CHAPTER 4

RAID Information

When you click the **RAID Information** button in the navigation pane, you are taken to the RAID Array Information page. The navigation bar across the top contains links to this section's subpages.

- **RAID Array** links to RAID Array Information
- **Progress** links to RAID Array Utility Progress
- **Volumes** links to Configured Logical Volumes
- **Disk Drives** links to Disk Information
- **Disk Stats** links to Disk Statistics
- **Fibre Info** links to Fibre Channel Information
- **Host Stats** links to Host Statistics
- **System Nav** links to System Hierarchal View

RAID Array Information

Clicking **RAID Information** takes you to the RAID Array Information page, which displays summary information for each array that has been configured on the unit. This includes arrays that are being constructed or rebuilt. There is an information block for each array, which contains the following information:

Item	Description
Title Bar	The Array name, Array number, and Enclosure.
Array name	The user-defined name of the array. If no name has been assigned, this item defaults to "Array #*n*", where *n* is the **Array number**. The name can be changed on the Rename RAID Arrays page (see Rename RAID Arrays, page 6-3).
Array number	Reference number, normally given in order of creation.
Enclosure	Reference number of the unit that houses the disks that make up this array. "Enclosure 0" is the main unit; "Enclosure 1" is the expansion unit.
Configured owner	Displays the RAID Controller to which this array has been assigned. This can be changed on the RAID Array Ownership page (see RAID Array Ownership, page 6-4).

Item	Description
Current owner	Displays the RAID Controller that is currently controlling this array. This may differ from Configured owner if the assigned RAID Controller is restarting or has failed.
Array status/health	Displays the current status of the RAID array: fault tolerant, not fault tolerant, constructing, critical, rebuilding, or offline. If an array verification is currently being performed (see Verify RAID Arrays, page 10-5), the progress of the scan is also displayed here.
RAID level	Displays the RAID level that this array is configured for. See Appendix A, "RAID Levels" for more information.
Disk type	Displays the type of disk (SATA, SAS, or SSD) and its speed in revolutions per minute (RPMs). **Note** SAS drives are not supported with the Cisco Video Surveillance Storage System. iSCSI is supported on Cisco Video Surveillance Systems (VSM) deployed as a Virtual Machine for VSM releases 7.2 or higher.
Array capacity	Displays the total data storage space of the array, in true terabytes (TB) followed by binary terabytes (TiB).
No. of members	The number of disks that make up the array.
No. of spares	The total number of spares available for the array. This includes both pool spares and dedicated spares. New spares can be added on the Add Hot Spare page (see Appendix 6, "Add Hot Spare").
No. of volumes	The number of configured volumes in this array.
Data stripe size	The size of the individual data stripes in this array.
Cache memory	Indicates whether the cache is enabled, its mirroring status, its streaming mode, and its FUA status.
Cache size	The total size of the cache, in megabytes (MB).
Rebuild priority	Displays the configured rebuild priority, ranging from Lowest to Highest. This controls the amount of resources that a RAID Controller assigns to rebuilding the array versus handling host data requests. See Configure Rebuild Priority, page 10-5 for more information.
Verify utility	Displays the user-configured verification tests for this array, as well as how often they are run. Verification tests are configured on the RAID Array Verify page (see Verify RAID Arrays, page 10-5).
Verify due	The date and time of the next scheduled verification, formatted as "Day-of-week DD-Mmm-YYYY HH:MM". If the verification is scheduled to begin within a few hours, this will display "[Verification test] will start shortly". If the verification is currently running, it will display "[Verification test] is currently active". A RAID array verification can be initiated at any time by going to the RAID Array Verify page and clicking the **Execute Verify Utility NOW** button (see Verify RAID Arrays, page 10-5).
Number of reads	Displays number of reads from the array.
Number of writes	Displays number of writes to the array.
Created	Displays the date and time that the array was created, formatted as "Day-of-Week DD-Mmm-YYYY HH:MM".

The bottom area displays the array status icon, the Array status/health, and the Array capacity. The array status icon can indicate several states:

- A green status bar indicates that all RAID arrays are functioning correctly and are fault-tolerant.
- A moving green status bar indicates that one or more RAID arrays are being constructed.
- A status bar alternating yellow and red indicates that one or more RAID arrays are in a critical state.
- A status bar alternating green and yellow indicates that one or more RAID arrays are being rebuilt.
- A red icon with a flashing red status bar indicates that one or more RAID arrays are offline or have failed.

New arrays can be created on the Create a New RAID Array page (see Create a New RAID Array, page 6-1). Arrays can be deleted on the Delete a RAID Array page (see Delete a RAID Array, page 6-3).

RAID Array Utility Progress

Clicking **RAID Information > Progress** takes you to the RAID Array Utilities Progress page, which displays the progress of active RAID array utilities.

Processes that can be viewed on this page are:

- Array construction (see Create a New RAID Array, page 6-1)
- Array reconstruction (see Acknowledge Rebuild, page 6-7)
- Surface scan (see Verify RAID Arrays, page 10-5)
- Parity scrub (see Verify RAID Arrays, page 10-5)

Configured Logical Volumes

Clicking **RAID Information > Volumes** takes you to the Configured Logical Volumes page, which displays the configured volumes for each array.

Volume Details displays the volume name, the array to which it is assigned, the number of the controller to which the array is assigned, the unit that the array is in, and the total capacity of the volume.

- The volume name can be changed on the Rename Logical Volumes page (see Rename Logical Volumes, page 7-4).
- If there is room left in the array, the total capacity of the volume can be expanded on the Expand a Logical Volume page (see Expand a Logical Volume, page 7-2).

The **Fibre** (or **SAS** or **10GE**) columns display the host port configurations and LUN mappings.

- The LUN mappings can be changed on the Map Logical Volumes page (see Map Logical Volumes, page 7-4).

Clicking the **Next** button takes you to a detail page for that volume.

The upper area displays the same information as on the previous page. The lower area displays details for host access: the Default Access, Groups (if any), and individual hosts.

The **Type** column indicates the kind of host link (Fibre/SAS/10GE or iSCSI) and its status: green for connected, yellow for connected but with no LUNs assigned, and gray for disconnected or offline.

The **Host** column displays the host number or name, its type, and its connection.

The **Access** column displays the kind of access the host has to the volume: **None**, **Read**, or **Read/Write**. Access can be changed on the Host Access page (see Host Access, page 8-3).

Volumes are created on the Add Volume page (see Create a Logical Volume, page 7-1) and deleted on the Delete Volume page (see Delete a Logical Volume, page 7-3).

Volume Access Summary

If you click the **Click here to view volume access summary** link at the bottom of the main Configured Logical Volumes page, it takes you to a summary page that displays which hosts have access to which volumes. There are columns for Type, Host, and each configured volume in the system. There are rows for Default Access, Groups (if any), and each Host connection.

The icons in the volume columns indicate the access privileges each host has to that volume:

- No icon indicates no access.
- A green icon on a gray background indicates Read/Write access.
- An amber icon on a gray background indicates Read/Write access, but that the host is not connected to a port with a logical unit number (LUN) mapping.
- A gray icon on a gray background indicates Read/Write access, but that the host is disconnected or offline.
- A green icon on a green background indicates Read Only access.
- An amber icon on a green background indicates Read Only access, but that the host is not connected to a port with a logical unit number (LUN) mapping.
- A gray icon on a green background indicates Read Only access, but that the host is disconnected or offline.

Clicking the gray arrow button on the left takes you back to the main Configured Logical Volumes page.

Detailed Volume Layout

Clicking the **Click here to view detailed volume layout** link at the bottom of the Configured Logical Volumes page takes you to this page, which shows the free space left in each array (if any), the size of each volume, the percentage of the total array that the volume takes up, and the volume's relative position within the array.

The information sections are arranged by array. Each array's section displays a status icon, the array name, the array number, the controller number, the total capacity, and a list of any free areas in the array (see RAID Array Information, page 4-1 for more information). If there is no free space in the array, a message is displayed in place of the list.

Below each array's information section are sections for each volume in the array. These display the following information:

Field Name	Description
Title bar	The volume ID and array name.
Volume name	The user-defined name of the volume.
Volume capacity	Displays the total data storage space of the array, in megabytes (MB), true gigabytes (GB), and binary gigabytes (GiB).

Field Name	Description
% of total array used	Displays the percentage of the array capacity that this volume uses.
Number of bad blocks	Displays the number of blocks in the volume that cannot be read or written to because of disk media errors.
LUN mapping	Displays a link: “Click to view”. Clicking the link takes you to the volume’s detail page.
Volume serial number	Displays the volume’s unique serial number.
Volume created	Displays the date and time that the volume was created, formatted as “Day of Week DD-Mon-YYYY HH:MM”.

The darker area below the listed items displays the name of the array that the volume belongs to, the controller number, and the **Volume capacity**.

The bottom area contains a bar which represents the percentage of the array’s capacity that the volume uses, as well as the volume’s relative position within the array.

Disk Information

Clicking **RAID Information > Disk Drives** takes you to the Disk Information page, which shows all of the disk drives in the system and displays information about each disk.

The **Disk** column displays the disk number and a disk icon. Clicking the disk icon takes you to a detail page for that disk (see Disk Information Detail Page, page 4-6).

The disk icon can indicate various states:

- **Disk not present**: A grayed out icon with a grayed out status bar indicates that no drive is installed in that slot.
- **Disk not configured**: A gray status bar indicates that the drive is functioning, but is not assigned to an array and is not designated as a spare.
- **Array disk, functioning normally**: A green status bar indicates that the drive is functioning and is part of a RAID array (see RAID Array Information, page 4-1). The text below it indicates which RAID array it belongs to and which RAID Controller that array is assigned to.
- **Spare disk**: A blue status bar indicates that the drive is functioning and is designated as a spare, which will be used to rebuild RAID arrays when other drives fail (see Add Hot Spare, page 6-4, Delete Hot Spare, page 6-5, and Configure Hot Spare Mode, page 6-6). The text below it indicates whether it is a “Pool Spare” (which can be used by any RAID array) or a dedicated spare (assigned to a specific RAID array).
- **Disk idle**: A green “Zzz” on a disk icon indicates that the drive is in low-power mode (see Chapter 9, “Power Settings”).
- **Disk inaccessible**: A red status bar indicates that the drive is functioning, but the RAID array to which it belongs is currently inaccessible.
- **Disk in critical array**: A status bar alternating amber and red indicates that the drive is functioning, but is part of a RAID array that is in a critical state (see RAID Array Information, page 4-1).
- **Disk failed**: A red icon with a flashing red status bar indicates that the drive has failed.
- **Spare added to array**: A moving green status bar indicates that this disk was a spare, but is being added to the array. Data from the missing drive is being rebuilt and saved onto this disk.

- **Array rebuilding**: A status bar alternating green and amber indicates that the drive is functioning and is part of a RAID array that is being rebuilt.

The **Status** column displays the array that the disk belongs to, the controller number, and the AutoMAID status of the disk (see Chapter 9, "Power Settings").

The **Details** column lists the following information:

- **Model** is the manufacturer's model number for the drive.
- **Capacity** is the raw data storage capacity of the drive, in megabytes (MB).
- **Serial Number** is the manufacturer's serial number for the drive.
- **Firmware** is the firmware that the drive is currently running.

Disk Information Detail Page

When you click a disk icon on the Disk Information page or an information icon on the Disk Statistics page (see Disk Statistics, page 4-7), you are taken to the detail page for that particular disk. The following information is displayed:

Field Name	Description
Status	Displays the array that the disk belongs to, the controller number, and the disk's status icon.
Capacity	Displays the raw data storage capacity of the drive, in megabytes (MB).
Type	Displays the type of disk (SAS, SATA, or SSD) and it's speed in revolutions per minute (RPMs).
Model	Displays the manufacturer's model number for the disk drive.
Serial Number	Displays the manufacturer's serial number for the drive.
Firmware	Displays the firmware that the drive is currently running.
Read IOs	Displays the number of reads executed on the drive because of array access by attached hosts.
Write IOs	Displays the number of writes executed on the drive because of array access by attached hosts.
Other IOs	Displays the number of disk input/output operations (I/Os) executed on the drive that are not because of array access, but are directly from the RAID Controller.
R/W Transfer Retries	Displays the number of times that the RAID Controller has had to retry a read or write operation on a block of data on this drive due to data transfer problems.
R/W Media Retries	Displays the number of times that the RAID Controller has had to retry a read or write operation on a block of data on this drive due to disk media problems.
Bad blocks	Displays the number of blocks on the drive that cannot be read or written to because of disk media errors.
AutoMAID Status	Displays the current AutoMAID level of the disk, if any (see Chapter 9, "Power Settings").
Qualified by	Shows who qualified the drive for use in Cisco Video Surveillance Storage System components. If the disk is unqualified, this row is not displayed.

Clicking **Previous** or **Next** takes you to other disk's detail pages.

Disk Statistics

Clicking **RAID Information > Disk Stats** takes you to the Disk Statistics page, which displays data on how often individual disks have been accessed and how many retries have been performed in data recovery attempts.

The **Disk Number** column displays the disk number, the controller to which it belongs, and an information icon. Hover the mouse over the information icon for a pop-up dialog that displays that disk's information. Click the icon to be taken to that disk's detail page (see Disk Information Detail Page, page 4-6).

The IOs column displays the number of input/output operations (I/Os) performed on the disk.

- **Read** indicates the number of times the drive has been read because of host array access.
- **Write** indicates the number of times the drive has been written to because of host array access.
- **Others** indicates the number of times that the drive has been accessed by the RAID Controller directly. Examples include array creation, array rebuilds, and verifications.

The **Transfer Retries** column displays the number of times (for **Read** and **Write** operations, respectively) that the RAID Controller has had to retry an I/O operation due to data transfer problems.

The **Media Retries** column displays the number of times (for **Read** and **Write** operations, respectively) that the RAID Controller has had to retry an I/O operation due to disk media problems.

Fibre Channel Information

Clicking **RAID Information > Fibre Info** takes you to the Fibre Channel Information page, which provides an information summary for each Fibre Channel port on each RAID Controller in the system. The information is arranged by controller and host port. For each, the following information is displayed:

Field Label	Description
Fibre Port Name	The World Wide Port Name (WWPN) of the Fibre Channel port.
Fibre Node Name	The World Wide Node Name (WWNN) of the Fibre Channel node. This is the address of the enclosure, which is able to support multiple ports.
Fibre Loop State	Displays the status of the Fibre Channel Loop, either up or down. It also displays the loop speed in gigabits per second (Gb/s).
SFP Information	Displays the make and model of the installed SFPs (see the Cisco Video Surveillance Storage System Hardware Manual for more information).
Topology	Displays the current Fibre Channel topology, either Loop or Point-to-Point (P2P). It also indicates whether the topology is full-fabric.
Loop ID	Shows the loop address if the port is in loop mode.
Port ID	Shows the ID if the port is in point-to-point mode.
Link Speed	Shows the current Fibre Channel link speed in gigabits per second (Gb/s).

These settings can be configured or changed on the Configure Fibre page (see Configure Fibre Channel Host Access, page 8-1).

Host connectivity is also shown at the bottom of this page:

- The **Status** column icons can indicate several states:

  Green indicates that the host is connected.

  Gray indicates that the host is not connected or is offline.

  Amber indicates that the host is connected, but no volumes have been mapped to it.

  Red indicates that the host is on a failed RAID Controller.
- The **Port ID** column shows the port ID for connected hosts.
- The **Host Name** column shows the default or user-configured name of the host (see Manage Hosts, page 8-3).
- The **C*N*:H*N*** columns show which host ports on which controllers the host is connected to. The number after **C** indicates the RAID Controller; the number after **H** indicates the host port on that RAID Controller. For instance, **C0:H1** is host port 1 on RAID Controller 0.

SAS Information

Note SAS drives are not supported with the Cisco Video Surveillance Storage System. iSCSI is supported on Cisco Video Surveillance Systems (VSM) deployed as a Virtual Machine for VSM releases 7.2 or higher.

If your Cisco Video Surveillance Storage System system is configured for SAS-to-Host connectivity, clicking **RAID Information > SAS Info** takes you to the SAS Information page, which provides an information summary for each SAS-to-Host port on each RAID Controller in the system. The information is arranged by controller and host port. For each, the following information is displayed:

Field Label	Description
SAS Port ID	The World Wide Port Name (WWPN) of the SAS port.
SAS Node Name	The World Wide Node Name (WWNN) of the SAS node. This is the address of the enclosure, which is able to support multiple ports.
Link Speed	Shows the current SAS link speed in gigabits per second (Gb/s) and the number of operating lanes. If the link is not operating, displays “Port Down”.
TCP Port	Displays the status of each physical SAS connection, either Up, Down, or Disabled.

These settings can be configured or changed on the Configure SAS page.

Host connectivity is also shown at the bottom of this page:

- The **Status** column icons can indicate several states:

  Green indicates that the host is connected.

  Gray indicates that the host is not connected or is offline.

  Amber indicates that the host is connected, but no volumes have been mapped to it.

Red indicates that the host is on a failed RAID Controller.

- The **Host Name** column shows the default or user-configured name of the host (see Manage Hosts, page 8-3).
- The **C*N*:H*N*** columns show which host ports on which controllers the host is connected to. The number after **C** indicates the RAID Controller; the number after **H** indicates the net port on that RAID Controller. For instance, **C0:H1** is net port 1 on RAID Controller 0.

Host Statistics

Clicking **RAID Information > Host Status** takes you to the Host Statistics page, which displays I/O, block, and reset statistics for each host port. The information is arranged by controller.

The **Controller** column lists the host ports for each controller.

The **IOs** column displays the number of input/output operations (I/Os) performed through the port.

- **Read** indicates the number of times that a read operation has been performed through the port.
- **Write** indicates the number of times that a write operation has been performed through the port.
- **Others** indicates the number of times an RAID Controller initiated I/O operation has been performed through the port. Examples include array creation, rebuilding, and verification.

The **Blocks** column displays the number of 512-byte data blocks that have been accessed by a **Read** or **Write** I/O operation through the host.

The **Resets** column displays the number of times that a logical unit (LUN) or a Port has been reset according to the host communication management protocol.

System Hierarchal View

Clicking **RAID Information > System Nav** takes you to the System Hierarchal View page, which gives an overview of the configured arrays, volumes, and array member disks in a hierarchal view. Clicking the "**+**" icon next to an item expands it to list its components.

Clicking an icon displays information related to the component:

- Unit: Displays a system information summary (see Summary Information, page 5-1).
- Array: Displays the RAID array information (see RAID Array Information, page 4-1).
- Progress: Displays the progress of any running utilities (see RAID Array Utility Progress, page 4-3).
- Disk: Displays that disk's detail page (see Disk Information Detail Page, page 4-6).
- Volume: Displays information specific to the volume, but in a format similar to the Detailed Volume Layout page (see Detailed Volume Layout, page 4-4).