



**NAStorage
Administrator Guide**

Hot Spare

Version 1.00

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Prepared by:

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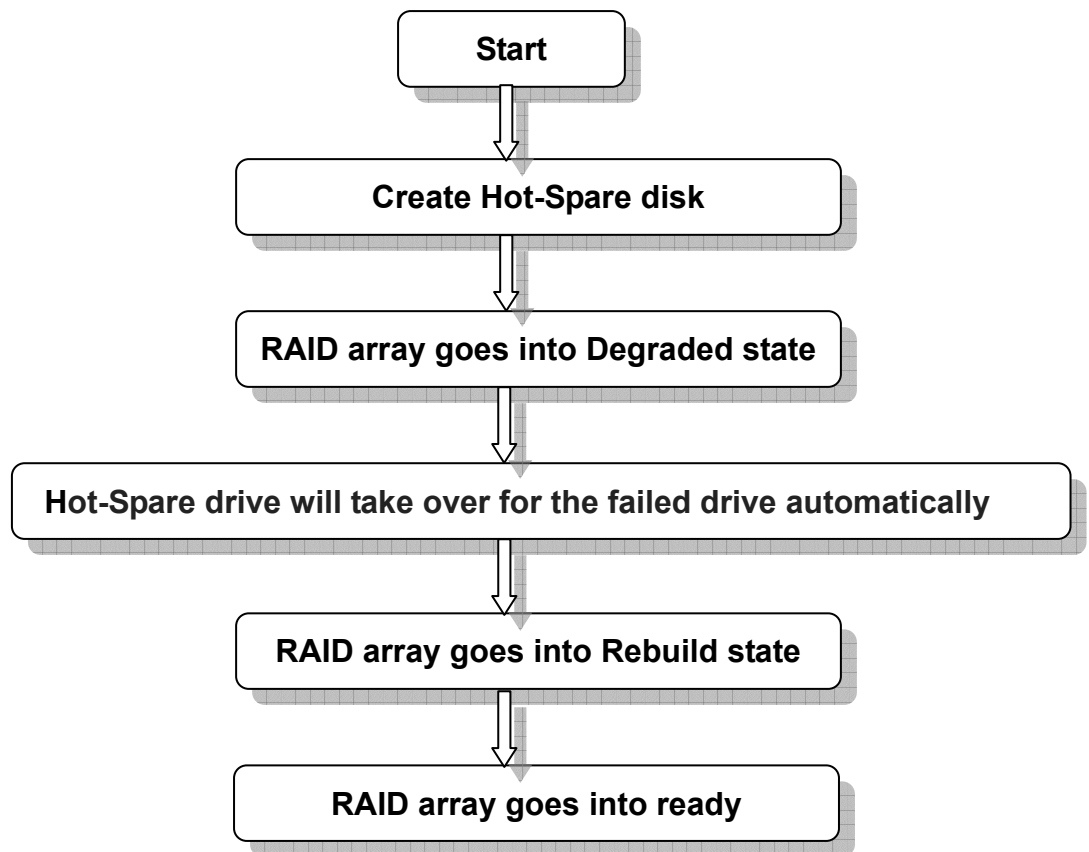
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Hot Spare

The **Hot Spare** drive is waiting for a possible drive failure in the **RAID** array. In the event of a failure, the **hot spare** drive will take over for the failed drive automatically and the **RAID** array will not suffer performance degradation.

Hot Spare function of the NASStorage support RAID1 and RAID5, that means you can add the unused hard disk as the hot spare disk, once RAID array get into faulty state, the hot spare drive will take over for the failed drive automatically.

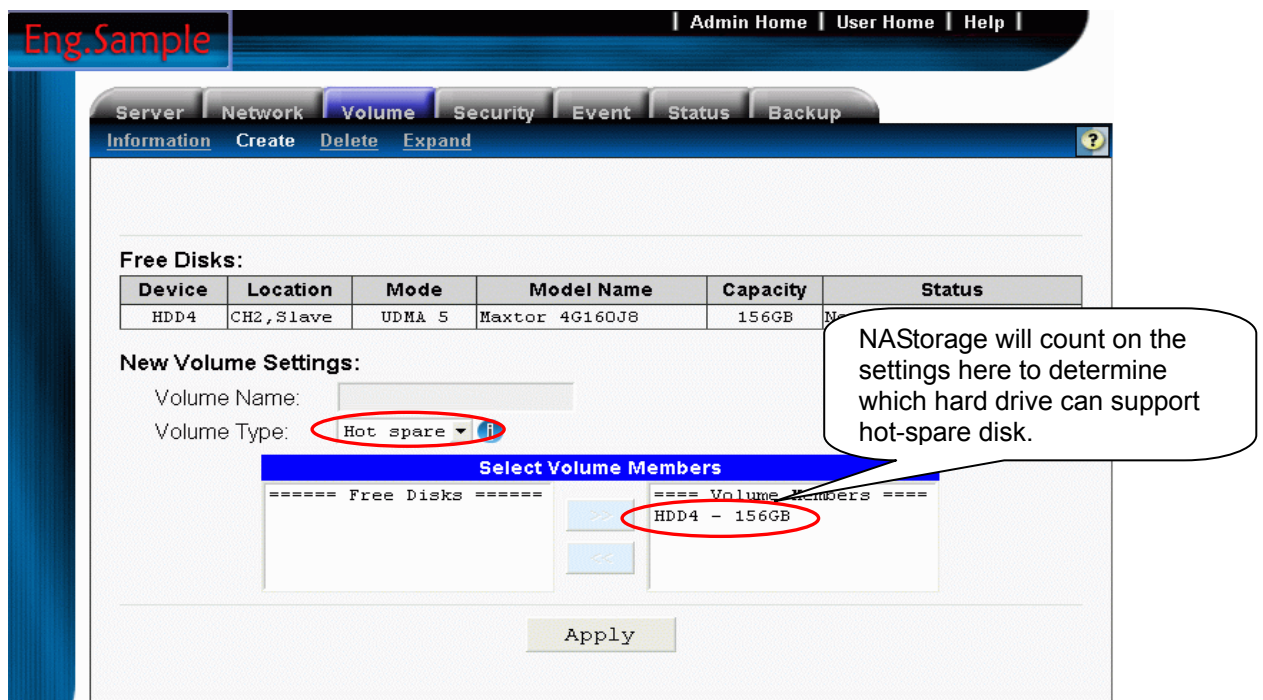
There's one thing need to concern, if the capacity of the selected hot spare hard disk is smaller than the smallest hard disk of the RAID group, the Hot Spare function won't take effect. That mean your hot spare disk capacity must greater or equal to the smallest hard disk of the RAID group.



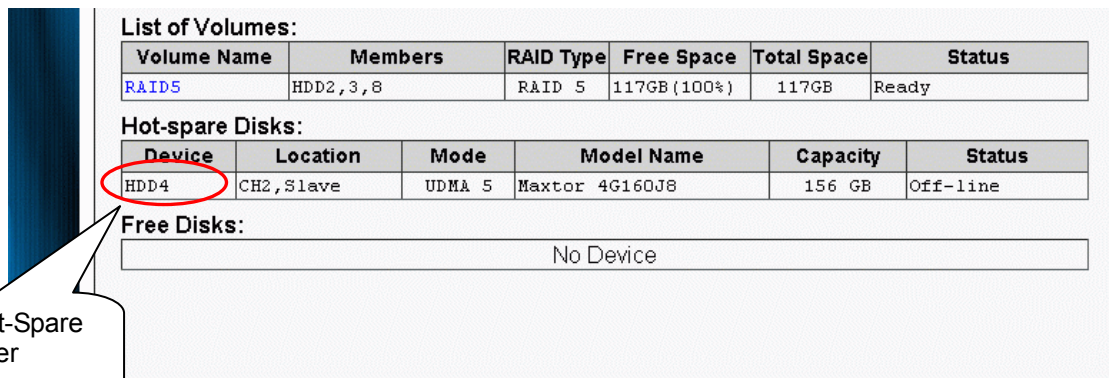
1. Create Hot-Spare Disks:

A Hot-Spare disk will be used to rebuild a RAID automatically whenever a RAID volume is degraded because of a bad or missing hard disk. Therefore you must assign a free disk as the hot-spare disk before you want take over for the failed drive automatically.

Configuration flow: **“Volume Manager–Create”** → Select Volume type **“Hot-Spare”** → Add a **Free Disk** from left to right window then click **“Apply”**.



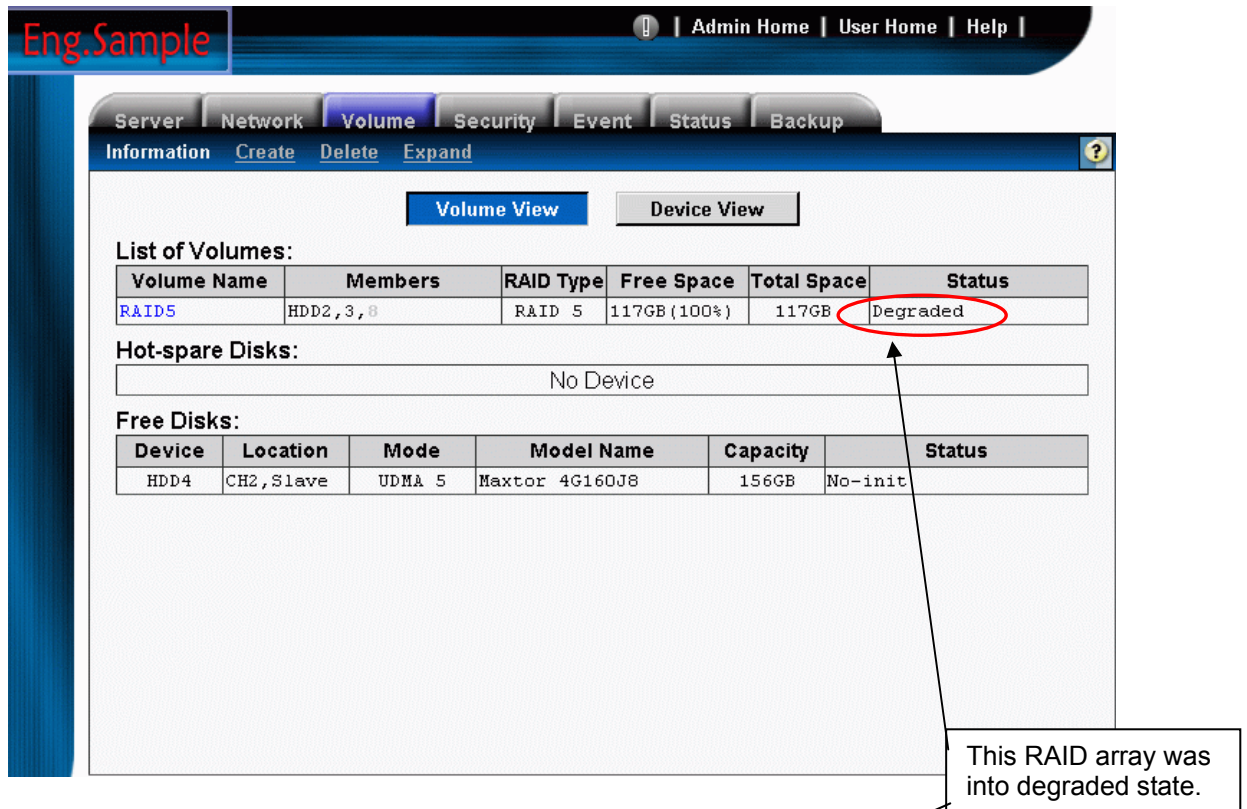
Then you will find the disk you selected is already under Hot-Spare Disks list, it means the disk goes into ready state and will take over for the failed drive automatically.



Available Hot-Spare disks sit under NASTorage

2. RAID array goes into Degraded state

When NASStorage detect one of the RAID volume members is defective. Data are still intact and accessible, but the volume is no longer protected by RAID and this RAID volume will go into degraded state.



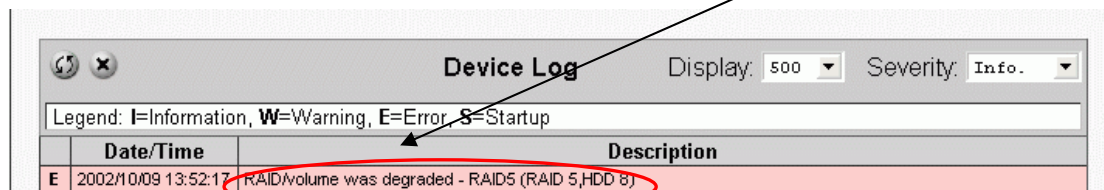
The screenshot shows the 'Volume View' of a RAID array. The 'List of Volumes' table indicates that the RAID5 array is in a 'Degraded' state. A callout box points to the 'Degraded' status with the text: 'This RAID array was into degraded state.'

Volume Name	Members	RAID Type	Free Space	Total Space	Status
RAID5	HDD2, 3, 8	RAID 5	117GB (100%)	117GB	Degraded

Hot-spare Disks: No Device

Device	Location	Mode	Model Name	Capacity	Status
HDD4	CH2, Slave	UDMA 5	Maxtor 4G160J8	156GB	No-init

You can check the log from "Event and Log" page, the HDD8 was defective.



The screenshot shows the 'Device Log' window with a legend: I=Information, W=Warning, E=Error, S=Startup. The log entry for 'E' at '2002/10/09 13:52:17' is circled in red and reads: 'RAID/volume was degraded - RAID5 (RAID 5,HDD 8)'. An arrow points from this log entry to the 'Degraded' status in the previous screenshot.

Date/Time	Description
2002/10/09 13:52:17	RAID/volume was degraded - RAID5 (RAID 5,HDD 8)

3. Hot spare drive will take over for the failed drive automatically.

Once RAID array went into Degraded state, the Hot Spare disk will take over for the failed hard disk automatically.

(For example, Hot Spare disk of the NASTorage is HDD4 and failed hard disk is HDD8.)

Eng.Sample | Admin Home | User Home | Help |

Server | Network | Volume | Security | Event | Status | Backup

Information | Create | Delete | Expand

Volume View | Device View

List of Volumes:

Volume Name	Members	RAID Type	Free Space	Total Space	Status
RAID5	HDD2, 4	RAID 5	117GB (100%)	117GB	Rebuild(00.0%)

Hot-spare Disks:
No Device

Free Disks:
No Device

The Hot spare disk will take over for the failed drive automatically

Eng.Sample | Admin Home | User Home | Help |

Server | Network | Volume | Security | Event | Status | Backup

Information | Create | Delete | Expand

Volume Name: RAID5

Volume Status: Rebuild(03.1%)

RAID Type: RAID 5

Free Space: 117,024 MB (99.97%)

Total Capacity: 117,064 MB

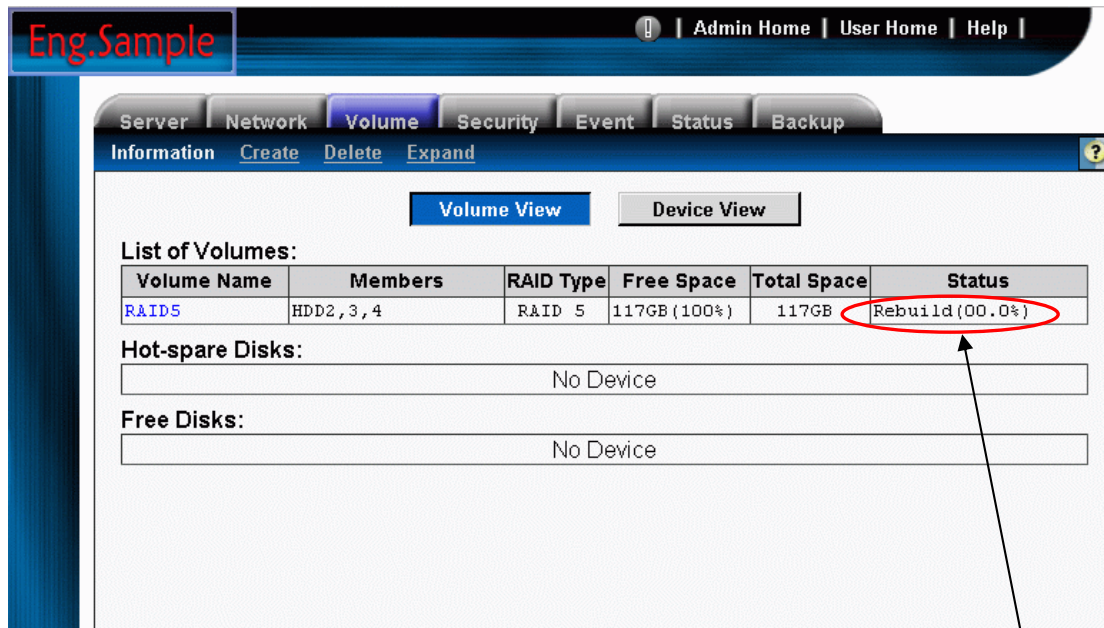
Volume Members:

Device	Location	Mode	Model Name	Capacity	Status
HDD2	CH1, Slave	UDMA 5	WDC WD1200JB-00CRA1	114GB	On-line
HDD3	CH2, Master	UDMA 5	IBM-DTLA-307060	59GB	On-line
HDD4	CH3, Slave	UDMA 5	Maxtor 4G160J8	156GB	On-line

Apply | Close

4. RAID array goes into Rebuild state

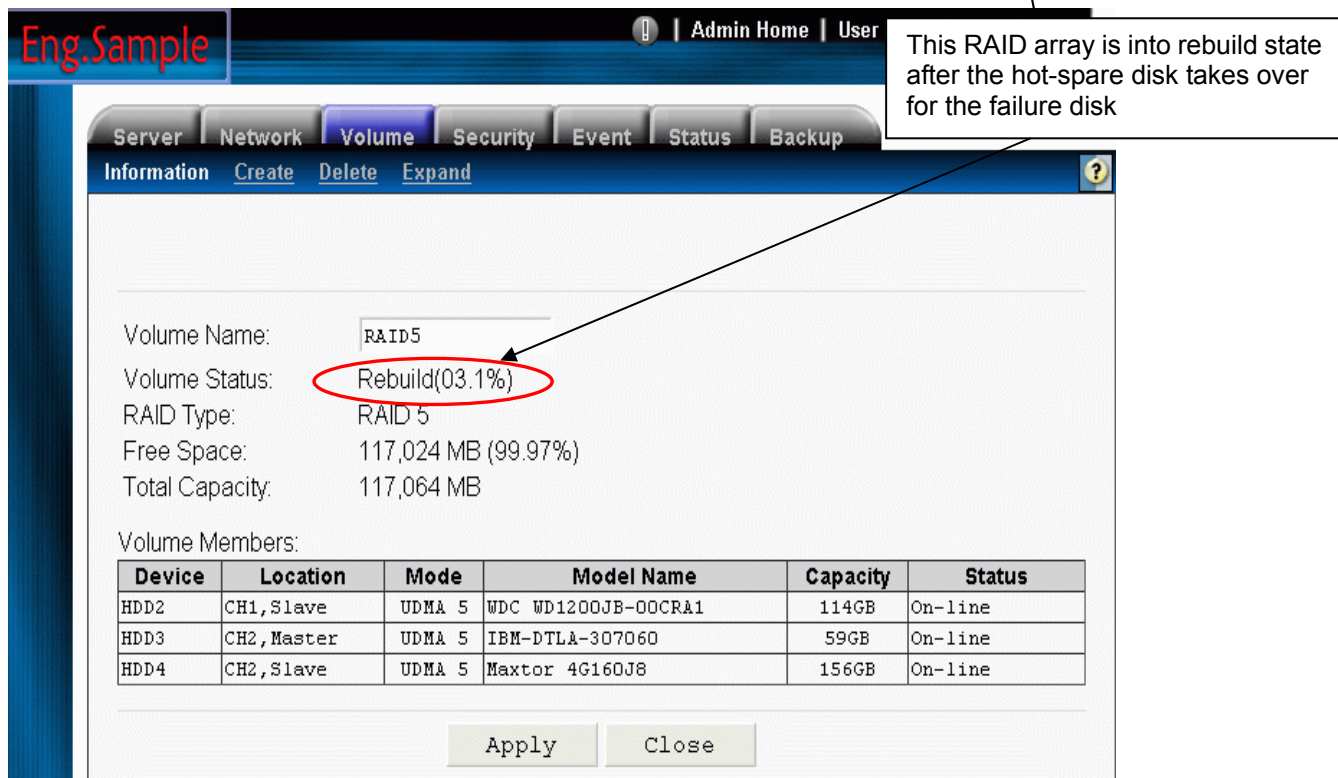
If NASTorage sever detect the system have hot-spare disk when the RAID array into degrade state, the hot-spare disk will take over for the failed hard disk automatically. Then this RAID array will go into Rebuild state.



The screenshot shows the NASTorage management interface. The top navigation bar includes 'Eng.Sample', 'Admin Home', 'User Home', and 'Help'. Below this, there are tabs for 'Server', 'Network', 'Volume', 'Security', 'Event', 'Status', and 'Backup'. The 'Volume' tab is active, and the 'Information' sub-tab is selected. The main content area shows 'Volume View' and 'Device View' buttons. A table titled 'List of Volumes:' displays the following data:

Volume Name	Members	RAID Type	Free Space	Total Space	Status
RAID5	HDD2,3,4	RAID 5	117GB (100%)	117GB	Rebuild(00.0%)

Below the table, there are sections for 'Hot-spare Disks:' and 'Free Disks:', both showing 'No Device'. An arrow points from the 'Rebuild(00.0%)' status in the table to the second screenshot.



The screenshot shows the NASTorage management interface with a dialog box open. The top navigation bar includes 'Eng.Sample', 'Admin Home', and 'User'. The 'Volume' tab is active, and the 'Information' sub-tab is selected. The dialog box displays the following details for the RAID array:

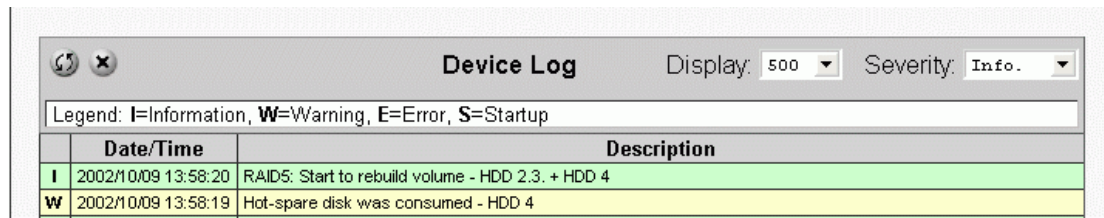
Volume Name: RAID5
Volume Status: Rebuild(03.1%)
RAID Type: RAID 5
Free Space: 117,024 MB (99.97%)
Total Capacity: 117,064 MB

Volume Members:

Device	Location	Mode	Model Name	Capacity	Status
HDD2	CH1, Slave	UDMA 5	WDC WD1200JB-00CRA1	114GB	On-line
HDD3	CH2, Master	UDMA 5	IBM-DTLA-307060	59GB	On-line
HDD4	CH2, Slave	UDMA 5	Maxtor 4G160J8	156GB	On-line

At the bottom of the dialog box, there are 'Apply' and 'Close' buttons. A text box on the right side of the screenshot contains the text: 'This RAID array is into rebuild state after the hot-spare disk takes over for the failure disk'. An arrow points from this text box to the 'Rebuild(03.1%)' status in the dialog box.

The Device Log will display “hot-spare disk was consumed”, that means this disk already took over for the failure disk automatically.

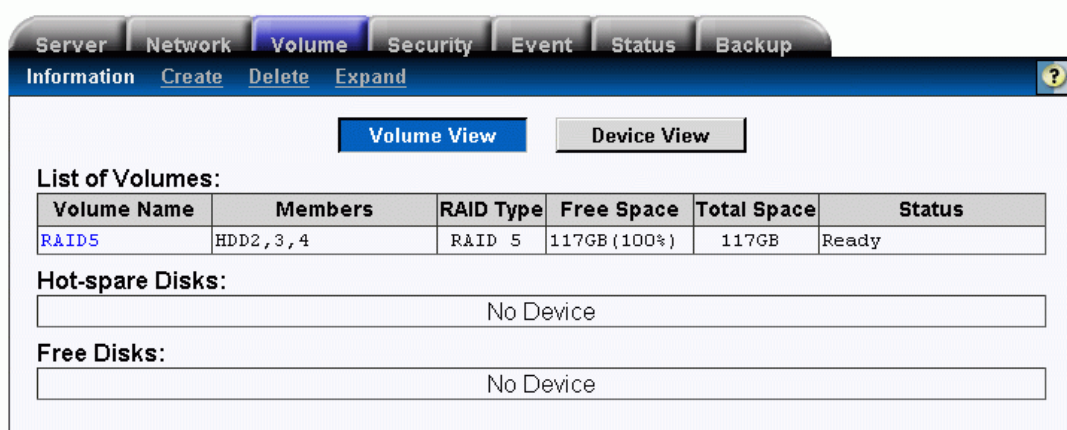


The screenshot shows a window titled "Device Log" with a "Display" dropdown set to "500" and a "Severity" dropdown set to "Info.". Below the title bar is a legend: "Legend: I=Information, W=Warning, E=Error, S=Startup". The main content is a table with two columns: "Date/Time" and "Description".

	Date/Time	Description
I	2002/10/09 13:58:20	RAID5: Start to rebuild volume - HDD 2.3. + HDD 4
W	2002/10/09 13:58:19	Hot-spare disk was consumed - HDD 4

5. RAID array goes into ready state

The RAID array will go into ready state after rebuild is finished.

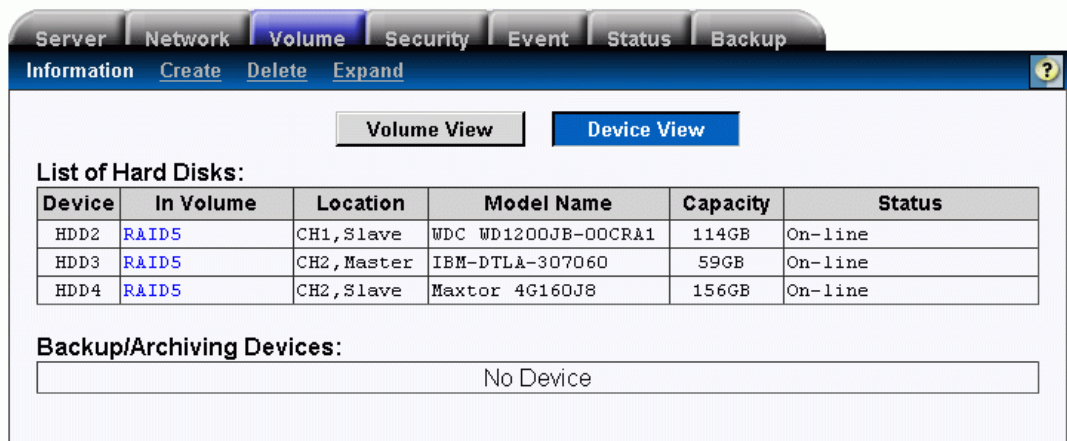


The screenshot shows the RAID configuration interface with the 'Volume' tab selected. The 'Volume View' button is active. The 'List of Volumes' table shows a single RAID5 volume with a status of 'Ready'.

Volume Name	Members	RAID Type	Free Space	Total Space	Status
RAID5	HDD2,3,4	RAID 5	117GB (100%)	117GB	Ready

Hot-spare Disks: No Device

Free Disks: No Device

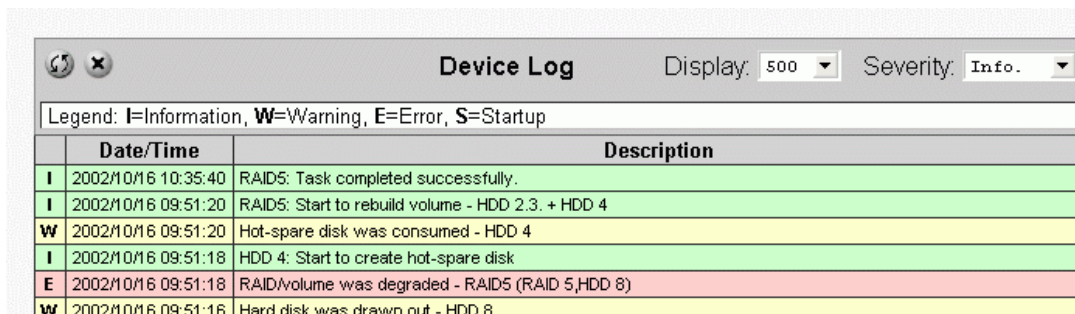


The screenshot shows the RAID configuration interface with the 'Device View' button active. The 'List of Hard Disks' table shows three disks: HDD2 (114GB), HDD3 (59GB), and HDD4 (156GB), all with a status of 'On-line'.

Device	In Volume	Location	Model Name	Capacity	Status
HDD2	RAID5	CH1, Slave	WDC WD1200JB-00CRA1	114GB	On-line
HDD3	RAID5	CH2, Master	IBM-DTLA-307060	59GB	On-line
HDD4	RAID5	CH2, Slave	Maxtor 4G160J8	156GB	On-line

Backup/Archiving Devices: No Device

The log will also appear the message "Task completed successfully".



The screenshot shows the 'Device Log' window with a legend and a list of log entries. The entry for 'RAID5: Task completed successfully' is highlighted in green.

Legend: I=Information, W=Warning, E=Error, S=Startup

	Date/Time	Description
I	2002/10/16 10:35:40	RAID5: Task completed successfully.
I	2002/10/16 09:51:20	RAID5: Start to rebuild volume - HDD 2,3. + HDD 4
W	2002/10/16 09:51:20	Hot-spare disk was consumed - HDD 4
I	2002/10/16 09:51:18	HDD 4: Start to create hot-spare disk
E	2002/10/16 09:51:18	RAID/volume was degraded - RAID5 (RAID 5,HDD 8)
W	2002/10/16 09:51:16	Hard disk was drawn out - HDD 8

6. Remove Hot-Spare Disks:

You can remove the hot-spare disk then the disk will be a free disk.

Configuration flow: **“Volume Manager–Delete”** → Select the check box of the hard disk you want to remove from the Hot-Spare Disks list, then click **“Delete”** →click **“OK”** in message windows.



The screenshot shows the Volume Manager interface. The top navigation bar includes 'Eng.Sample' and 'Admin Home | User Home | Help |'. The main menu has 'Server', 'Network', 'Volume', 'Security', 'Event', 'Status', and 'Backup'. The 'Volume' sub-menu is active, showing 'Information', 'Create', 'Delete', and 'Expand'. Below the menu is a 'List of Volumes:' table with one entry: RAID5 (Members: HDD2,3,8; RAID Type: RAID 5; Free Space: 117GB (100%); Total Space: 117GB; Status: Ready). Below this is the 'Remove Hot-spare Disks:' table with one entry: HDD4 (Location: CH2, Slave; Mode: UDMA 5; Model Name: Maxtor 4G160J8; Capacity: 156 GB; Status: Off-line). The checkmark in the first column of the 'Remove Hot-spare Disks:' table is circled in red. A 'Delete' button is located below the table.

Volume Name	Members	RAID Type	Free Space	Total Space	Status
<input type="checkbox"/> RAID5	HDD2,3,8	RAID 5	117GB (100%)	117GB	Ready

Device	Location	Mode	Model Name	Capacity	Status
<input checked="" type="checkbox"/> HDD4	CH2, Slave	UDMA 5	Maxtor 4G160J8	156 GB	Off-line

Eng.Sample | Admin Home | User Home | Help

Server | Network | **Volume** | Security | Event | Status | Backup

Information | Create | Delete | Expand

Volume View | Device View

List of Volumes:

Volume Name	Members	RAID Type	Free Space	Total Space	Status
RAID5	HDD2,3,8	RAID 5	117GB (100%)	117GB	Ready

Hot-spare Disks:

No Device

Free Disks:

Device	Location	Mode	Model Name	Capacity	Status
HDD4	CH2,S.Dave	UDMA 5	Maxtor 4G160J8	156GB	No-init

You can check the log; there will appear “Spare disk was deleted successfully” message.

Device Log | Display: 50 | Severity: Info.

Legend: I=Information, W=Warning, E=Error, S=Startup

Date/Time	Description
2002/08/27 15:10:12	Spare disk was deleted successfully - HDD 4