Configuring two ServeRAID controllers in a failover environment (Windows NT 4.0 Only)

You can now configure two ServeRAID 3 controllers or two ServeRAID 2 controllers in a failover environment when using Windows NT 4.0. The latest version of the ServeRAID 3 and ServeRAID 2 device drivers includes *fault tolerant* technology. With fault tolerance, you can pair two controllers and connect them to the same enclosure in order to provide access to the disk, even after a controller fails.

Hardware requirements

To perform fault tolerance, you must use only matched pairs of ServeRAID adapters. You can use the following pairs for fault tolerance:

- Two ServeRAID 3H

- Two ServeRAID 3L

- Two ServeRAID 2

Note: If your server has a ServeRAID controller built-in on the system board, you cannot use the built-in controller in the fault-tolerant pair.

You can use the ServeRAID adapters in the IBM Netfinity Server 5500, 5500 M10, 5500 M20, or 7000 M10.

In order to perform fault tolerance with ServeRAID controllers, you must use one of the following enclosures:

- IBM PC Server Enterprise Expansion Enclosure (3518), using IBM SCSI-2 Fast/Wide Enhanced Repeater Adapter

- IBM Netfinity Rack Drawer Enclosure (3519), using IBM SCSI-2 Fast/ Wide Enhanced Repeater Adapter

- IBM Netfinity EXP10 Rack Storage Enclosure, using Netfinity EXP10 3m External Auto-Sensing Cable

- IBM Netfinity EXP15 Rack Enclosure.

Installation guidelines, considerations, and restrictions

In order to perform fault tolerance with ServeRAID, you must adhere to the following guidelines and restrictions.

- A fault-tolerant pair cannot be part of a Microsoft Cluster Server shared cluster.

- The controller must be configured as write-through.

  Note: If you have the battery backup option, it will be disabled when you create a fault-tolerant pair. The write-cache mode will automatically be changed from write-back mode to write-through mode.

- The controllers must be configured in an active-passive mode, where all logical drives are defined on only one adapter of the pair.

  Note: If both controllers have logical drives configured, the controllers will not be configured as a fault-tolerant pair.

- Do not create hot-spare drives when creating a fault-tolerant pair. Hot-Spare drives are not supported in a failover environment except within a logical drive with a RAID-level 5E.

  Note: The hot-spare drive in a RAID-level 5E logical drive is created by the system and integrated into the array when the RAID level is set to 5E during the configuration process.

- A fault-tolerant pair must not contain any Ready hard disk drives. All hard disk drives must be configured in arrays.

- You cannot increase the free space in arrays or expand the size of a logical drive in a fault-tolerant pair.

- All logical drives must have unique shared merge-group numbers.

- Only the active controller in a fault-tolerant pair appears in the NT Administration and Monitoring utility and in the ServeRAID Manager.

- When using multiple fault-tolerant pairs in a system, each set of controllers must have a unique set of controller host IDs and cluster partner IDs.

- You cannot hot-add a backup controller to a system.

- You cannot disable an on-board ServeRAID controller, even if the controller is not used.

Configuring the controllers in a failover environment

To configure the controllers, do the following:

1. Insert the *IBM ServeRAID Configuration CD* (or the configuration CD that came with your server) into the CD-ROM drive; then turn on the server.

   The ServeRAID Configuration Program should open in either the Configuration Mode or the Information Mode. If the program opens in the Information Mode, a screen similar to the following appears. Continue to step 2 on page 3.
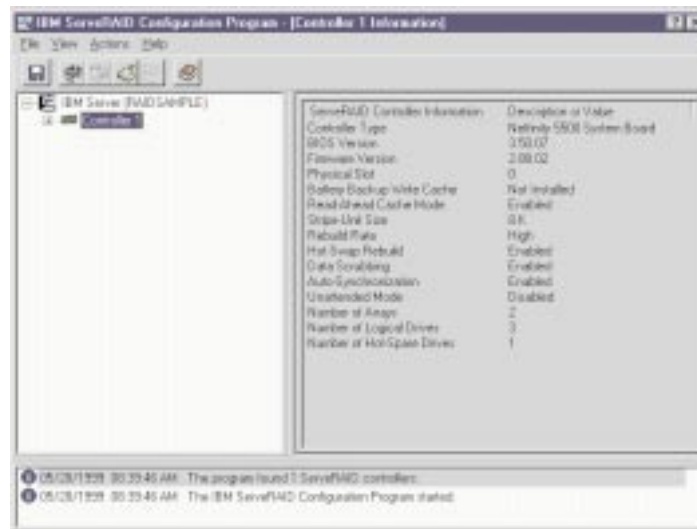

Figure 1. Information Mode Screen

   If the program opens in the Configuration Mode, a screen similar to the following appears.

   Click on **Cancel** to go to the Information Mode Screen and then continue to step 2 on page 3.
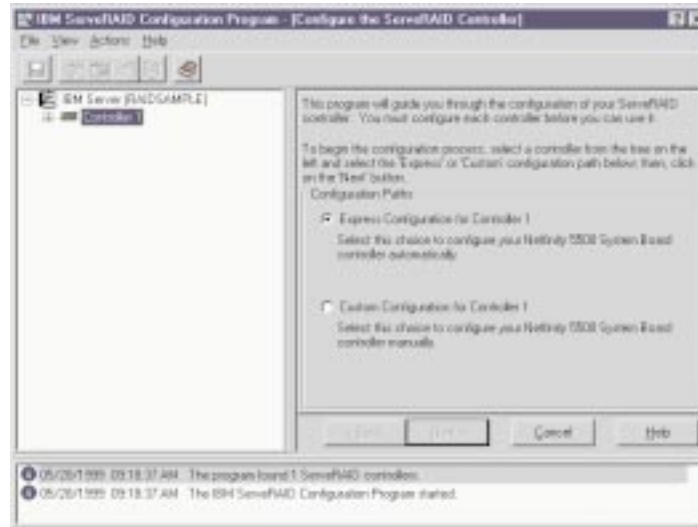
Figure 2. Configuration Mode Screen

> **Important**
>
> The ServeRAID controller should be initialized only one time, when the controller is first installed. Initializing the controller removes all configuration information from NVRAM. This information includes the SCSI IDs, the Controller Host ID and the Cluster Partner Host ID, and the array information. This point is especially important if the Windows NT system startup drive is attached to the IBM ServeRAID controller. If the initialization occurs after the startup drive array has been created, the array information will be removed and the server will no longer start in Windows NT.

2. Using the right mouse button, click on the first ServeRAID controller in the main tree that you are configuring; a pop-up list appears.

3. Click on **Restore to Factory Defaults**.

4. When the initialization is complete, a message appears at the bottom of the screen saying that the initialization was successful.

5. Using the right mouse button, click on the second ServeRAID controller in the main tree that you are configuring and a pop-up list appears.

6. Click on **Restore to Factory Defaults**.

7. When complete, a message appears at the bottom of the screen saying that the initialization was successful.

Configuring the controllers for failover

To configure the controllers for failover, do the following:

1. Using the right mouse button, click on the first ServeRAID controller in the main tree that you are configuring and the pop-up list appears.

2. Click on **Configure for Clustering**.

3. A window appears. Fill in the following information:

    Note: The name of the Controller Host ID and the Cluster Partner Host ID are case sensitive.

    • Controller Host ID - Enter a name to identify the first controller, for example, Name_1.

- Cluster Partner Host ID - Enter a name that you will use to identify the second controller, for example, Name_2.
- Initiator Identifiers (Channels) - The system presets these to seven (7).

4. Click **OK**.

5. Using the right mouse button, click on the second ServeRAID controller in the main tree that you are configuring and the pop-up list appears.

6. Click on **Configure for Clustering**.

7. A window appears. Fill in the following information:

- Controller Host ID - Enter the name you chose in step 3 on page 3 to identify the second controller. This is the same name as the Cluster Partner Host ID you set up for the first controller, in this case, Name_2.
- Cluster Partner Host ID - Enter the name you chose in step 3 on page 3 to identify the first controller. This is the same name as the Controller Host ID you set up for the first controller, in this case, Name_1.
- Initiator Identifiers (Channels) - The system presets these to seven (7). Change the values to six (6).
- Record all Controller Host IDs and Cluster Partner Host IDs that you have chosen in a safe place for future reference. You will need this information to recover the configuration if the ServeRAID 3 controller should fail.

8. Click **OK**.

   Note: Disregard the instructions to remove the *IBM ServeRAID Configuration CD* (or the configuration CD that came with your server) from the CD-ROM drive; do not remove the CD-ROM.

9. Exit the Configuration Program by either clicking on the box with the "X" in the upper right corner, or by clicking on **File**, and then **Exit**.

10. Shutdown the server.

Connecting the expansion enclosures

After you configure the controllers, you must connect the expansion enclosures to the ServeRAID controllers.

1. Connect the expansion enclosure to each of the ServeRAID controllers.

   Important

   When connecting the cables, you must connect the same channel connectors on both ServeRAID controllers to the same expansion enclosure. For example, if you connect the cable from Channel 1 on the first ServeRAID controller to the first expansion enclosure, then you must connect the cable from Channel 1 on the second ServeRAID controller to the first expansion enclosure.

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2. Restart the server with the Configuration CD still in the CD-ROM drive.

Configuring logical drives

Note: You can create only one logical drive per array in a failover environment.

To configure a logical drive, do the following:

1. Using the right mouse button, click on the ServeRAID controller that you want to configure in the main tree and a pop-up window appears.

2. Click on **Configure the ServeRAID Controller**.

3. Click on the **Custom Configuration** radio button.

4. Click on the **Next** button.

   Note: You must have two or more drives for RAID level 1 within the same array. You must have three or more drives for RAID level 5 within the same array. You must have four or more drives for RAID level 5E within the same array.

5. Define your logical drives by doing one of the following:

   • Using the right mouse button, click on the drive or SCSI Channel icons in the main tree to select the drives that you want to add to your arrays or delete from your arrays; then, select a choice from the pop-up list.

       or

   • Drag the drive or SCSI Channel icon from the main tree and drop it on the Array icon in the Main Panel on the right. If you change your mind, you can drag the icons back to the main tree to remove them from the configuration.

   Note: You must use all the Ready drives when creating your arrays (that is, all Ready drives in the main tree must be Online).

6. After you select the Ready drives for your arrays, click on the **Next** button.

   If you change your mind, you can remove a specific drive from a newly defined array or delete an entire newly defined array. To do this:

   a. Click on the **Back** button.

   b. Using the right mouse button, click on the specific drive or Array icon in the Main Panel on the right.

   c. Select **Remove from New Array** or **Delete New Array**.

   Note: Hot-Spare drives are not supported in a failover environment except within a logical drive with a RAID-level 5E. The hot-spare drive in a RAID-level 5E logical drive is created by the system and integrated into the array when the RAID level is set to 5E during the configuration process.

7. Select a RAID level for each of the logical drives from the RAID pull-down menu in the Main Panel.

   Note: If you have four or more Ready drives in an array, the recommended RAID level is RAID-level 5E.

8. Create only one logical drive for each array.

   Notes:

   a. Typically, the first logical drive defined on the first ServeRAID controller found by system BIOS during startup will be your startup (boot) drive.

   b. You cannot increase the free space in arrays or or expand the size of a logical drive in a fault-tolerant pair.

9. If you have created multiple arrays in step 5, click on another array in the Main Tree and go back to step 7 to configure it. After configuring all of your arrays, continue with step 10.

10. Click on the **Next** button.

11. Review the information that appears on the Configuration Summary screen.

    Note: To change the configuration, click on **Modify**.

12. Click on **Apply** to accept and save the configuration.

Setting Merge Group Numbers

Note: The ServeRAID Configuration Program will open in either the the configuration mode screen (Figure 1 on page 2) or the Information Mode Screen (Figure 2 on page 3). If it opens in the Information Mode screen, go to step 2 on page 6. If it opens in the Configuration Mode Screen, first click **Cancel** to get to the Information Mode Screen, then repeat step 1 on page 6. Then, go to step 2 on page 6.

After creating the logical drives, you must assign a Merge Group Numbers to the shared drives. To set the Merge Group Numbers, do the following:

1. Using the right mouse button, click on the ServeRAID controller in the main tree that contains the logical drives and a pop-up list appears.

2. Click on **Configure for Clustering**.

   The clustering information window appears.

3. Click on the **Shared** check boxes for all logical drives.

4. Click on **Ok**.

5. Exit the Configuration Program either by clicking on the box with the "X" in the upper right corner, or by clicking on **File**, and then **Exit**.

6. Shut down the server and remove the *IBM ServeRAID Configuration CD* (or the configuration CD that came with your server) from the CD-ROM drive.

7. Restart the server to make the new configuration become active.

To complete the installation of the failover environment, do the following:

1. Install the ServeRAID device drivers for Windows NT. Refer to the ServeRAID User's Guide.

2. Install Windows NT. Refer to the documentation that came with the Windows NT program.

   Note: Allow the auto-synchronization program to finish before testing your failover environment. Refer to the ServeRAID User's Guide for instructions on how to check the progress of the synchronization.

3. Install the ServeRAID Fault-Tolerant Control Panel Applet. Refer to the ServeRAID User's Guide.

   Note: You must install the ServeRAID Fault-Tolerant Control Panel Applet to verify your failover setup.

For troubleshooting in a failover-environment, refer to the ServeRAID User's Guide.