 and Type 8843 blade servers and the BladeCenter HS40 Type 8839 blade server.

Mounting and unmounting media in Red Hat Enterprise Linux ES 2.1

Note: This procedure is based on a default installation of Red Hat Enterprise Linux ES 2.1. The file names, structures, and commands might be different for other versions of Red Hat Linux.

Use one of the following procedures to mount media when using the Red Hat Enterprise Linux ES 2.1 operating system with a BladeCenter HS20 Type 8832 or Type 8843 blade server or a BladeCenter HS40 Type 8839 blade server:

- Complete the following steps if the medium to be mounted is a CD:
  1. Make sure that the /mnt/cdrom directory exists on your server. If this directory does not exist, type

     ```
     mkdir /mnt/cdrom
     ```

     and then press Enter.
  2. To mount the CD, type

     ```
     mount /dev/scd0 –t iso9660 –o ro /mnt/cdrom
     ```

     and then press Enter.
- Complete the following steps if the medium to be mounted is a diskette:
  1. Make sure that the /mnt/floppy directory exists on your server. If this directory does not exist, type

     ```
     mkdir /mnt/floppy
     ```

     and then press Enter.

2. To mount the diskette, type

   ```
   mount /dev/sda –o auto /mnt/floppy
   ```

   and then press Enter.

Complete the following steps to unmount media when using the Red Hat Enterprise Linux ES 2.1 operating system with a BladeCenter HS20 Type 8832 or Type 8843 blade server or a BladeCenter HS40 Type 8839 blade server:

1. Type `cd` and then press Enter.
2. Type one of the following commands:
   - If the medium to be unmounted is a CD, type

     ```
     umount /mnt/cdrom
     ```

     and then press Enter.
   - If the medium to be unmounted is a diskette, type

     ```
     umount /mnt/floppy
     ```

     and then press Enter.

Mounting and unmounting media in SUSE SLES 8.0

Note: This procedure is based on a default installation of SUSE SLES 8.0. The file names, structures, and commands might be different for other versions of SUSE Linux.

Use one of the following procedures to mount media when using the SUSE SLES 8.0 operating system with a BladeCenter HS20 Type 8832 or Type 8843 blade server or a BladeCenter HS40 Type 8839 blade server:

- Complete the following steps if the medium to be mounted is a CD:
  1. Make sure that the /media/cdrom directory exists on your server. If this directory does not exist, type

     ```
     mkdir /media/cdrom
     ```

     and then press Enter.
  2. To mount the CD, type

     ```
     mount /dev/scd0 –t iso9660 –o ro /media/cdrom
     ```

     and then press Enter.
- Complete the following steps if the medium to be mounted is a diskette:
  1. Make sure that the /media/floppy directory exists on your server. If this directory does not exist, type

     ```
     mkdir /media/floppy
     ```

     and then press Enter.
  2. To mount the diskette, type

     ```
     mount /dev/sda –o auto /media/floppy
     ```

     and then press Enter.

Complete the following steps to unmount media when using the SUSE SLES 8.0 operating system with a BladeCenter HS20 Type 8832 or Type 8843 blade server or a BladeCenter HS40 Type 8839 blade server:

1. Type `cd` and then press Enter.
2. Type one of the following commands:
   - If the medium to be unmounted is a CD, type

     ```
     umount /media/cdrom
     ```

     and then press Enter.
   - If the medium to be unmounted is a diskette, type

     ```
     umount /media/floppy
     ```

     and then press Enter.

Mounting and unmounting media for the BladeCenter JS20 Type 8842 blade server

Note: This procedure is based on a default installation of SUSE SLES 8.0. The file names, structures, and commands might be different for other versions of SUSE Linux.

Use one of the following procedures to mount media when using the Linux operating system with a BladeCenter JS20 Type 8842 blade server.

- Complete the following steps if the medium to be mounted is a CD:
  1. Make sure that the /media/cdrom directory exists on your server. If this directory does not exist, type

     ```
     mkdir /media/cdrom
     ```

     and then press Enter.
  2. To mount the CD, type

     ```
     mount /dev/scd0 –t iso9660 –o ro /media/cdrom
     ```

     and then press Enter.
- Complete the following steps if the medium to be mounted is a diskette:
  1. Make sure that the /media/sda directory exists on your server. If this directory does not exist, type

     ```
     mkdir /media/sda
     ```

     and then press Enter.
  2. To mount the diskette, type

     ```
     mount /dev/sda –o auto /media/sda
     ```

     and then press Enter.

Complete the following steps to unmount media when using the Linux operating system:

1. Type `cd` and then press Enter.
2. Type one of the following commands:
   - If the medium to be unmounted is a CD, type

     ```
     umount /media/cdrom
     ```

     and then press Enter.
   - If the medium to be unmounted is a diskette, type

     ```
     umount /media/sda
     ```

     and then press Enter.

Appendix A. 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 system, 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 is 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* on the IBM *BladeCenter Documentation* CD or at the IBM Support Web site.
- Go to the IBM Support Web site at http://www.ibm.com/pc/support/ to check for technical information, hints, tips, and new device drivers.

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

Using the documentation

Information about your IBM BladeCenter, xSeries, or IntelliStation system and preinstalled software, if any, is available in the documentation that comes with your system. That documentation includes printed books, online books, 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/pc/support/ and follow the instructions. Also, you can order publications through the IBM Publications Ordering System at http://www.elink.ibmlink.ibm.com/public/applications/publications/cgibin/pbi.cgi.

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 BladeCenter, xSeries, and IntelliStation products, services, and support. The address for IBM BladeCenter and xSeries information is http://www.ibm.com/eserver/xseries/. The address for IBM IntelliStation information is http://www.ibm.com/pc/intellistation/.

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You can find service information for your IBM products, including supported options, at http://www.ibm.com/pc/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 and xSeries servers, IntelliStation workstations, and appliances. For information about which products are supported by Support Line in your country or region, go to http://www.ibm.com/services/sl/products/.

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Part Number: 25K8446

Printed in USA

(1P) P/N: 25K8446