

# Configuring RAID devices

This chapter describes how to configure SAS and SATA RAID devices, and includes these topics:

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## Topics

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For additional information about configuring RAIDs, see [http://www.hp.com/support/RAID\\_FAQs](http://www.hp.com/support/RAID_FAQs). For information about preparing the workstation for RAID configuration, see [http://www.hp.com/support/workstation\\_manuals](http://www.hp.com/support/workstation_manuals).

## Maximum hard drive configurations

This section lists the maximum number of hard drives supported on HP workstations for RAID configurations.

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 **NOTE:** This section applies to internal workstation configurations that do not use add-in cards and JBODs.

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 **TIP:** Use the table values to determine workstation-specific maximum number of hard drives as discussed the sections below.

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**Table 1** Maximum hard drives

| Workstation | SATA hard drive | SATA SFF*<br>hard drive | SAS hard drive |
|-------------|-----------------|-------------------------|----------------|
| Z800        | 5               | 6                       | 5              |
| Z600        | 3               | 4                       | 3              |
| Z400        | 4               | 4                       | 4              |

\* Small form factor hard drive

# Configuring SATA RAID devices

This section describes how to use the Intel Matrix Storage Manager option ROM Configuration utility to set up and manage SATA RAID volumes.

The following SATA RAID configurations are supported on this workstation:

- Up to the workstation-specific maximum number of internal SATA hard disk drives and eSATA drives (if you use an optional eSATA bulkhead cable)
- Intel Matrix Storage Manager (IMSM) for Windows

If only a single HDD is attached, the Intel Matrix Storage Manager option ROM does not execute. Associated messages are not displayed.

The Intel SATA AHCI BIOS executes when you select **RAID+AHCI** for the SATA emulation mode. This BIOS is only used to support serial-attached optical drives.

This section does not apply to configuring SATA RAID in the Linux environment. For Linux SATA RAID, refer to the Software RAID in Linux Workstations section in the *HP Workstations for Linux User Guide* at <http://bizsupport1.austin.hp.com/bc/docs/support/SupportManual/c00063015/c00063015.pdf>.

## Attaching SATA HDDs

Attach the required minimum number of SATA hard drives for the desired RAID level:

- RAID 0: two or more hard drives
- RAID 1: only two hard drives
- RAID 5: three or more hard drives
- RAID 10: only four hard drives

## Configuring system BIOS

Configure the system BIOS to enable embedded SATA RAID functionality.

1. To enter the system BIOS setup, press **F10**.
2. Use the arrow keys to highlight the desired language, and then press **Enter**.
3. Use the arrows to highlight **Storage>Storage Options**, and then press **Enter**.
4. Use the up or down arrow key to highlight **SATA Emulation**.
5. Use the left or right arrow key to select **RAID+AHCI**.
6. To accept the new setting, press **F10**.
7. Use the arrows to highlight **Advanced>Power-On Options**, and then press **Enter**.
8. Use the up or down arrow key to highlight **POST Messages**.
9. Use the left or right arrow key to select **Enable**.
10. To accept the new setting, press **F10**.
11. Use the arrow keys to highlight **Advanced>Device Options**, and then press **Enter**.
12. Use the up or down arrow key to highlight **SATA RAID Option ROM Download**, and then press **Enter**.
13. Use the left or right arrow key to select **Enable**.
14. To accept the new setting, press **F10**.
15. Use the arrows to highlight **File>Save Changes and Exit**, and then press **Enter**.
16. Press **F10** when prompted.

## Creating RAID volumes

To create RAID volumes, use the Intel Matrix Storage Manager option ROM Configuration utility.

1. To enter the Intel Matrix Storage Manager option ROM Configuration utility, press **Ctrl+I** when prompted
2. If required, refer the workstation *Maintenance and Service Guide* to make available enough physical drives to create the RAID volume.
3. Use the up or down arrow key to highlight **1. Create RAID Volume**, and then press **Enter**.
4. Type the desired RAID volume name in the Name: field, and then press **Tab**.
5. Use the up or down arrow key to select the RAID level in the RAID Level: field, and then press **Tab**.
6. To display the Select dialog, press **Enter**.
7. Use the up and down arrow keys and Space to mark individual physical as members of the volume.
8. To exit the Select dialog and return to the Create Volume Menu dialog, press **Enter**.
9. If appropriate, use the up or down arrow key to select the Strip Size in the Strip Size: field, and then press **Tab**.
10. Enter the desired volume size in the Capacity: field, and then press **Tab**.
11. Press **Enter** to initiate volume creation.
12. When prompted, press **Y** to acknowledge the warning message and create the volume.
13. Return to step 3 to create additional RAID volumes, or use the up or down arrow key to highlight **4. Exit**, and then press **Enter**.
14. Press **Y** when prompted to confirm the exit.

# Configuring SAS RAID devices

## Supported configurations

The following RAID configurations are supported on this workstation:

 **NOTE:** This section does not apply to configuring SAS RAID in the Linux environment. For Linux SAS RAID information, including supported configurations, refer to *Installing and Configuring SAS Hardware RAID on HP Linux Workstations* at [http://www.hp.com/support/xw8600\\_manuals](http://www.hp.com/support/xw8600_manuals).

- Up to the workstation-specific maximum number of internal SAS hard disk drives
- LSI MegaRAID Storage Manager (MSM) for Windows

The following RAID configurations are supported on this workstation:

- RAID 0 – Striped disk array (IS)
  - Two drive minimum
  - Improved I/O performance
  - No fault tolerance
- RAID 1 — Mirrored disk array (IM)
  - Two drives
  - 100% redundancy
  - Can recover from single drive failure
  - Improved read performance
- RAID 1E — Striped and Mirrored disk array (IME)
  - Functionality is similar to RAID10
  - Three drives minimum
  - Can be an odd number of drives
  - Can always recover from a single drive failure and, in some cases, can recover from two drive failures

## SAS RAID 0 configuration

Use the following procedure to configure an Integrated Striped (IS) volume with the BIOS-based configuration utility. The procedure assumes that the system has the required disk and disk controllers.

1. Start the LSI Corporation Configuration Utility. During BIOS start up, you are prompted to **Press Ctrl-C to start LSI Corp. Configuration Utility**.
2. On the Main menu of the BIOS-based configuration utility, use the arrow keys to select an adapter.
3. Press **Enter** to go to the Adapter Properties screen.
4. On the Adapter Properties screen, use the arrow keys to select **RAID Properties**, and press **Enter** to go to the New Array Type screen.
5. In the Select New Array Type screen, use the arrow keys to select **Create IS Volume**. Press **Enter** to go to the Create New Array screen.
6. In the Create New Array screen, use the arrow keys to select the first disk for the IS volume. Then use the arrow keys to move to the RAID Disk column for this disk, and press Space and **+** or **-** to select **Yes** as the value for this column.

If partitions are defined on the selected disk, a message appears warning you that data on the disk will be lost when the striped volume is created.

7. Press **M** to migrate, or **D** to delete the data on the drive.
8. To select additional drives for the striped volume, up to the workstation-specific maximum number, repeat the previous steps.
9. When all drives are selected, press **C** to create the array once. Use the arrow keys to move to **Save changes then exit this menu** and press **Enter**.
10. When the new array is created, the Adapter Properties screen appears. Press **Esc** twice and select **Exit**.

## SAS RAID 1 configuration

Use the following procedure to configure an Integrated Mirroring (IM) volume with the BIOS-based configuration utility. The procedure assumes that the system has the required drives and drive controllers.

1. Start the LSI Corporation Configuration Utility. During BIOS start up, you are prompted to **Press Ctrl-C to start LSI Corp. Configuration Utility**.
2. On the Main menu of the BIOS-based configuration utility, use the arrow keys to select an adapter.
3. Press **Enter** to go to the Adapter Properties screen.
4. On the Adapter Properties screen, use the arrow keys to select **RAID Properties**, and press **Enter** to go to the New Array Type screen.
5. In the Select New Array Type screen, use the arrow keys to select **Create IM Volume**. Press **Enter**.
6. To configure a two-disk mirrored volume with an optional hot spare disk:
  - a. In the Create New Array screen, use the arrow keys to select the primary disk for the IM volume (the disk with the data you want to mirror.)
  - b. Use the arrow keys to move to the RAID Disk column for this disk and press Space to select **Yes** as the value.

If partitions are defined on the selected disk, a message appears warning you that data on the disk will be lost when the mirrored volume is created.
  - c. Press **M** to migrate or **D** to delete the data on the drive.
  - d. The value in the Array Disk column changes to Primary.

Use the arrow keys to select the secondary (mirrored) disk for the IM volume, and then select **Yes** as the value for the Array Disk column.

If partitions are defined on this disk, a message warns that data on the disk will be lost when the mirrored volume is created.
  - e. Press **Delete** to confirm erasing data from the disk, or press any other key to deselect the disk.
7. When all drives are selected, press **C** to create the array once. Use the arrow keys to move to **Save changes then exit this menu** and press **Enter**.
8. When the new array is created, the Adapter Properties screen appears. Press **Esc** twice and select **Exit**.

## SAS RAID 1E configuration

Use the following procedure to configure an Integrated Mirroring Extended (IME) volume with the BIOS-based configuration utility. The procedure assumes that the system has the required disk and disk controllers.

1. Start the LSI Corporation Configuration Utility. During BIOS start up, you are prompted to **Press Ctrl-C to start LSI Corp. Configuration Utility**.
2. On the Main menu of the BIOS-based configuration utility, use the arrow keys to select an adapter.
3. Press **Enter** to go to the Adapter Properties screen.
4. On the Adapter Properties screen, use the arrow keys to select **RAID Properties**, and press **Enter** to go to the New Array Type screen.
5. In the Select New Array Type screen, use the arrow keys to select **Create IME Volume**. Press **Enter**.
6. To configure a mirrored volume or an optional hot spare drive with up to the workstation-specific maximum number of drives:
  - a. In the Create New Array screen, use the arrow keys to select the first disk for the IME volume.
  - b. Use the arrow keys to move to the RAID Disk column for this disk, and then use the **+** or **-** keys to select **Yes** as the value.

If partitions are defined on the selected disk, a message appears warning that the data on the disk will be lost when the mirrored volume is created.
  - c. Press **M** to migrate, or **D** to delete the data on the drive.
  - d. Use the arrow keys to select the next disk for the IME volume, and then select **Yes** as the value for the Array Disk column.

If partitions are defined on this disk, a message warns you that data on the disk will be lost when the mirrored volume is created.
  - e. Press **Delete** to confirm erasing data from the disk, or press any other key to deselect the disk.
  - f. Repeat the previous steps to select up to the workstation-specific maximum number of drives for the IME volume, including configuration of a hot spare.
7. When all drives are selected, press **C** to create the array once. Use the arrow keys to move to **Save changes then exit this menu** and press **Enter**.
8. When the new array is created, the Adapter Properties screen appears. Press **Esc** twice and select **Exit**.

## Deleting RAID volumes

Use the LSI Logic Corporation Configuration Utility to delete SAS RAID volumes.

1. Start the LSI Corporation Configuration Utility. During BIOS start up, you are prompted to **Press Ctrl-C to start LSI Corp. Configuration Utility**.
2. On the Main menu of the BIOS-based configuration utility, use the arrow keys to select an adapter.
3. Press [Enter](#) to go to the Adapter Properties screen.
4. In the Select New Array Type screen, use the arrow keys to select **New Existing Array**.
5. In the View Array screen, use the arrow keys to select **Manage Array**. Press [Enter](#).
6. In the Manage Array screen, use the arrow keys to select **Delete Array**. Press [Enter](#).  
Press [Y](#) to delete the array and exit to the adapter properties screen.