# SGI® Modular InfiniteStorage™ (MIS) Platform User Guide

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# Record of Revision

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| --- | --- |
| 001 | June 2012<br>Original printing. |

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# About This Guide

This guide describes the features and components of the SGI® Modular InfiniteStorage™ (MIS) platform. It also describes system monitoring, troubleshooting, and chassis maintenance as well as important safety and regulatory specifications.

## Audience

This guide is written for owners/users of the MIS platform. It is written with the assumption that the reader has a good working knowledge of computers and computer systems.

## Related Publications

The following documents are relevant to the MIS platform:

- *MegaRAID SAS Software User's Guide*, publication number 80-00156-01
- *MegaRAID 6Gb/s SAS RAID Controllers User's Guide*, publication number 41450-02
- *Intel Server Boards and Server Platforms Server Management Guide*, publication number 37830-002
- *SGI Foundation Software Start Here*, publication number (007-5641-xxx)
- *SGI Performance Suite Start Here*, publication number (007-5680-xxx)
- SGI InfiniteStorage series documentation
- Man pages (online)

You can obtain SGI documentation, release notes, or man pages in the following ways:

- Refer to the SGI Technical Publications Library at http://docs.sgi.com. Various formats are available. This library contains the most recent and most comprehensive set of online books, release notes, man pages, and other information.
- Refer to the SGI Supportfolio™ webpage for documents whose access require a support contract (as do the MegaRAID books cited above). See "Product Support" on page xiii.
- You can also view man pages by typing **`man`** <*title*> on a command line.

## Conventions

The following conventions are used throughout this document:

| Convention | Meaning |
|---|---|
| `Command` | This fixed-space font denotes literal items such as commands, files, routines, path names, signals, messages, and programming language structures. |
| *variable* | The italic typeface denotes variable entries and words or concepts being defined. Italic typeface is also used for book titles. |
| **`user input`** | This bold fixed-space font denotes literal items that the user enters in interactive sessions. Output is shown in nonbold, fixed-space font. |
| [ ] | Brackets enclose optional portions of a command or directive line. |
| ... | Ellipses indicate that a preceding element can be repeated. |
| `man page`(*x*) | Man page section identifiers appear in parentheses after man page names. |
| **GUI element** | This font denotes the names of graphical user interface (GUI) elements such as windows, screens, dialog boxes, menus, toolbars, icons, buttons, boxes, fields, and lists. |

## Product Support

SGI provides a comprehensive product support and maintenance program for its products. SGI also offers services to implement and integrate Linux applications in your environment.

- Refer to http://www.sgi.com/support/
- If you are in North America, contact the Technical Assistance Center at +1 800 800 4SGI or contact your authorized service provider.
- If you are outside North America, contact the SGI subsidiary or authorized distributor in your country.

## Reader Comments

If you have comments about the technical accuracy, content, or organization of this document, contact SGI. Be sure to include the title and document number of the manual with your comments. (Online, the document number is located in the front matter of the manual. In printed manuals, the document number is located at the bottom of each page.)

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SGI values your comments and will respond to them promptly.

# System Overview

The SGI Modular InfiniteStorage (MIS) platform is a high-performance, high-density 4U rackmount system that can be either a compute and storage server or just a JBOD storage unit. Figure 1-1 shows the front view of an MIS server. Its features include the following:

- 6 GB/s performance
- Storage density:
  - Server—Up to 72 disk drives (3.5”) or 144 disk drives (2.5”)
  - JBOD unit—Up to 81disk drives (3.5”) or 162 disk drives (2.5”)
- High-level of reliability, availability, scalability, and manageability (RASM):
  - redundant cooling and power
  - RAID, dual-host access to every hard disk drive (HDD), hot-swappable HDDs
  - Up to two serverboards and a varying number of PCIe Gen 3 HBAs
  - Built-in remote management
- Easy serviceability with enhanced enclosure maneuverability

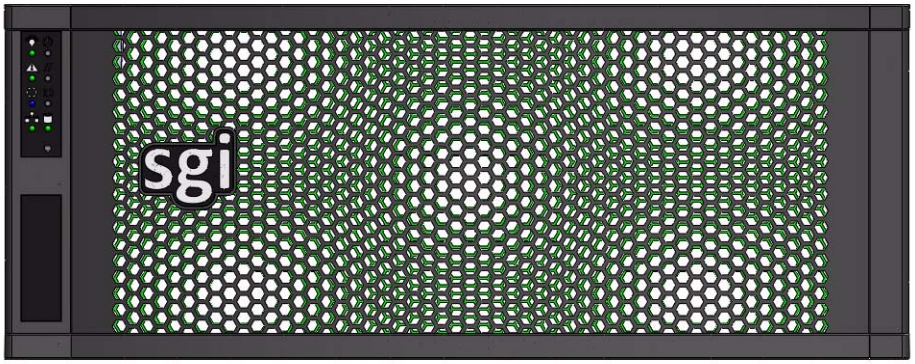


**Figure 1-1** MIS Server Front View

# Chassis

This section describes the major components in the MIS chassis. The unique aspects of its modularity lies in the following:

- The presence or absence of server modules determines whether the platform is an MIS server or a JBOD storage unit.
- The use of innovative drive bricks to house the drive bays allows the platform to maximize storage density.

See Figure 1-2.

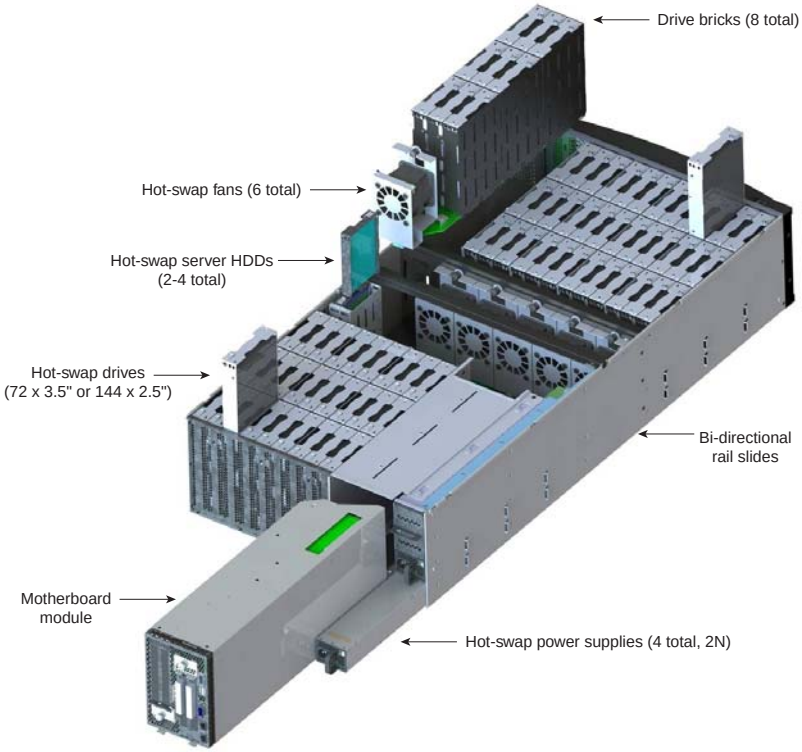


**Figure 1-2** MIS Chassis Architecture (Server)

## Serverboard Module

As shown in Figure 1-2, an MIS server has two to four internal hard drives (boot drives) and the serverboard module has the following configuration options:

- Up to two serverboards
- One or two Intel® Xeon® E5-2600 series processors per serverboard
- 8 DDR3 DIMMs (4 GB, 8 GB, or 16 GB) for a single-serverboard configuration. Up to 16 DIMMs for a dual-serverboard configuration.
- Up to six full-height PCIe HBAs for a single-serverboard configuration. Up to eight for a dual-serverboard configuration (two full-height and six half-height).
- Up to three PCIe riser cards

The MIS serverboard supports the Intel C600 chipset. Figure 1-3 is a closeup of the serverboard module.

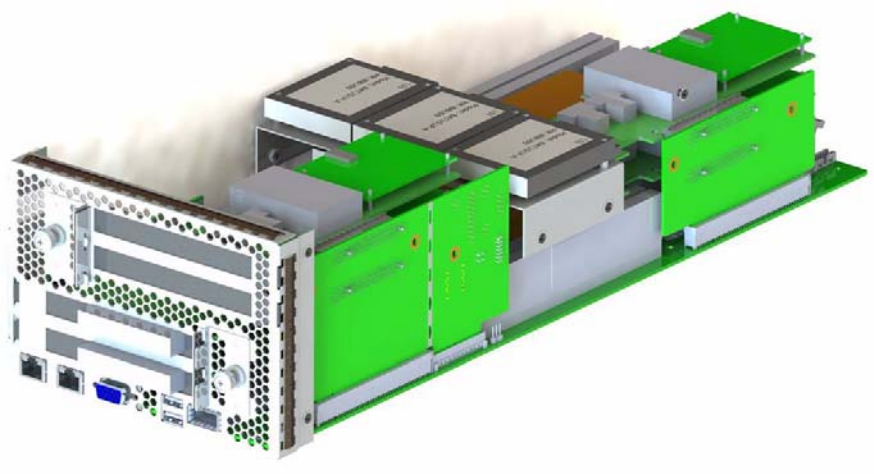

**Figure 1-3** MIS Serverboard Module

## JBOD Storage Unit

If you have the SGI MIS JBOD product, the serverboard module shown in Figure 1-2 is replaced by a drive brick and I/O modules as shown in Figure 1-4.

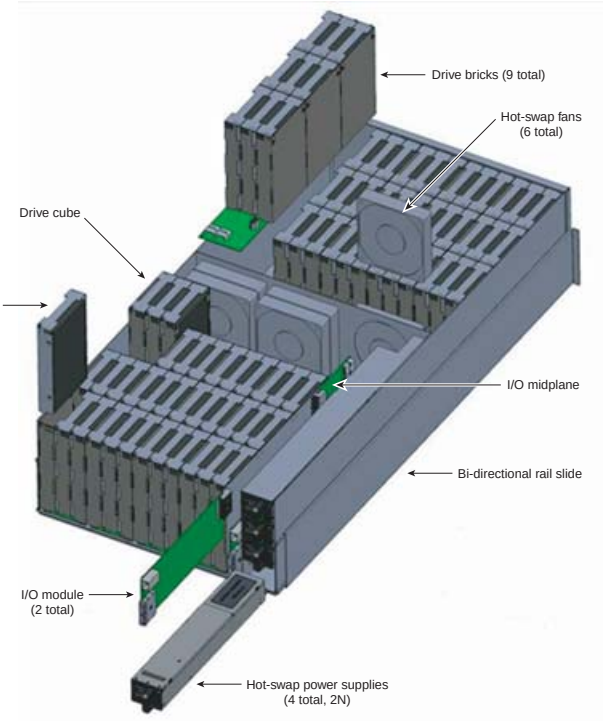


**Figure 1-4** MIS Chassis Architecture (JBOD)

## Disk Drive Bays

Instead of the conventional architecture, an array of independent drive bays, the MIS chassis houses its drive bays in a set of drive bricks. The drive brick contains nine drive slots. See Figure 1-2 and Figure 1-5.

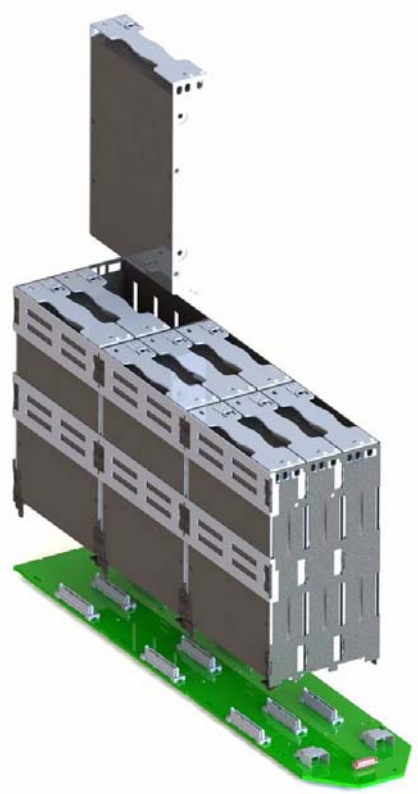

**Figure 1-5** MIS Drive Brick Architecture

The modular drive bricks along with the other modular components allow the MIS chassis to achieve industry-leading storage density. An MIS server has eight drive bricks and an MIS JBOD unit has nine. The drive bricks support SAS, SATA, and SSD drives.

## Front Panel Components

As shown in Figure 1-6 , the control panel is the main item of interest on the front panel. For a description of the control panel and its components, see Chapter 3, “System Monitoring.”

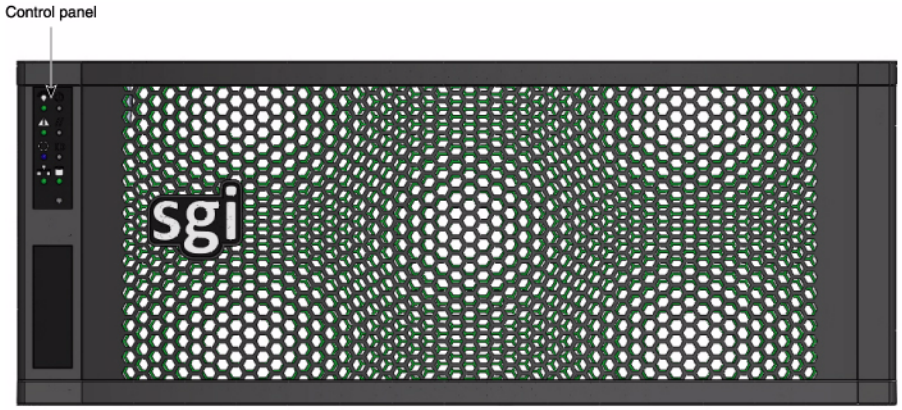


**Figure 1-6** MIS Control Panel

**Note:** A dual-serverboard MIS server and an MIS JBOD unit have a second control panel. The second control panel is situated directly below the one shown in Figure 1-6. Each control panel is associated with an MIS server or JBOD unit.

## Rear Panel Components

Figure 1-7, Figure 1-8, and Figure 1-9 illustrate the pertinent components of the rear panel for single-server, dual-server, and JBOD MIS platforms, respectively.

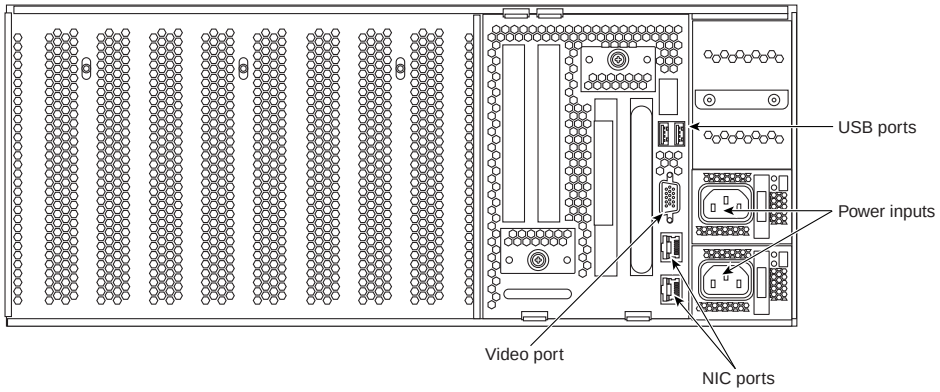


**Figure 1-7** Rear Panel—Single-Server Platform

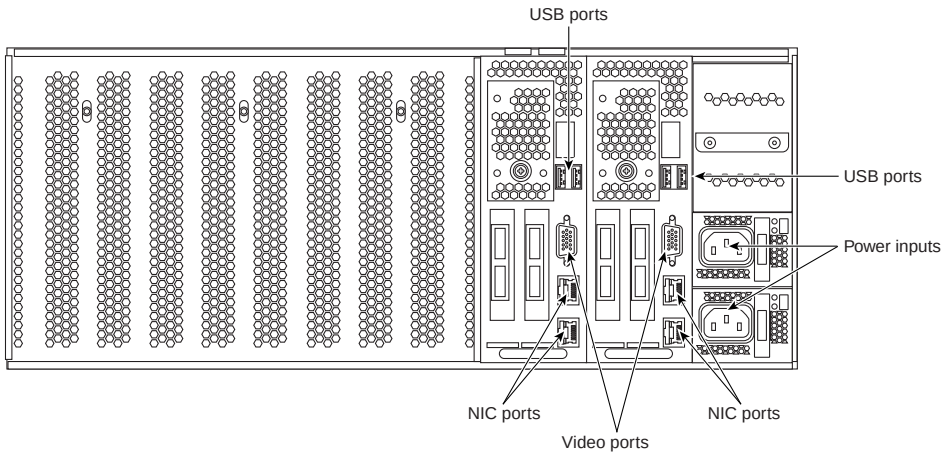


**Figure 1-8** Rear Panel—Dual-Server Platform

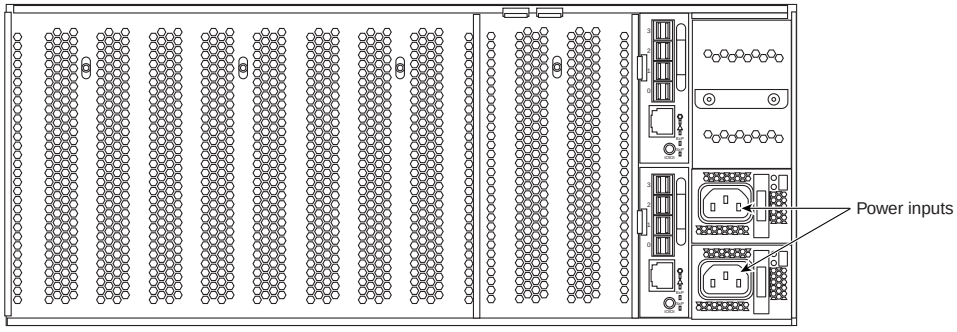


**Figure 1-9** Rear Panel—JBOD Platform

## Fans

As shown in Figure 1-2, the MIS chassis has six hot-swappable fan modules with two fans per module.

## Rack Mounting

The MIS chassis has unique bi-directional sliding rails. The special rails and the 19-inch SGI Destination (D-Rack) rack allow you to slide the chassis forward 20” or backward 18” to access disk drives and other serviceable components. Other third-party 19-inch racks are also supported.

You can mount up to 10 MIS chassis in a single D-Rack. See Figure 1-10.

**Figure 1-10** Fully Loaded SGI D-Rack

## Power Supply

An MIS chassis can have up to four power supplies (two redundant). They are high-efficiency, hot-swappable power supplies rated at 1100 Watts. In the unlikely event of a failure in one of the power supplies, you can remove and replace the faulty power supply without powering down the system.

Figure 1-11 shows an up-close view of a power supply.

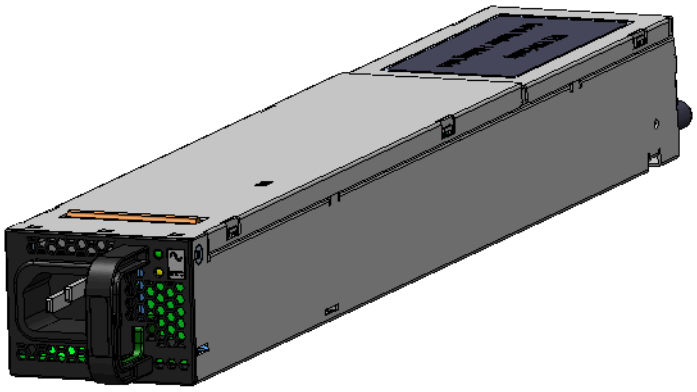

**Figure 1-11** Power Supply

# Disk RAID Support

The MIS server supports both software and hardware RAID. The server supports up to four PCIe RAID cards per serverboard.

RAID is defined as an array of multiple independent hard disk drives that provides high performance and fault tolerance. Disk performance is improved because more than one disk can be accessed simultaneously. Fault tolerance is improved because data loss caused by a hard drive failure can be recovered by rebuilding missing data from the remaining data or parity drives.

The MIS platform supports the following RAID levels:

- RAID 0 (Striping)
- RAID 1 (Mirrored)
- RAID 5 (Parity)
- RAID 6 (Dual parity)
- RAID 10 (Mirrored stripes)

The internal boot HDDs are configured for RAID 1.

## RAID 0 (Striping)

Disk striping allows the writing of data across multiple physical disks instead of just one physical disk. It involves partitioning each disk drive storage space into stripes that can vary in size from 8KB to 128KB.

## RAID 1 (Mirrored)

Disk mirroring has two disks; data is written simultaneously to both disks. If one disk fails, the contents of the disk can be used to run the system and reconstruct the failed disk.

## RAID 5 (Parity)

RAID 5 stripes both data and parity information across three or more drives. Fault tolerance is maintained by ensuring that the parity information for any given block of data is placed on a drive separate from those used to store the data itself. The performance of a RAID 5 array can be

"adjusted" by trying different stripe sizes until one is found that is well-matched to the application being used.

### RAID 6 (Dual Parity)

Striped set with dual distributed parity. Provides fault tolerance from two drive failures; the array continues to operate with up to two failed drives. With dual parity, it gives time to rebuild the array without the data being volatile while the failed drive is being recovered.

### RAID 10 (Mirrored Stripes)

RAID 10 is a combination of RAID 1 and RAID 0. RAID 10 is a stripe across a number of mirrored sets. It combines the best features of striping and mirroring to yield large arrays with high performance in most uses and superior fault tolerance.

### RAID Configuration Note

For RAID configuration, see the MegaRAID guides in "Related Publications" on page xii. Treat each drive brick as an enclosure. For redundancy, choose one drive from each drive brick as you build the LUNs.

## Operating System Support

SGI certifies recent releases of popular operating systems on its MIS servers:

- Microsoft® Windows® 2008 (not shipped with product)
- Red Hat® Enterprise Linux (RHEL)
- SUSE LINUX® Enterprise Server
- VMware®

# BMC/IPMI Support

Chapter 3 describes the use of the control panel and various other LEDs to monitor the overall status of the system and its components. Underlying the light-guided diagnostics provided through the various LEDs on the control panel, power supplies, motherboard, etc. are the BMC/IPMI interfaces. The MIS server supports the platform management features (environmental monitoring, power management, etc.) provided by the Intel BMCs and IPMI 2.0. Moreover, the BMCs have features beyond those of IMPI 2.0 (for instance, detection of chassis intrusion). For more information, see the platform management documentation for the Intel S2600JF motherboard in *Intel Server Boards and Server Platforms Server Management Guide* (publication number 37830-002).

# System Safety

This chapter describes basic safety precautions.

## Electrical Safety Precautions

Basic electrical safety precautions should be followed to protect yourself from harm and the MIS system from damage, as follows:

• Be aware of the locations of the power on/off switch on the chassis as well as the room's emergency power-off switch, disconnection switch or electrical outlet. If an electrical accident occurs, you can then quickly remove power from the system.

• Do not work alone when working with high voltage components.

• Power should always be disconnected from the system when removing or installing system components that are not hot-swappable, such as serverboards and memory modules. When disconnecting power, you should first power down the operating system first and then unplug the power cords. The unit has more than one power supply cord. Disconnect two power supply cords before servicing to avoid electrical shock.

• When working around exposed electrical circuits, another person who is familiar with the power-off controls should be nearby to switch off the power if necessary.

• Use only one hand when working with powered-on electrical equipment. This is to avoid making a complete circuit, which will cause electrical shock. Use extreme caution when using metal tools, which can easily damage any electrical components or circuit boards they come into contact with.

• Do not use mats designed to decrease static electrical discharge as protection from electrical shock. Instead, use rubber mats that have been specifically designed as electrical insulators.

• The power supply power cords must include a grounding plug and must be plugged into grounded electrical outlets.

• Serverboard Battery

**Caution:** There is a danger of explosion if the onboard battery is installed upside down, which will reverse its polarites (see Figure 2-1). This battery must be replaced only with the same or an equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

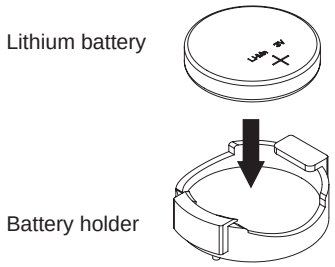


**Figure 2-1** Installing the Onboard Battery

# General Safety Precautions

Follow these rules to ensure general safety:

- Keep the area around the MIS system clean and free of clutter.
- Do not attempt to move a fully loaded MIS system. An MIS server can weigh up to 220 lbs when fully loaded. If the system must be moved, first remove the drives and drive bricks from the chassis. When lifting the system, two people (one at each end) should lift slowly with feet spread apart to distribute the weight. Always keep your back straight and lift with your legs.
- Place the chassis top cover and any system components that have been removed away from the system or on a table so that they won't accidentally be stepped on.
- While working on the system, do not wear loose clothing such as neckties and unbuttoned shirt sleeves, which can come into contact with electrical circuits or be pulled into a cooling fan.
- Remove any jewelry or metal objects from your body, which are excellent metal conductors that can create short circuits and harm you if they come into contact with printed circuit boards or areas where power is present.
- After accessing the inside of the system, close the system back up and secure it to the rack unit with the retention screws after ensuring that all connections have been made.

## ESD Precautions

**Caution:** Electrostatic discharge (ESD) is generated by two objects with different electrical charges coming into contact with each other. An electrical discharge is created to neutralize this difference, which can damage electronic components and printed circuit boards.

The following measures are generally sufficient to neutralize this difference before contact is made to protect your equipment from ESD:

- Use a grounded wrist strap designed to prevent static discharge.
- Keep all components and printed circuit boards (PCBs) in their antistatic bags until ready for use.
- Touch a grounded metal object before removing the board from the antistatic bag.
- Do not let components or PCBs come into contact with your clothing, which may retain a charge even if you are wearing a wrist strap.
- Handle a board by its edges only; do not touch its components, peripheral chips, memory modules or contacts.
- When handling chips or modules, avoid touching their pins.
- Put the serverboard and peripherals back into their antistatic bags when not in use.
- For grounding purposes, make sure your computer chassis provides excellent conductivity between the power supply, the case, the mounting fasteners and the serverboard.

# System Monitoring

## Overview

As shown in Figure 3-1, the control panel is located on the left side of the chassis front. There are several LEDs on the control panel as well as others on the hard disk drive carriers and power supplies. These LEDs keep you constantly informed of the overall status of the system as well as the activity and health of specific components. There are also buttons on the chassis control panel. This chapter describes the buttons and LEDs.

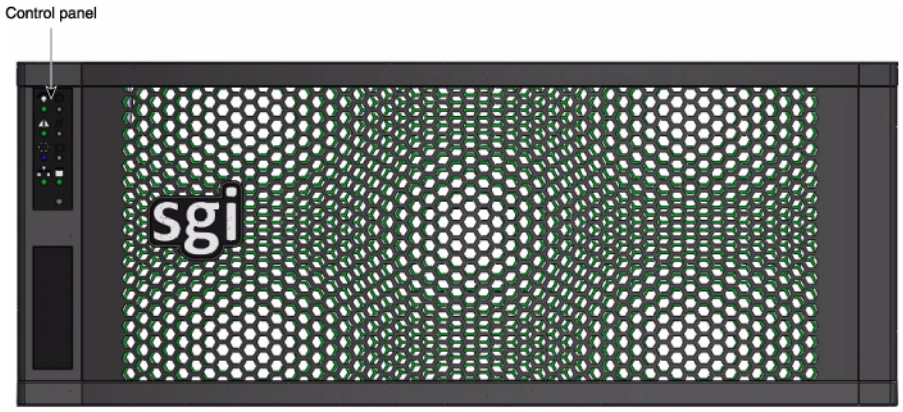


**Figure 3-1** MIS Control Panel

**Note:** A dual-serverboard MIS server and an MIS JBOD unit have a second control panel. The second control panel is situated directly below the one shown in Figure 3-1. Each control panel is associated with an MIS server or JBOD unit.

## Control Panel Buttons and LEDs

Figure 3-2 shows the buttons and LEDs on the control panel.

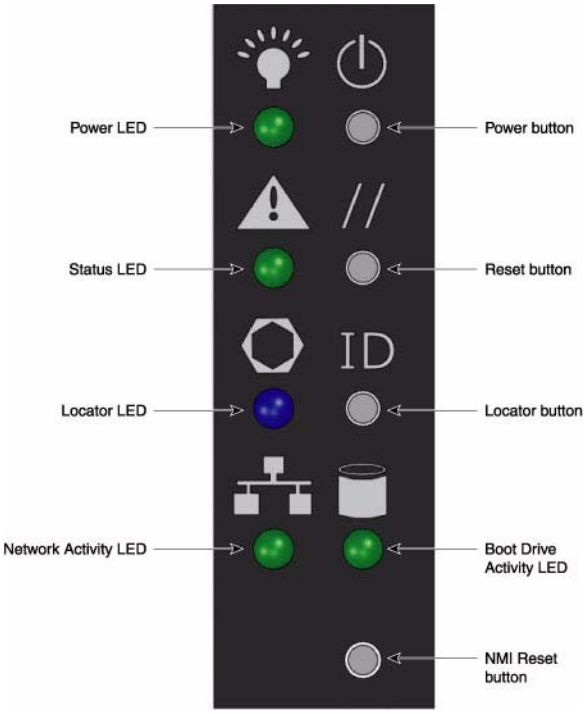


**Figure 3-2** Control Panel Buttons and LEDs

Table 3-1describes the function of the various buttons and LEDs.

**Table 3-1** Control Panel Buttons and LEDs

| LED/Button | Description |
|---|---|
| Power LED | When the green LED is on, it indicates that main power has been turned on. |
| Power button | Pushing this button powers on the system. Pushing the button after the system has booted powers off the system gracefully if the operating system is running. If the operating system is hung, holding the button down for 10 seconds or more will power off the system. |
| Status LED | The system status indicator. The LED will either be green for good or yellow for service required. This will be active when ever AC power is available to the power supplies even if the main power is off. |
| Reset button | The service reset button. When pushed, this button causes the server to reboot and, if the fault is cleared by the reset, causes the Status LED to go back to green. |
| Locator LED | The chassis locator LED. The LED will be blue when the Locator button below the ID symbol is pushed. When the Locator button is pushed again, the LED will go off. There is a corresponding LED on the back of the server that will be blue as well. This function can be done remotely through the BMC interface as well. |
| Locator button | See the description for the Locator LED. |
| NIC Activity LED | The green LED will be active whenever there is any network traffic occurring on the base board NIC ports. |
| Boot Drive Activity LED | The LED is active whenever the boot drives are being accessed. |
| NMI Reset button | Used only under the direction of technical support personnel. |

# Disk Drive LEDs

Figure 3-3 shows the the location of the disk drive LEDs.

**Figure 3-3** Disk Drive LEDs

Table 3-2 describes the function of disk drive LEDs.

**Table 3-2** Disk Drive LEDs

| Bi-Color LED | | Blue LED | Drive Status |
|---|---|---|---|
| **Green** | **Yellow** | | |
| Off | Off | Off | There is no power to the drive. |
| On | Off | Off | Dirve is on and idle. |
| Random blink | Off | Off | Drive is being accessed. |
| Off | On | Off | Drive service is required. |
| Off | On | On | Drive can be removed. |
| On | Off | On | Drive can be removed. |
| Off | Off | On | Drive can be removed. |

## Power Supply LEDs

There are two power supply LEDs, one green and one amber. Table 3-3 describes the function of the power supply LEDs.

**Table 3-3** Power Supply LEDs

| Green LED | Amber LED | Power Supply Status |
|---|---|---|
| Off | Off | No AC power to the supply. |
| Off | Solid | Power supply has failed. |
| Off | Blinking | Power supply problem warning. |
| Blinking | Off | AC available to the power supply (standby) but the enclosure is powered off. |
| Solid | Off | Power supply is on and functioning normally. |

# Chassis Maintenance

For warranty and safety considerations, SGI designates the following chassis components as customer-replaceable units (CRUs):

- Power supplies
- Fans
- Disk drives

These components are all hot-swappable; that is, you can replace them without powering down the storage server. A trained service technician should install and replace all other components. This chapter describes how you replace the CRUs and check the system airflow:



**Tools Required**: The only tool you will need to perform maintenance is a 6-32 Phillips screwdriver.

**Warning: Review the warnings and precautions listed in this manual before setting up or servicing this chassis. These include the items described in Chapter 2, "System Safety".**

## Detecting Component Failures

In general, when a system component fails, the operating system/storage management system (OS/SMS) receives an alert. The OS/SMS generates an alert to the monitoring application for your storage server. The alerts include the system serial number, the suspect component, and a summary of the fault. For most components, you should inform SGI service of the fault and forward the information from the alerts.

In addition to the alerts, the control panel on the chassis front panel can indicate component failures in the case of power supplies, fans, and drives. See Chapter 3, “System Monitoring”.

For more information about alert generation and management, see the Intel platform management documentation.

## Sliding the Chassis Forward/Backwards

The cable management system of the MIS chassis allows it to be slid forward (20”) or backwards (18”). You will need to slide the chassis out to service some of its components.

To slide the chassis out, follow these steps:

1. Push the two release latches in towards the center of the chassis.

   The release latches are at the front and rear.

2. Pull the chassis out using the handles.

   The chassis will latch at the 20- or 18-inch limit.

3. To slide the chassis back in, depress the two release latches near the rail and slide it back in.

# Removing the Front or Rear Chassis Cover

**Important:** When a chassis cover is removed, an intrusion sensor monitored by the SMS will detect its removal. If the cover is off for more than 15 minutes or any system temperature sensor exceeds its threshold limit, the server will perform an orderly shutdown and power-off.

As shown in Figure 4-1, the top of the chassis is bifurcated; that is, there is a fornt and rear chassis cover. Except for power supply maintenance, all service actions require that you remove the front or rear chassis cover. This section describes the steps.

1. To remove a chassis cover, unlock the chassis and slide the chassis forward or backwards.

   See section "Sliding the Chassis Forward/Backwards" on page 26.

2. Remove the single security screw (6-32 Phillips) from the cover.
3. Push the detent button and slide the cover off and up from the chassis.


**Figure 4-1** Front and Rear Chassis Covers

## Replacing a Power Supply

To replace a failed power supply, do the following:

1. Using the OS/SMS interface for your system, verify the fault (failed unit) and its location.
2. Locate and replace the failed unit.

   The failed unit should have a lighted yellow service LED. See Figure 4-2.
3. Unplug the power supply that will be replaced.
4. Push the release tab on the back of the power supply.
5. Pull the power supply out using the handle.
6. Replace the failed power module with another of the same model.
7. Push the new power supply module into the power bay until it clicks into the locked position.
8. Plug the AC power cord back into the module and power up the server.
9. Once power supply is verified good, clear the service required status via the OS/SMS interface.

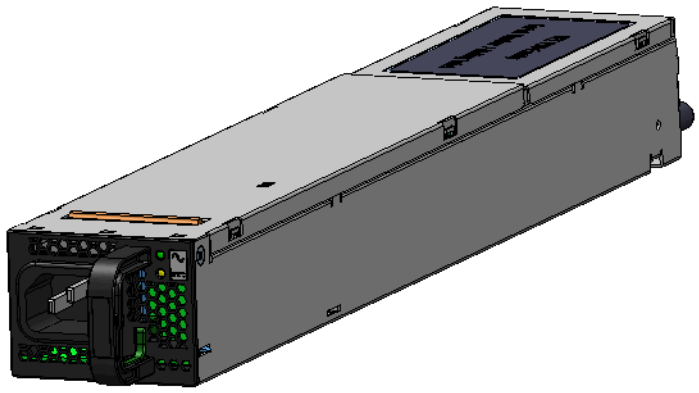

**Figure 4-2** Replacing a Power Supply

## Replacing a Fan Module

To replace a fan module, do the following:

1. Using the OS/SMS for your system, verify the fault (failed unit).
2. Using the OS/SMS, set the system to a service state for the removal of the faulted fan.

   The OS/SMS will turn off the fan module. It will then turn on the safe-to-service LED (blue) for that fan module.
3. Remove the front chassis cover.

   See section "Removing the Front or Rear Chassis Cover" on page 27.
4. Locate the fan module with the illuminated blue LED.

   See Figure 4-3.

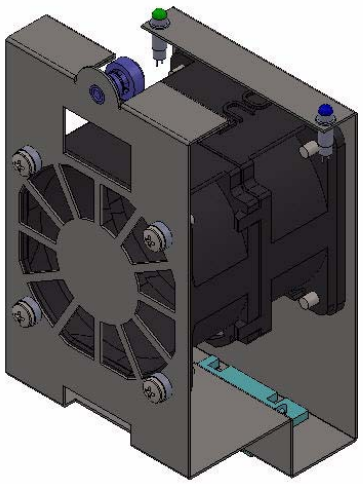

**Figure 4-3** Replacing a Fan Module

5. Loosen the thumbscrew, pull out the faulted fan, and replace it.
6. Once the fan module is replaced, re-install the chassis cover and security screw.

7. Unlock the chassis from the extended position and push it back until it locks into the stowed position.
8. Using your OS/SMS, return the system to a normal state and the new fan module will be powered on.

## Replacing a Disk Drive

**Important:** Regardless of how many hard drives are installed, all drive carriers must remain in the drive bricks to maintain proper airflow.

To replace a failed disk drive, do the following:

1. Using the OS/SMS for your system, verify the fault (failed unit).
2. Using the OS/SMS, set the system to a service state for the removal of the faulted drive.

   The OS/SMS will turn off the drive module. It will then turn on the safe-to-service LED (blue) for that drive module.
3. Remove the chassis cover.

   See section "Removing the Front or Rear Chassis Cover" on page 27.
4. Locate the faulted drive with the illuminated blue LED and remove it from its drive brick (or boot drive bay).

   See section "Removing the Drive" on page 31.
5. Replace the faulted drive.

   See section "Re-installing the Drive" on page 32.
6. Once the drive module is replaced, re-install the chassis cover and security screw.
7. Unlock the chassis from the extended position and push it back until it locks into the stowed position.
8. Using the OS/SMS, return the system to a normal state.

   The new drive will be powered on.
9. Using the OS/SMS, clear the service required status.

   At this time the rebuild or mirroring of the data to the new drive will begin.

## Removing the Drive

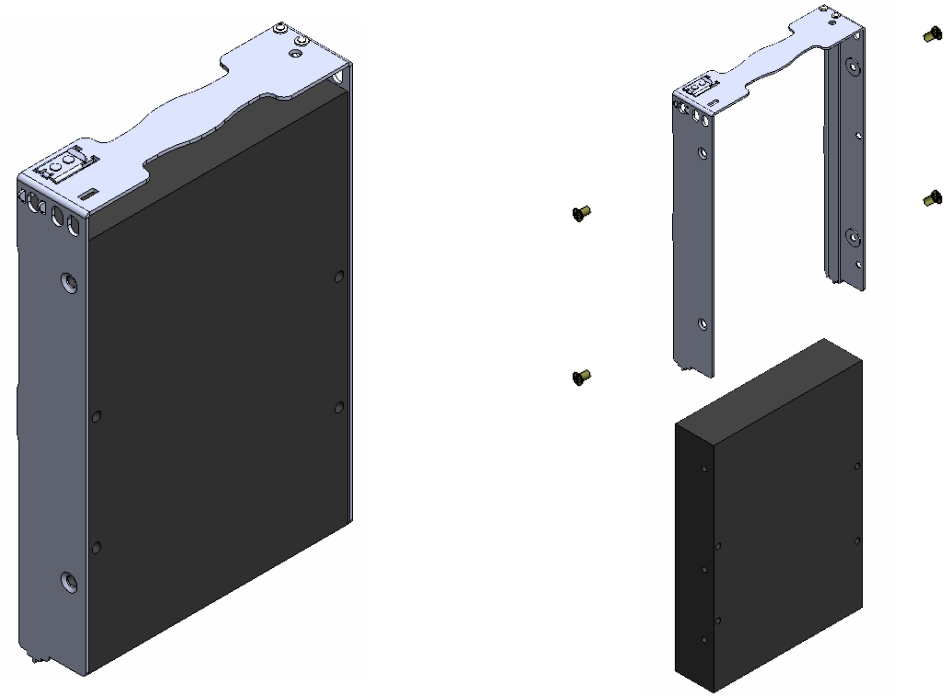

**Figure 4-4** Hard Drive Carrier

As shown in Figure 4-4, the drives are mounted in driver carriers to simplify their installation and removal from the drive bricks or boot drive bays in the chassis.

To remove the drive, perform the following steps:

1. Unlatch the drive carrier and pull the drive carrier out of the drive brick (or boot drive bay).
2. Remove the four screws that secure the drive to the drive carrier.
3. Remove the drive from the carrier.

### Re-installing the Drive

To re-install a hard drive into the hard drive carrier, perform the following steps:

1. Place the hard drive carrier on a flat, stable surface such as a desk, table, or work bench.
2. Slide the hard drive into the carrier with the printed circuit board side facing down.
3. Carefully align the mounting holes in the hard drive and the carrier.

   Make sure the bottom of the hard drive and bottom of the hard drive carrier are flush.
4. Secure the hard drive using the four screws (see Figure 4-4).
5. Replace the drive carrier into the chassis.
6. Push the drive carrier down to lock it place.

## Checking the System Air Flow

To check the MIS system air flow, perform the following steps:

1. Make sure there are no objects to obstruct airflow in and out of the server.
2. Do not operate the server without drives or drive trays in the drive bricks.
3. Make sure no wires or foreign objects obstruct air flow through the chassis.

   Pull all excess cabling out of the airflow path or use shorter cables.

# Troubleshooting

**Caution:** Do not change the system BIOS or the Sensor Data Records (SDRs). If you do, you might experience unexpected behavior and the inability to revert to the released software.

Chapter 3, "System Monitoring," describes the use of the control panel to monitor the overall status of the system, including the health and activity of specific components. Chapter 4, "Chassis Maintenance," describes how you replace defective components. This chapter describes troubleshooting for the following problems:



If you need further assistance, SGI provides extensive product support. See "Product Support" on page xiii.

## No Power

1. Make sure that no short circuits between the serverboard and the chassis.
2. Make sure that all jumpers are set to their default positions.
3. Check that the 115V/230V switch on the power supply is properly set.
4. Turn the power switch on and off to test the system.
5. Verify that the battery on your serverboard still supplies ~3VDC. If it does not, replace it with a new one.

## No Video

1. If the power is on but you have no video, remove all the add-on cards and cables.
2. Use the speaker to determine if any beep codes exist. Refer to Appendix B, “BMC Error Codes” for details on beep codes.

## Losing the System’s Setup Configuration

1. Make sure that you are using a high quality power supply.

   A poor quality power supply may cause the system to lose the CMOS setup information.
2. Verify that the battery on your serverboard still supplies ~3VDC. If it does not, replace it with a new one.
3. If the above steps do not fix the Setup Configuration problem, contact your vendor for repairs.

## Memory Errors

When a `No_Memory_Beep_Code` is issued by the system, check the following:

1. Make sure that the DIMM modules are properly and fully installed.
2. Check if different speeds of DIMMs have been installed. Use the same RAM speed for all DIMMs in the system.
3. Make sure you are using the correct type of DDR3 Registered ECC or Unbuffered ECC/Non ECC 1333 MHz/1066 MHz/800 MHz SDRAM (recommended by the manufacturer.)
4. Check for bad DIMM modules or slots by swapping a single module between all memory slots and check the results.
5. Make sure that all memory modules are fully seated in their slots.
6. Check the position of the 115V/230V switch on the power supply.

**Note:** The MIS server has 8 DIMM slots that support up to 128 GB of DDR3 Registered ECC. Do not mix memory modules of different speeds and sizes.

## I/O Timeouts and MegaRAID Drivers

To avoid I/O timeouts with certain workloads, the `megaraid_sas` driver needs to have the `poll_mode_io` variable set to 1. For Novell operating systems on SGI InfiniteStorage servers, the file `/etc/modprobe.conf.local` needs the following line added:

```
options megaraid_sas poll_mode_io=1
```

This modification will be made on systems shipped from the factory, but if a system is installed or upgraded in the field, this change will have to be made after installation/upgrade.

# Technical Specifications

Table A-1 describes the technical specifications for the SGI MIS platform.

**Table A-1** Technical Specifications

| Attribute | Specification |
|---|---|
| Overview | |
| Profile | –4U<br>–Standard-depth chassis |
| Product type | SGI MIS Server or SGI MIS JBOD unit |
| Connectivity | Up to four SGI MIS JBOD units per SGI MIS Server |
| Mount | –SGI 19-inch Destination Rack (D-Rack), 42U<br>–Up to 10 chassis per D-Rack<br>–Standard 19-inch rack-compatible rail mount (weight-dependent) |
| Chassis Dimensions | |
| Height | 6.94” (176 mm) |
| Width | 16.9” (429.2 mm) |
| Depth | 36” (914.4 mm) |
| Max weight | 220 lbs. |
| Power | |
| AC Input | 100–240 VAC (50-60Hz), single or three phase |
| Safety | –UL/CSA certified to UL6050-1<br>–CE/CB certified to EN60950/IEC60950 |
| EMC | –North America FCC Class A<br>–Europe EN55022/EN55024 |

**Table A-1** Technical Specifications **(continued)**

| Attribute | Specification |
|---|---|
| Operating Environment | |
| Operating temperature range | 41° to 95° F (5° to 35° C) |
| Non-operating temperature range | -40° to 140° F (minus 40° to 60° C) |
| Operating humidity range | 10% to 90% non-condensing |
| Non-operating Humidity | 10% to 95% non-condensing |
| SGI MIS Server Specifications | |
| Servers/System | –One or two serverboards per system<br>–Single- or dual-socket processors per server |
| Processor support | Supports Intel Xeon processor E5 family |
| Max cores | 16 per server (32 per system) |
| Memory | –Up to 8 DDR3 DIMMs per server (4GB, 8GB or 16 GB DIMMs)<br>–Max 128GB per server |
| Boot drives | –Two per server.<br>–SAS, SATA or SSD<br>–Up to 300 GB |
| Supported operating systems | –RHEL 6.2<br>–SLES 11 SP1<br>–VMware ESX 5.0<br>–Windows 2008 R2 SP1 |
| Networking | Dual GbE onboard. Optional 2-port 10GbE, 2-port GbE or 4-port 8Gb FC PCIe cards. 4 Optional networking PCIe cards maximum |
| Expansion slots | Single server: 6 x PCIe gen 2<br>Dual server: 4 x PCIe gen 2 per server (8 total) |
| RAID controllers | –8 to 32 SAS ports via 8-port PCIe cards<br>–Support for RAID 0, 1, 5, 6, and 10 |

**Table A-1** Technical Specifications **(continued)**

| Attribute | Specification |
|---|---|
| External storage attachment | Up to 3 SGI MIS JBOD chassis via 8 SAS port PCIe cards |
| Internal storage | –Up to 72 x 3.5” or 2.5”-15mm drives (max 216TB)<br>–Up to 144 x 2.5”-9.5mm drives<br>–Drive size and capacity can be mixed in groups of 8.<br>–Supported internal drives: SAS, SATA, SSD |
| SGI MIS JBOD Specifications | |
| Internal Storage | –Up to 81 x 3.5” drives (max 243TB)<br>–Up to 162 x 2.5”-9.5mm drives.<br>–Drive type and size can be mixed in groups of 9.<br>–Supported internal drives: SAS, SATA, SSD |
| Connectivity | 8 or optional 16 SAS ports |

# BMC Error Codes

The BMC may generate beep codes upon detection of failure conditions. Beep codes are sounded each time the problem is discovered (for example, on each power-up attempt) but are not sounded continuously. Common supported codes are listed in Table B-1.

In Table B-1, each digit in the code is represented by a sequence of beeps whose count is equal to the digit.

**Table B-1** BMC Beep Codes

| Beep Code | Reason for Beep | Associated Sensors | Supported |
|---|---|---|---|
| 1-5-2-1 | No CPUs installed or first CPU socket is empty. | CPU Missing sensor | Yes |
| 1-5-2-4 | MSID Mismatch. | MSID Mismatch sensor. | Yes |
| 1-5-4-2 | Power fault: DC power is unexpectedly lost (power good dropout). | Power unit—power unit failure offset. | Yes |
| 1-5-4-4 | Power control fault (power good assertion timeout). | Power unit—soft power control failure offset. | Yes |
| 1-5-1-2 | VR Watchdog Timer sensor assertion | VR Watchdog timer | |
| 1-5-1-4 | The system does not power on or unexpectedly powers off and a power supply unit (PSU) is present that is an incompatible model with one or more other PSUs in the system. | PSU status | |