

HighPoint Storage Management Console User's Manual

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Overview

Thank you for using HighPoint Storage Management Software. This software consists of two parts: HighPoint Storage Management Console and HighPoint Storage Management Service. This is a help document for HighPoint Storage Management Console. In order to manage RAID array through this software more easily, please read the help file in detail.

Installation

Please refer to the installation guide for further information.

Running

To launch the program, type in the command "hptraid" or click the corresponding menu in your X-Window system. When the console main window is shown, you can connect to a system and perform management tasks.

Functions

1. Connect to a remote computer and manage the RAID arrays
2. User management
3. View information of controller, channel, array and device information in the computer system
4. Create a RAID array (supported RAID levels depend on controller and driver)
5. Delete a RAID array
6. Verify a RAID array
7. Rebuild a RAID array
8. Add a scheduled task to verify & rebuild a RAID array
9. Manage spare pool and dedicated spare disks
10. View event log
11. View icon legend
12. Auto-detect hot-swap disk
13. Auto-rebuild critical array
14. Add a disk into a critical array

Network

With this software, you can connect to any system that has HighPoint Storage Management Service running on it. After your identity being authenticated, you can perform array management tasks for the connected system.

Remote Control

Click File ->Remote Control menu in the main window to get into the Remote Control window. This is the default window after you launch the program. Only when you connect to the remote system successfully in this window can you manage the RAID arrays on that system.

Add Connection

Adds connection (System Address, Name and Port). It registers a system for management.

Click the Add button on the toolbar or click Operation->New System menu to display the Add connection dialog box. Enter the Address, Name and Port items, then click OK. Be sure not to keep the Address and Port items empty. You can enter either IP address or computer name, but the address you entered can't be the same as the system address added previously.

Modify Connection

Modifies connection (Name and Port). You can make a successful connection with the remote system only when the system port you entered is coherent with the real system port.

First select one of the connections you will modify in the connection list. Then click the Modify button on the toolbar or click Operation->Modify menu to display the Modify System dialog box. After modifying the system name and system port items, click OK.

The System Address item can't be changed. If you insist on modifying this item, you must first delete this connection and then add a new connection. Neither can you modify the connected system unless you disconnect it first and then modify it.

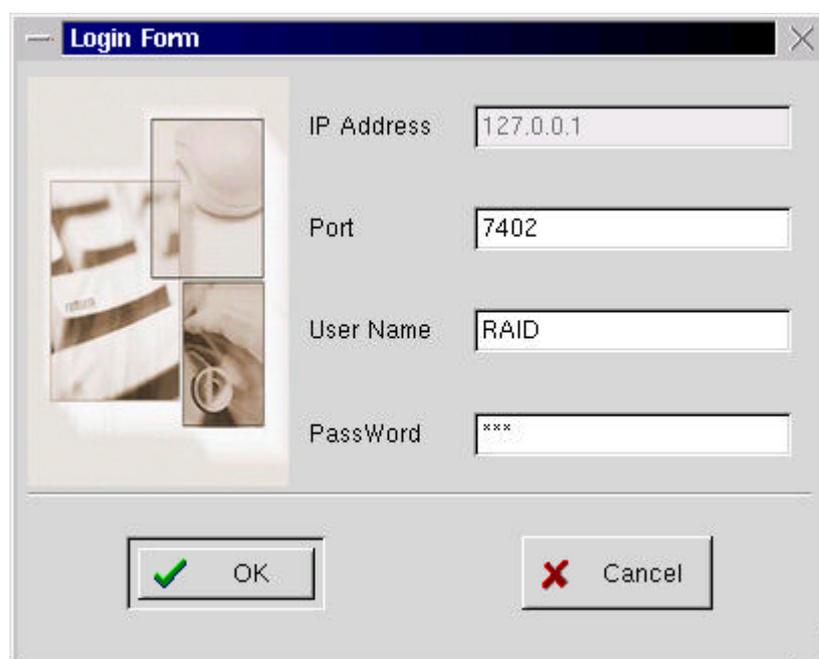
Delete Connection

Deletes the connection from the connection list.

First select one of the connections you will delete in the connection list. Then click the Delete button on the toolbar or click Operation->Delete menu to pop up a confirmation dialog box. Click Ok to delete the system record. You can't delete the connected system unless you disconnect it first.

Connect Remote System

Click the Connect button on the toolbar or click Operation->Connect menu to present the Login Form dialog box (See below). If you have already connected to another system, the current connection will be disconnected before establishing the new connection.



The screenshot shows a 'Login Form' dialog box. It contains the following fields and values:

Field	Value
IP Address	127.0.0.1
Port	7402
User Name	RAID
PassWord	***

Buttons: OK (with a green checkmark icon), Cancel (with a red X icon).

Enter System Address (either host name or IP address), System Port, User Name and Password, then click OK. The application will execute the remote connection and show the current connection status. Once the connection status shows "Connected", the connection process is over. Then you can use HighPoint Storage Management Console to manage the remote RAID array.

When you install the service of this software for the first time, the initial User Name is RAID, Password is hpt. It is strongly recommended to modify the initial password.

Note

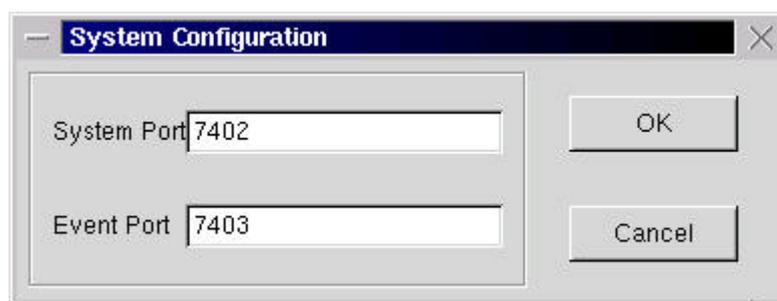
- System Port value must be the same as one on the HighPoint Storage Management service.
- The service only supports one client connection at one time.

Disconnect Remote System

If your computer is connecting to some remote system, click the Disconnect button on the toolbar or click Operation->Disconnect menu to pop up a confirmation dialog box. Click OK to terminate the current connection.

System Configuration

Click File->System Configuration menu in the main window. The System Configuration window pops up (see below).



System Port

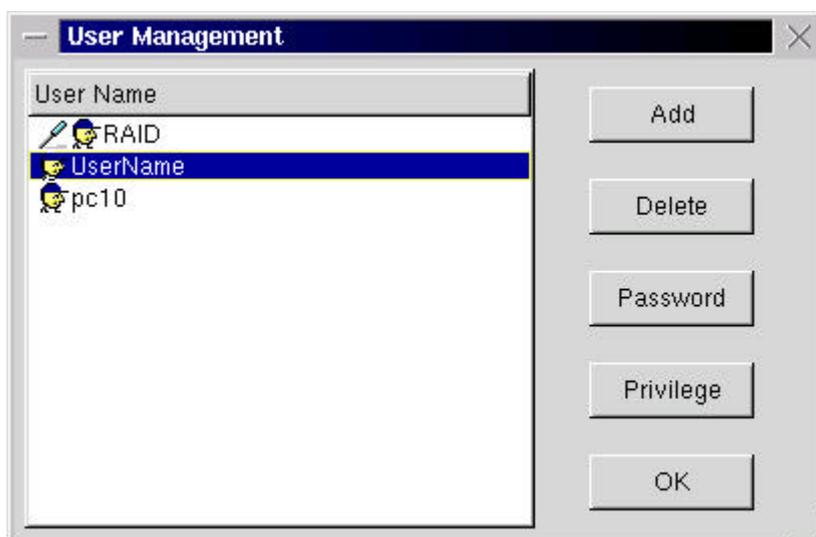
This is the TCP port number for the HighPoint Storage Management Service to communicate with management console. When you connect to the service, the port value you enter must be in accordance with the system port value on the service. The default value is 7402.

Event Port

The client software will retrieve events through this port. The default value is 7403. System Port must not be the same as Event Port. After you reset a system's configuration, you should restart the service on that system for the changes to take effect.

User Management

Click File- >User Management menu to display the User Management window (See below).



You can view all legal users in the current connected system. You can also perform add/delete/set password/set privilege operation.

- : The current user.

Add User

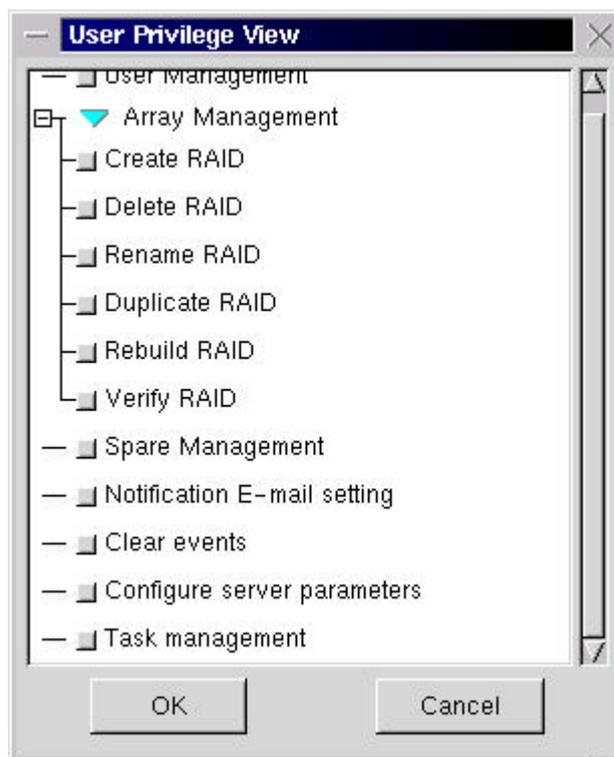
Clicking the Add button will enter into the Add User dialog.

To add a new user:

- (1) Enter User Name, password and confirm it.



- (2) Set user privilege.



If the new user is added successfully, it will appear in the User Management Window. Otherwise an error message will be displayed.

Delete User

Select a user from the user list box, and click the Delete button. The selected user will be deleted. If the user is now connecting to the remote computer, it can't be deleted.

Set Password

Select a user from the user list box, and click the Password button. Or you can click File->Password menu to modify the current password.

Set Privilege

Select a user from the user list box, and click the Privilege button to pop up the User Privilege View dialog box. You can view and modify the related privilege of this user.

Management

The RAID management functions are listed under Management menu in the main window. The submenus below make the connected RAID system configuration convenient by allowing managing and monitoring of the entire device tree "at-a-glance."

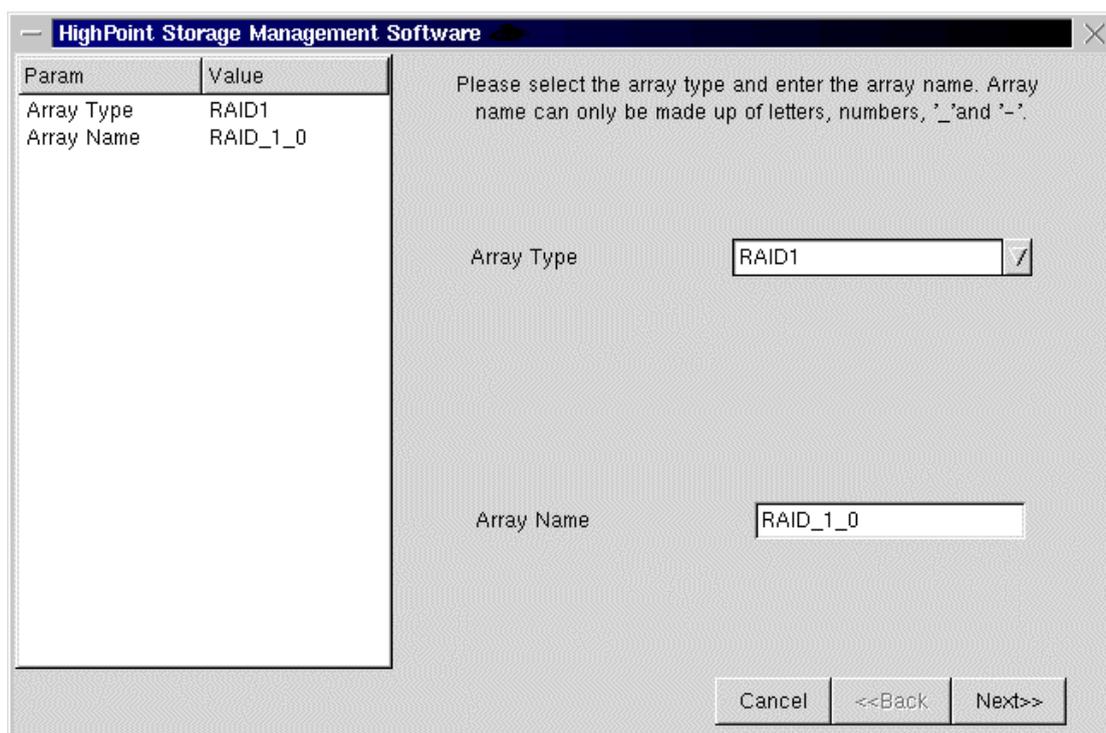
Array Management

Click the Management->Array Management menu to activate a window, in which you will view all logical disks grouped by physical disks are listed in a treelike structure. When any disk is selected, the right pane will show the corresponding detailed information. If you select an array, you can operate the array via the toolbar or the Operation menu.

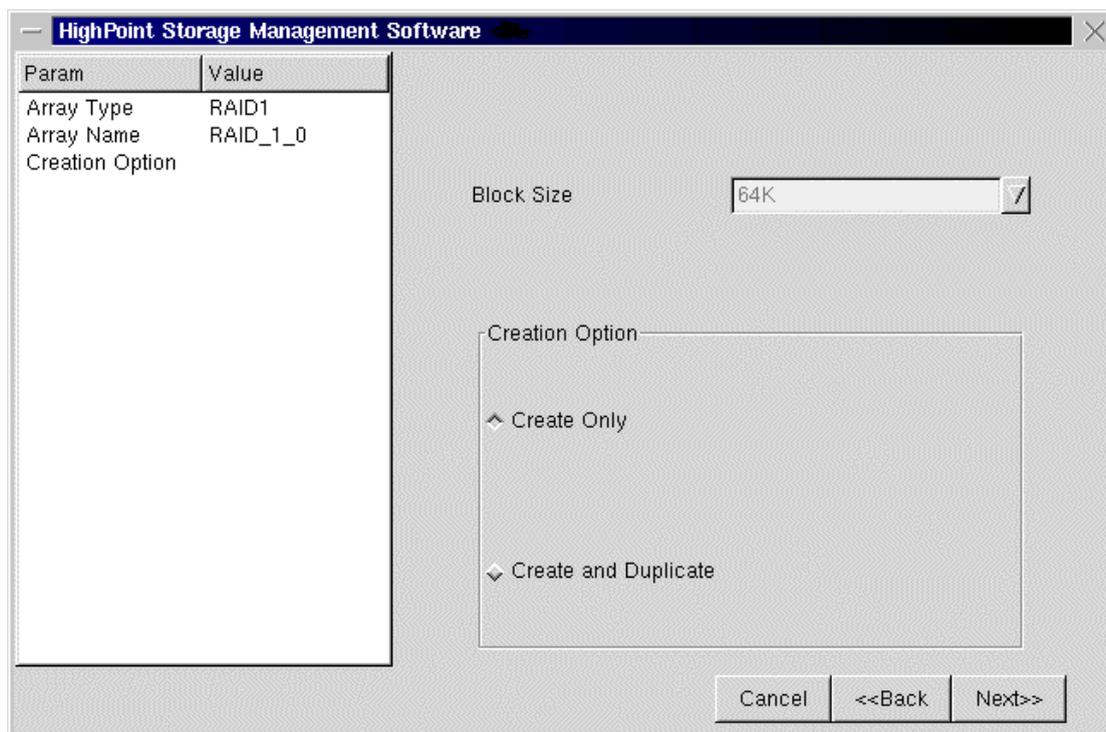
Create array

If you have Create RAID privilege and there are enough single disks in the system to create an array, click the Create button on the toolbar or select the Operation->Create menu to enter into the Array Creation wizard window.

Step 1: Choose the array type you want to create from the drop-down list. The available array types may vary; it depends on the controller and driver you use. Next, enter array name. You can't leave Array Name item empty. Then click the Next button. If the array type is JBOD, you can directly jump to the step 3.



Step 2: If the array type you choose is RAID 1, you will choose either of the creation options (See below).



RAID 1 Create Option:

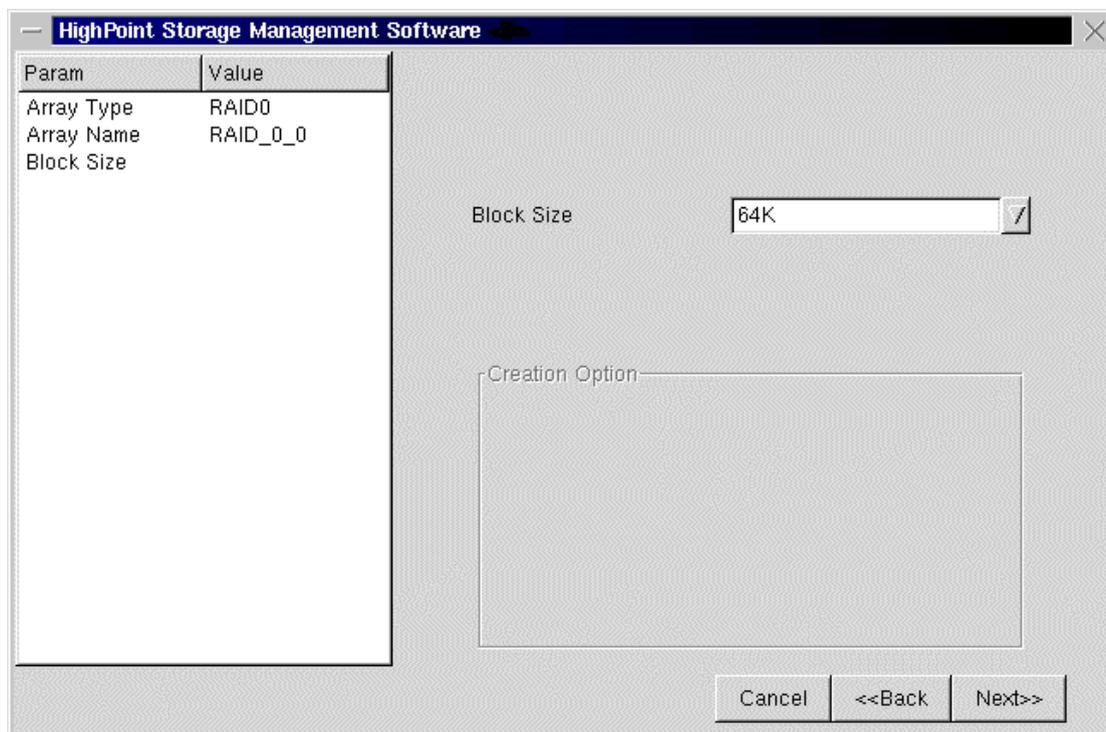
1. Create only

The RAID 1 array created in this way will lose all data on the member disks.

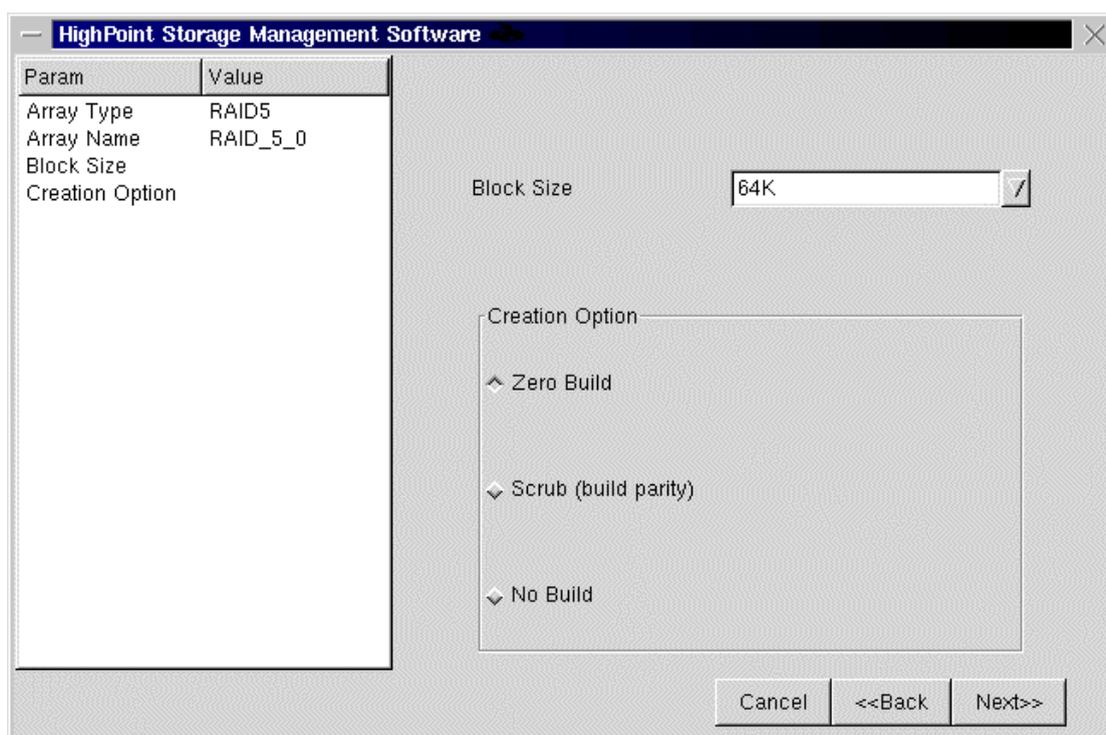
2. Create and duplicate

Create a RAID 1 array and copy data from the source disk to the mirror disk. The

capacity of the source disk mustn't be larger than the mirror disk.
Only create and duplicate a RAID 1 array can keep data on the source disk complete, while create any other types of arrays will lose all data on the member disks.
If the array type is RAID 0, RAID 0/1 or RAID 1/0, you need to select the block size from the drop-down list. Larger block sizes are better for random disk access (like email, POS, or web servers), while smaller sizes are better for sequential access.



If the array type you choose is RAID 5, you will choose the creation options and block size (See below).



RAID 5 Create Option:

1. Zero Build

This method requires each and every stripe in the RAID 5 array to be zeroed out. Note that, the result of an XOR on a set of zeros is also zero. Consequently this method of initialization permits parity to be determined and written to disks during the regular operation of the array (in response to write operations) using the "read-modify-write" method.

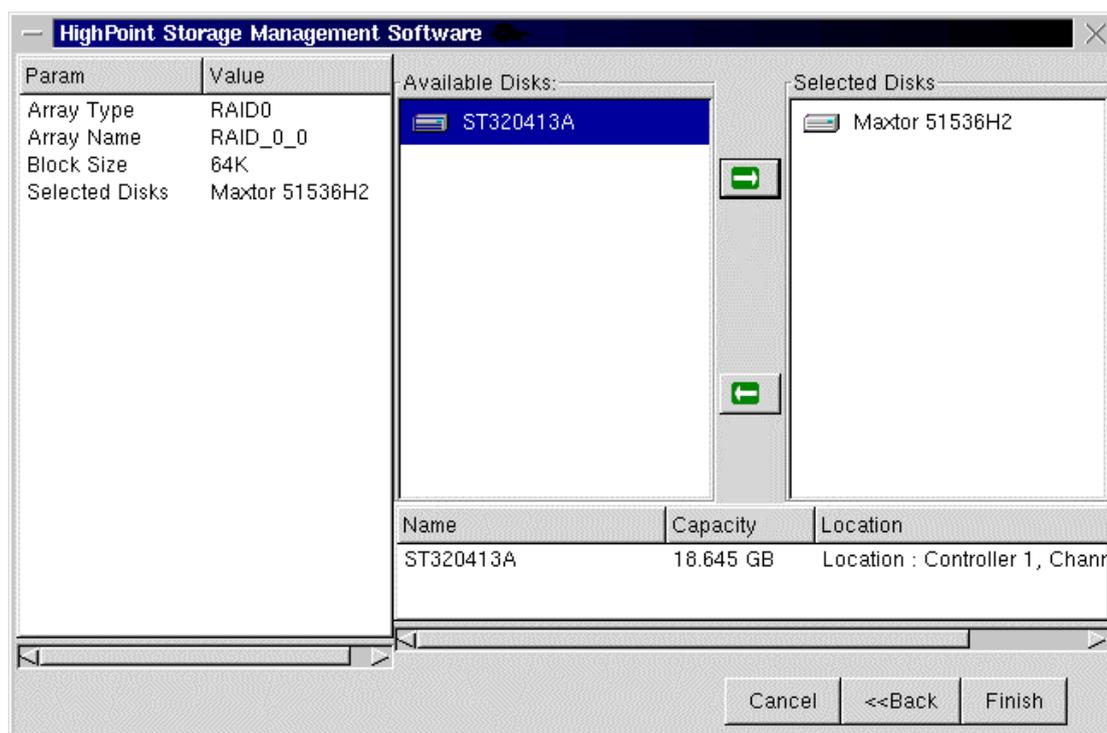
2. Scrub (build parity)

This method requires the parity of each and every stripe to be evaluated and written to the appropriate location on the RAID array. A "scrub" may be performed on an un-initialized array (i.e., an array with un-initialized disks) so that parity can be determined and written to disks during the regular operation of the array (in response to write operations) using the "read-modify-write" method.

3. No Build

This method assumes that a RAID 5 array is already in a consistent state with respect to the parity information contained in it. This is an initialization method that is typically employed in scenarios where the data and parity in the disks comprising an array are in a consistent state. For instance, all the drives may be zeroed out already by the manufacturer, thereby making them suitable for initialization using a no build. This method is however unsuitable for use when data in the disks used for building the array cannot be relied upon to be in a consistent state, i.e., the parity data is comprised of invalid values.

Step3: Select the single disks from the Available Disks list box and add them to the Selected Disks list box. If you create and duplicate a RAID 1 array, the first selected and added to the selected disks is the source disk. If you create only a RAID 1 array, the software will auto-select a disk as a source disk. Finally click Finish to complete creating an array.



Rename array

Click the Management->Array Management menu. Select the array you want to rename from the tree form, then click the Rename button on the toolbar or the Operation->Rename menu. Enter the new array name in the pop-up window and then click OK. If this button or the menu is disabled, then this array can't be renamed or you have not Rename Array privilege.

Note

The rebuilding/verifying/initializing/duplicating array can't be renamed.

Delete array

Click the Management->Array Management menu. Select the array you want to delete from the tree form, then click the Delete button on the toolbar or the Operation->Delete menu to do deletion. If this button or the menu is disabled, then this array can't be deleted or you have not Delete RAID privilege.

Note

The bootable array or the rebuilding/verifying/initializing/duplicating array can't be deleted.

Add disk to array

Click the Management->Array Management menu. If an array is broken, it's necessary to add single disks to it. Select a broken array, then click the Add Disk button or the Operation->Add Disk menu. If this button or the menu is disabled, then this array can't be added with disks or you have not the privilege. When the

system detects some physical disks, a dialog box appears. You can select a single disk and add it into the broken array. If the array is still broken, repeat adding the single disks into it. When the array's status changes to be unbroken, the system will auto-rebuilding the array.

Verify array

Click the Management ->Array Management menu. If you want to verify data on an array, you can use this function. If you want to verify the RAID 1/0 array, you should operate the sub-RAID 1 array in RAID 1/0 array. Select an array from the tree form and then click the Verify button on the toolbar or the Operation ->Verify menu. If this button or the menu is disabled, then you can't verify this array or you have not Verify RAID privilege. RAID 5, RAID 1, RAID 0/1 and sub-RAID 1 in RAID 1/0 can run this function. You can make Task Schedule to regularly verify the array.

Rebuild array

Click the Management ->Array Management menu. A critical RAID 5, RAID 1, RAID 0/1 array or a RAID 1/0 member can run this function. Select the array in the tree form, and click the Rebuild button on the toolbar or the Operation ->Rebuild menu. If this button or the menu is disabled, either the array can't be rebuilt or you have not Rebuild RAID privilege.

Abort rebuilding/verifying/initializing/duplicating

Click the Management ->Array Management menu. To abort a rebuilding/verifying/initializing/duplicating process, select the array from the tree form and then click the Abort button or the Operation ->Abort menu. If this button or the menu is disabled, the array task can't be aborted or you have not the privilege.

Device Management

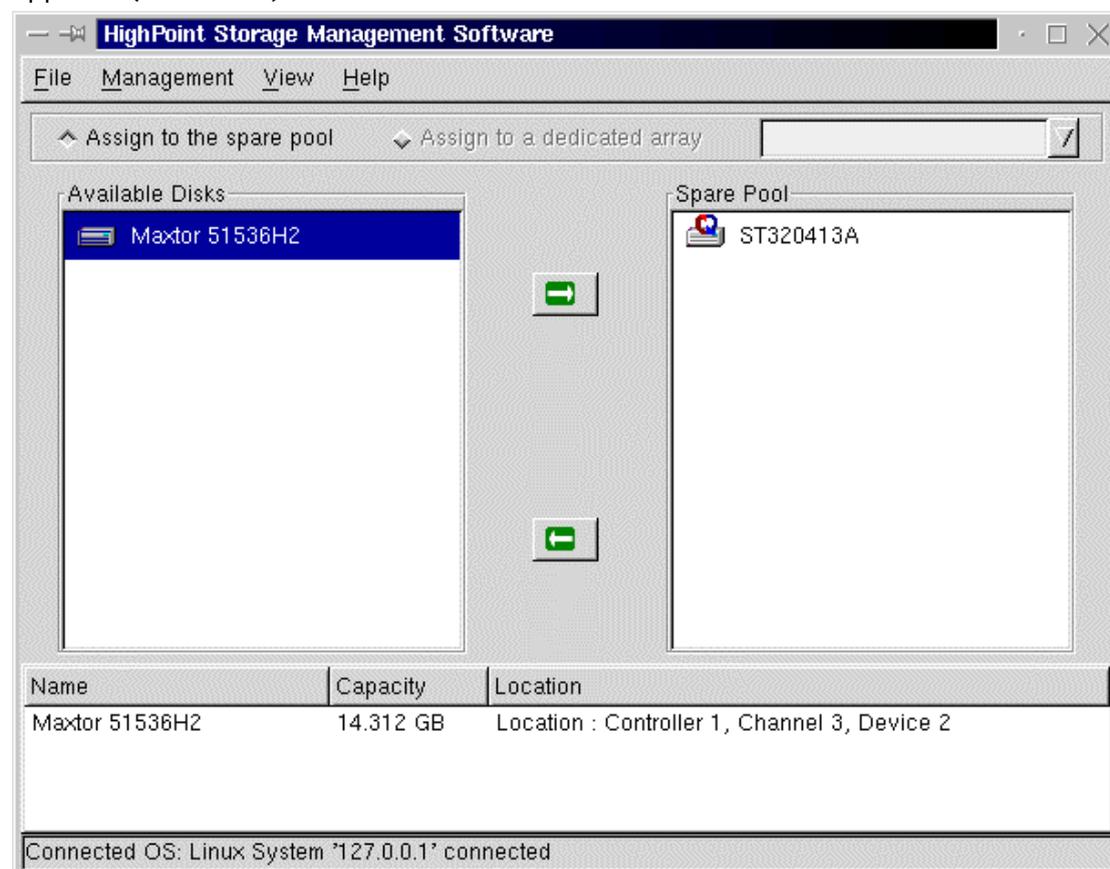
Click the Management->Device Management menu in the main window to display the Device Management window. In this window, all the physical devices (including Controller, Channel and other Device) are linked together in a form of treelike structure. When any device is selected, the right pane will show the corresponding detailed information.

Rescan Devices

Click the Rescan Devices button or the Operation->Rescan Devices menu to rescan all the physical devices attached to the controller.

Spare Management

Click the Management -> Spare Management menu, the Spare Management window appears (see below).



Assign to the spare pool

Choose the Assign to spare pool option, the Available Disks list box will display all single disks in the system and the Spare Pool list box will display all the added spare disks. When the array is critical, the system will auto-select a spare disk to take over the fault disk and then rebuild the array to the original status.

To add a spare disk, select it from the Available Disk list box and click the right arrow button to add the disk to the Spare Pool list box.

To remove a spare disk, select it from the Spare Pool list box and click the left arrow button to remove the disk from the Spare Pool list box.

Assign to the dedicated array

If the controller driver supports dedicated spare, you can choose "Assign to a dedicated array" option to add a dedicated spare for an array. You need to select an array for this operation. When an array is selected, the Available Disks list box will display all single disks in the system and the Array Spares list box will display all

added dedicated spare disks.

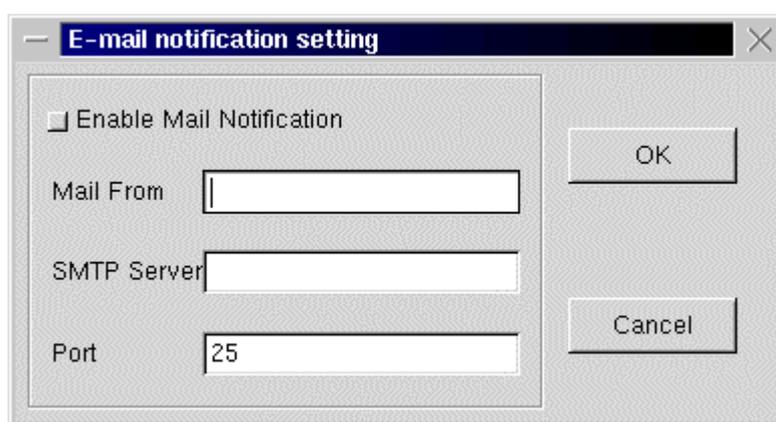
To add/remove a dedicated spare disk, you can perform the same operations as adding/removing a spare disk (see above).

Event Notification

Click the Management->Event Notification menu in the main window, the E-mail Notification window appears. When an event occurs, the system will send e-mail to those preset mailboxes according to the different event types (Information, Warning and Error).

E-mail notification setting

In order to send e-mail, you should first have an available SMTP server. The software does not support SMTP servers that require user authentication. Clicking the Setting button on the toolbar or the Operating->Setting menu will bring up the following E-mail notification setting window.



Check Enable E-mail Notification option and enter Mail From, SMTP Server and Port options, and then click OK.

Add Recipient

Click the Add button on the toolbar or the Operation->Add menu will pop up the Add recipient window (see below).



Enter an e-mail address, the recipient name and notification options. The e-mail

address entered can't be repeated with the previous e-mail address. There are three types of event notification: Information, Warning and Error. You can select either one or two, even all of them.

Modify Recipient

Select the recipient that you want to modify from the recipient list in the Event Notification window. Then click the Modify button on the toolbar or the Operation->Modify menu. The Modify Recipient window appears. Modify the recipient name and the notification options. Finally click OK.

Delete Recipient

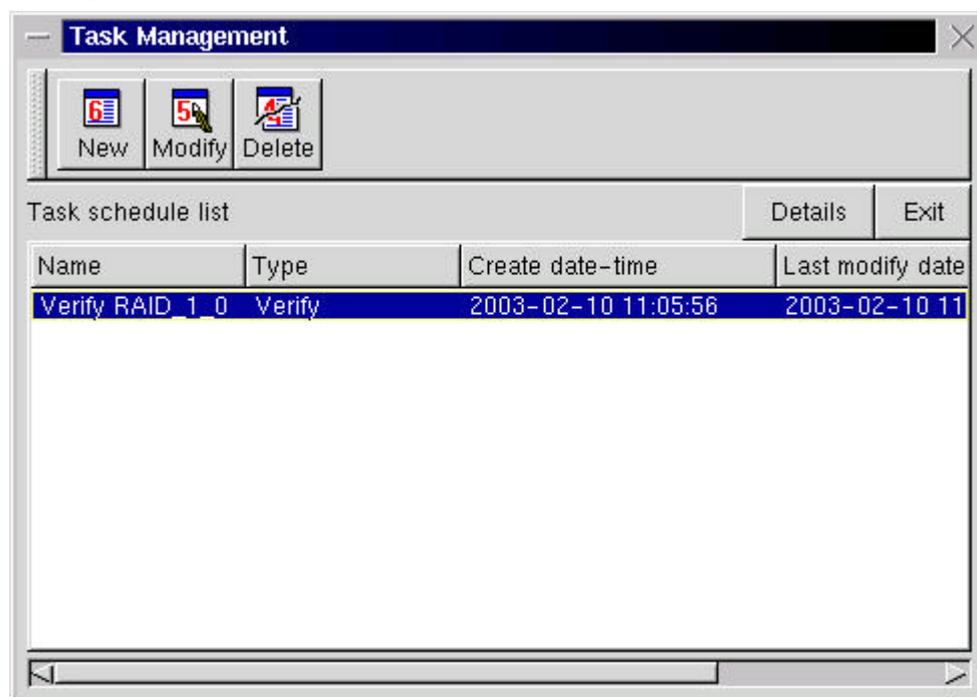
Select the recipient that you want to delete from the recipient list in the Event Notification window. Then click the Delete button on the toolbar or the Operation->Delete menu. Click OK on the pop-up confirmation dialog box.

Test

Sends a testing mail to the recipient. Select one recipient from the recipient list in the Event Notification window. Then click the Test button on the toolbar or the Operation->Test menu. If you fail to send this mail, you will get a pop-up error message.

Task Management

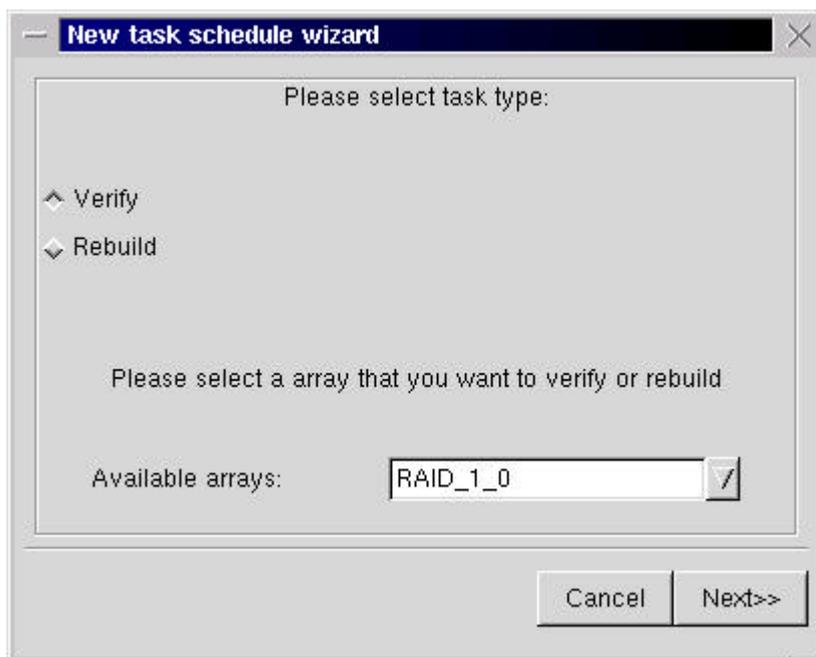
Click the Management ->Task Management menu in the main window, the following Task Management window appears.



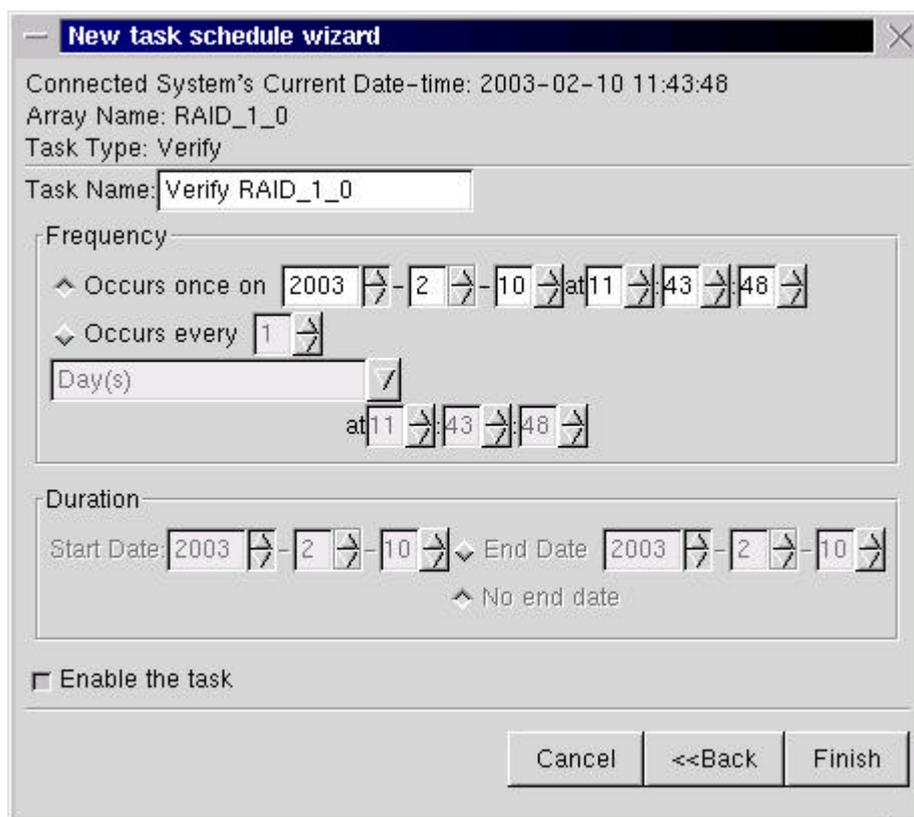
When you want to regularly verify/rebuild an array, you can make a new task schedule. The Task schedule list shows all added tasks. Select one task and click the Details button will display the detailed information of the selected task. If you have the privilege, you can add, modify or delete the task.

Add Task Schedule

There are two types of task that can be scheduled: Verify Array and Rebuild Array. If there are some arrays that can be verified or rebuilt in the current system, click the New button on the toolbar to pop up the New Task Schedule Wizard window (see below).



Select task type and array that you want to verify or rebuild from the available arrays drop-down list. Then click Next.



In this window you will configure the frequency you want to verify or rebuild the specified task.

To add a new task:

1. Enter a name for the task. You can also use the default task name.
2. Set Frequency. If you want to add a task to rebuild an array, you can select Occur one time option. If you want to add a task to verify an array, you can specify the

detailed occur time by daily, weekly or monthly.

3. Set the effective date for a task in the Duration option.
4. Check the Enable the task option to activate this task. If this option is unchecked, then the system will never execute this scheduled task.
5. Click the Finish button. When a task has been added successfully, it will appear to the task schedule list in the main window.

Modify Task Schedule

Select a task that you want to modify from the Task schedule list in the main window, then click the Modify button on the toolbar. In the pop-up window you can modify the task name and frequency the task occurs.

Delete Task Schedule

Select a task that you want to delete from the Task schedule list in the main window, and then click the Delete button on the toolbar. When you delete an array, all task schedule related to this array will be deleted at the same time.

Views

Event View

Clicking View- >Event View menu in the main window will display all events logged in the system. Those events are divided into three types: Information, Warning and Error.

Checking one of the Filter options will display all the selected type of events in the following event list box.

Clicking the Clear button will clear all events listed in the event list box and those stored on the remote system.

Clicking the Save button will save all events listed in the event list box as plain text file.

Clicking the Print button will print all events listed in the event list box.

Icon View

Clicking View- >Icon View menu in the main window will display a window, showing different icons and its descriptions.

Additional Features

HighPoint Storage Management Console provides the following additional features, which can keep maximum data integrity and consistency for your storage sub-system.

Auto-detect Hot-plugged Disks

If a disk is removed when it is running I/O operations or when some I/O errors occur in this disk, users will be informed. When the disk doesn't run read/write operations, users can use the refresh function to rescan the devices. Similarly, when you insert a new disk, you can force the software to detect the disk using refresh function. Once a new disk is found, the software will auto-detect if there exists a broken array. If the capacity of the new disk suits the requirement of the array, users will be inquired whether to add the new disk into this array or not. If yes, the system will do it and perform auto-rebuild operation.

Auto-rebuild Array

The HighPoint Storage Management Service supports the auto-rebuild function. This can help users to auto-rebuild RAID 1, RAID 5, RAID 0/1 or RAID 1/0 array under the following circumstances.

1. A spare disk exists in the spare pool. When a source disk in a RAID 1 array fails, a mirror disk will replace it automatically and the spare disk will become the mirror disk. If a mirror disk fails, the spare disk will auto-replace it to be the mirror disk.
2. When a disk is added to a RAID 1, RAID 5, RAID 0/1 or RAID 1/0 array and the array resumes normal, the auto-rebuild function will be started.
3. When the HighPoint Storage Management Service is enabled, the system will auto-rebuild all needed arrays at the same time.

Integrity Checking

When HighPoint Storage Management Console is launched, it will execute the following checking:

1. If there exists a disabled array, user will be informed to delete it.
2. If there exists a critical array, user will be prompted to rebuild it.
3. If there exists a broken array and also exists a single disk, user will be prompted to add the single disk to the broken array. Then the array will be auto-rebuilt.

Glossary

System

A computer with HighPoint RAID Controller, driver for the controller, and HighPoint Storage Management Service installed. Users can use HighPoint Storage Management Console to connect it and manage the RAID system.

Controller

A system may include one or more RAID controllers. A controller provides hardware control to devices. There are several channels on each controller.

Channel

A channel provides the connection between controller and device (array or physical disk). Each channel can attach a master device and a slave device.

Device

A device attached to the adapter. It can be an IDE hard drive or an ATAPI device such as CD-ROM or Tape.

Event

The detection of a disk failure will result in an event being recorded in the Event Log, which will trigger a critical warning message.

Spare Disk

A spare disk can be used as a replacement by a redundant array when a failure occurs.

Spare Pool

A logical container which includes several spare disks. When needed, the spare disks can be picked up sequentially.

Dedicated Spare

A spare disk that can only be used for a specified array.

Initialization

Initializing completely obliterates any information previously stored on the selected disks.

RAID

RAID is an acronym for Redundant Array of Inexpensive (or Independent) Disks. A RAID array is a collection of drives which collectively act as a single storage system, which can tolerate the failure of a drive without losing data, and which can operate independently of each other. The benefits of RAID can include: higher data transfer

rates for increased server performance, increased overall storage capacity for a single drive designation (i.e. C, D, E, etc.), data redundancy/fault tolerance for ensuring continuous system operation in the event of a hard drive failure. Different types of arrays use different organizational models and have varying benefits. The following outline breaks down the properties for each type of RAID array.

RAID 0 (Striping)

When a disk array is striped, the read and write blocks of data are interleaved between the sectors of multiple drives. Performance is increased, since the workload is balanced between drives (or "members") that form the array. Identical drives are recommended for performance as well as data storage efficiency. The disk array's data capacity is equal to the number of drive members multiplied by the smallest array member's capacity. For example, one 1 GB and three 1.2GB drives will form a 4GB (4*1GB) disk array instead of 4.6 GB. The stripe block size value can be set logically from 1KB, 2KB, 4KB, 8KB, 16KB, 32KB, 64KB [Default], 128KB, 256KB, 512KB, or 1024KB. This selection will directly affect performance. Larger block sizes are better for random disk access (like email, POS, or web servers), while smaller sizes are better for sequential access. RAID 0 arrays deliver the best data storage efficiency and performance of any array type. The disadvantage is that if one drive in a RAID 0 array fails, the entire array fails.

RAID 1 (Mirroring)

When a disk array is mirrored, identical data is written to a pair of drives, while reads are performed in parallel. The reads are performed using elevator seek and load balancing techniques where the workload is distributed in the most efficient manner. Whichever drive is not busy and is positioned closer to the data will be accessed first. Under RAID 1, if one physical drive suffers a mechanical failure or sector error, the other mirrored drive continues to function. This is called Fault Tolerance. Moreover, if a spare drive is present, the spare drive will be used as the replacement drive and data will begin to be mirrored to it from the remaining good drive. Due to the data redundancy of mirroring, the drive capacity of the array is only the size of the smallest drive. For example, two 1 GB drives which have a combined capacity of 2GB instead would have 1GB of usable storage when set up in a mirrored array. Similar to RAID 0 striping, if drives of different capacities are used, there will also be unused capacity on the larger drive. RAID 1 delivers the best performance of any redundant array type.

RAID 5 (Stripe with Rotating Parity)

This type of array is composed of independent data disk with distributed parity blocks. Each entire data block is written on a data disk; parity for blocks in the same rank is generated on Writes, recorded in a distributed location and checked on Reads. RAID 5 requires a minimum of 3 drives to implement. This type of RAID owns the highest Read data transaction rate.

RAID 0/1 (Mirrored Striping)

Mirrored Striping combines both of the previous array types. It can increase performance by reading and writing data in parallel while protecting data with duplication. A minimum of four drives is needed for Mirrored Striping to be installed. With a four-drive disk array, two drives are striped together, and a second pair of striped drives is used to mirror the first pair of striped drives. The data capacity is similar to a standard mirroring array, with half of the total storage capacity dedicated for redundancy. An added plus for using RAID 0/1 is that, in many situations, such an array offers double fault tolerance. Double fault tolerance may allow your data array to continue to operate depending on which two drives fail.

RAID 1/0

RAID 1/0 is implemented as a striped array whose segments are RAID 1 arrays. It has the same fault tolerance as RAID 1 and the same overhead for fault-tolerance as mirroring alone. It owns the very high reliability combined with high performance.

Disk Striping

The technique of combining a set of disk partitions located on different hard disks into a single volume, creating a virtual "stripe" across the partitions that the operating system recognizes as a single drive. Disk striping can occur at the bit level or at the sector level and allows multiple concurrent disk accesses that can improve performance considerably.

Disk Mirroring

A fault-tolerant technique that writes the same information simultaneously onto two hard disks or two hard-disk partitions, using the same disk controller. If one disk or partition fails, information from the other can be used to continue operations. It is offered by most major network operating systems. It is also known as RAID 1.

JBOD (Volume)

JBOD is an acronym for Just a Bunch of Disks. It is used to refer to hard disks that aren't configured according to RAID -- a subsystem of disk drives that improves performance and fault tolerance. JBOD provides much more capacity (the sum of all the disks). If there is more than a single physical disk (not member of an array and not an ATAPI device or a removable disk), you can create a JBOD array.