

Intel[®] RAID SSD Cache Controller RCS25ZB040/RCS25ZB040LX Quick Installation Guide

Intel Order Number: G78583-002

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Preface

This is the primary hardware guide for the Intel® RAID SSD Cache Controller RCS25ZB040/RCS25ZB040LX. It contains installation instructions and specifications.

Audience

The people who benefit from this document are:

- Engineers who are designing an Intel® RAID Controller.
- Anyone installing an Intel® RAID Controller.

Organization

This document includes the following chapters and appendices:

- Chapter 1 provides a general overview of the Intel® RAID SSD Cache Controller RCS25ZB040/RCS25ZB040LX.
- Chapter 2 describes the procedures for installing the Intel® RAID SSD Cache Controller RCS25ZB040/RCS25ZB040LX.
- Chapter 3 provides the procedures for configuring the Intel® RAID SSD Cache Controller RCS25ZB040/RCS25ZB040LX.
- Chapter 4 provides the characteristics and technical specifications for the Intel® RAID SSD Cache Controller RCS25ZB040/RCS25ZB040LX.
- Appendix A provides safety instructions to be observed during installation and assembly.
- Appendix B provides regulatory and certification information.

Related Publication

This is the primary hardware guide for the Intel® RAID SSD Cache Controller RCS25ZB040/RCS25ZB040LX. It contains installation instructions and product specifications.

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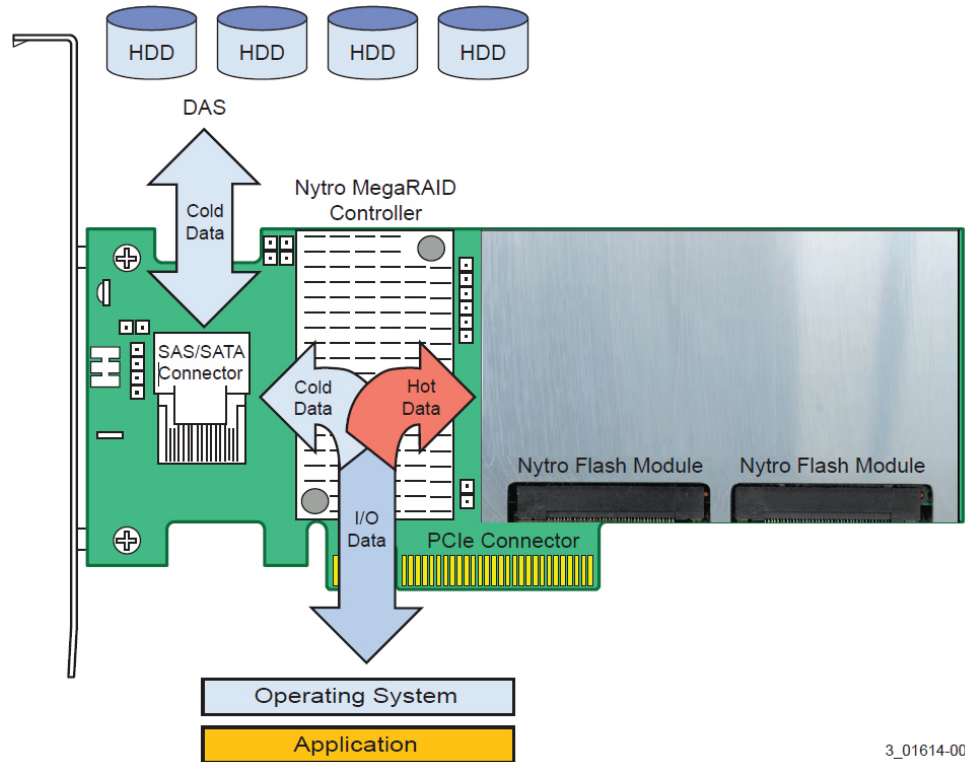
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1 Overview of Intel® RAID SSD Cache Controller RCS25ZB040/RCS25ZB040LX

The Intel® RAID SSD Cache Controller RCS25ZB040/RCS25ZB040LX is a combination of Intel® proven MegaRAID controller technology coupled with built-in Flash modules to be used as data cache devices with the help of Intel® SSD Cache 2.0 software. The Intel® RAID SSD Cache Controller RCS25ZB040/RCS25ZB040LX is a direct-attached storage (DAS) device designed to accelerate application storage performance by using intelligent caching through the Nytro Flash modules directly attached to the RAID controller. The Intel® RAID SSD Cache Controller RCS25ZB040/RCS25ZB040LX increases the storage performance up to 30x, but retains the current investment in DAS. Using intelligent caching algorithms to help identify application hot data, the frequently accessed data is stored and accessed from Flash, enabling the lowest possible latency.

The Intel® RAID SSD Cache Controller RCS25ZB040/RCS25ZB040LX combines Flash with HDD storage to provide application acceleration with economical storage. The Intel® RAID SSD Cache Controller RCS25ZB040/RCS25ZB040LX uses latest ROC technology, which is PCIe 3.0 compliant. The intelligent caching implementation can provide high performance when using SATA or SAS hard drives. The card provides a 4-lane mini-SAS connector for disk connection. In addition, caching lightens the HDD load so that HDD RAID rebuilds complete faster and removes traditional HDD head wear from accessing small block requests typical in database environments.



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Figure 1. Data Flow on a Intel® RAID SSD Cache Controller RCS25ZB040/RCS25ZB040LX

This guide describes the steps necessary to install and configure the Intel® RAID SSD Cache Controller RCS25ZB040/RCS25ZB040LX Application Acceleration Card and how to use the configuration utility to monitor and configure your card.

Note: Convention of usage of important terms:

Nytro Cache: This term refers to the on-board Flash module is used for user data cache, called Nytro Cache.

SSD: This term refers to external SSDs.

Configuring the Intel® RAID SSD Cache Controller RCS25ZB040/RCS25ZB040LX

You can use the Intel® RAID SSD Cache Controller RCS25ZB040/RCS25ZB040LX in the following scenarios:

- **Low-end, internal SATA configuration:**

In this configuration, use the RAID card as a high-end SATA, SATA II, or SATA III compatible card that directly-connects up to four drives or an internal expander. This configuration is mostly for low-end or entry servers. Enclosure management is provided through an out-of-band I²C bus.

- **Midrange internal SAS configuration:**

This configuration is like an internal SATA configuration, but with high-end SAS drives. This configuration is more suitable for low-range to midrange servers.

The following figure shows a direct-connect configuration. The Inter-IC (I²C) interface communicates with peripherals. The external memory bus provides a 32-bit memory bus, parity checking, and chip select signals for pipelined synchronous burst static random access memory (PSBRAM), non-volatile static random access memory (NVSRAM), and Flash ROM. The card can connect to an internal drive bay that uses an expander.

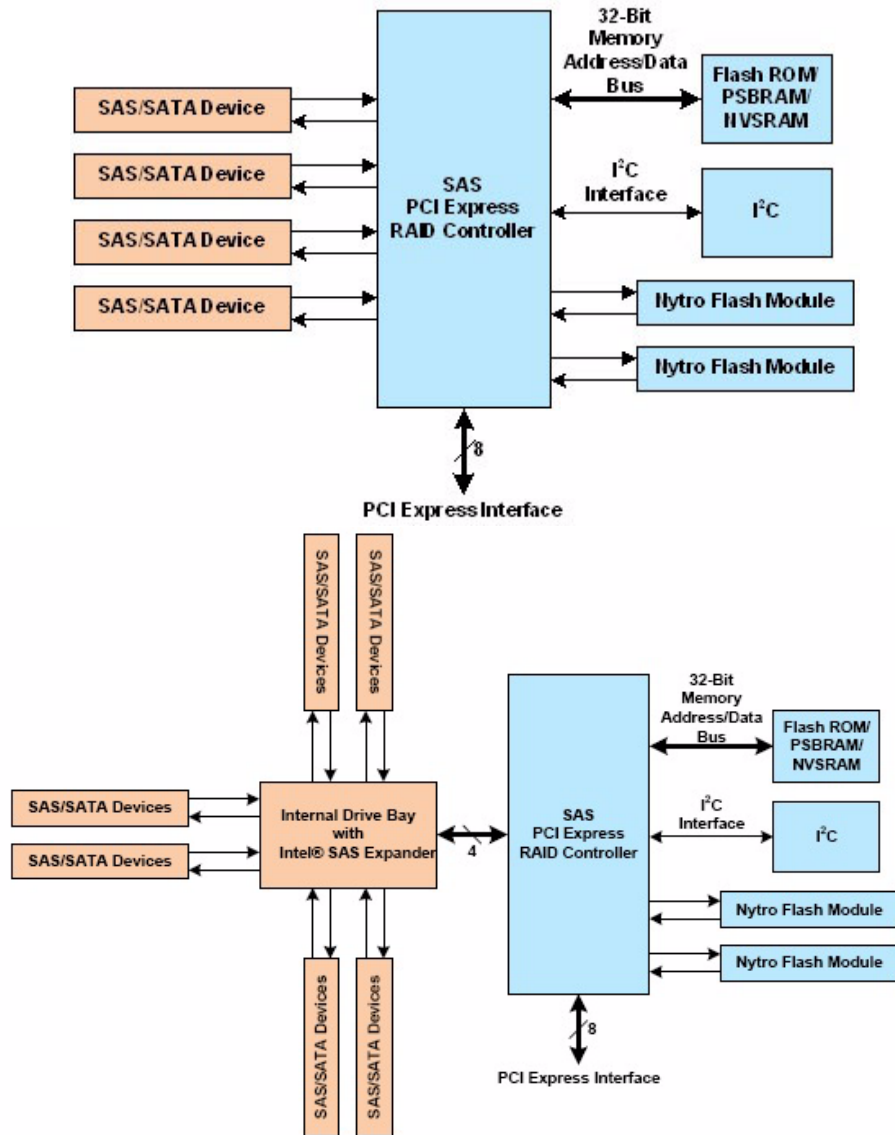


Figure 2. Example of an Intel® RAID SSD Cache Controller RCS25ZB040/RCS25ZB040LX with Direct-Connect Application

2 Hardware and Software Installation Overview

The following flowchart shows the steps necessary to configure your Intel® RAID SSD Cache Controller RCS25ZB040/RCS25ZB040LX and RAID system.

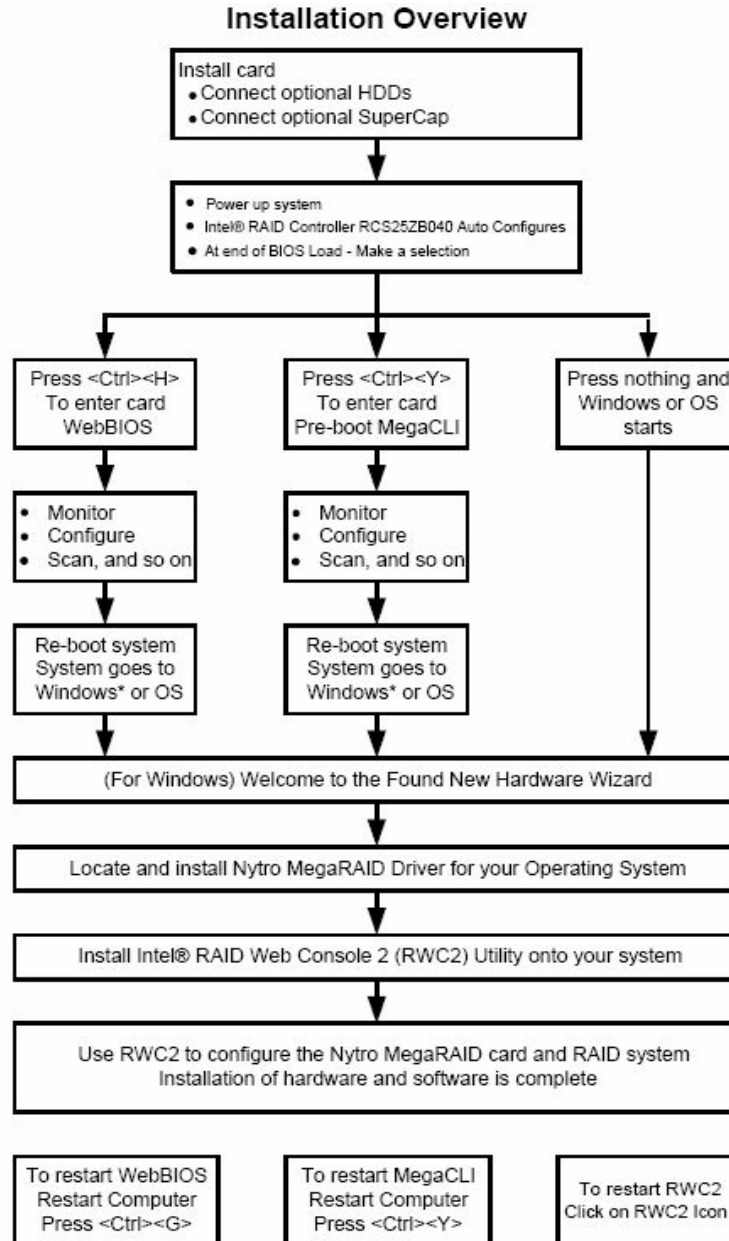


Figure 3. Installation Flowchart

3 Installing the Intel® RAID SSD Cache Controller RCS25ZB040/RCS25ZB040LX

Use the following steps to install your Intel® RAID SSD Cache Controller RCS25ZB040/RCS25ZB040LX. These steps are for experienced computer users or installers.

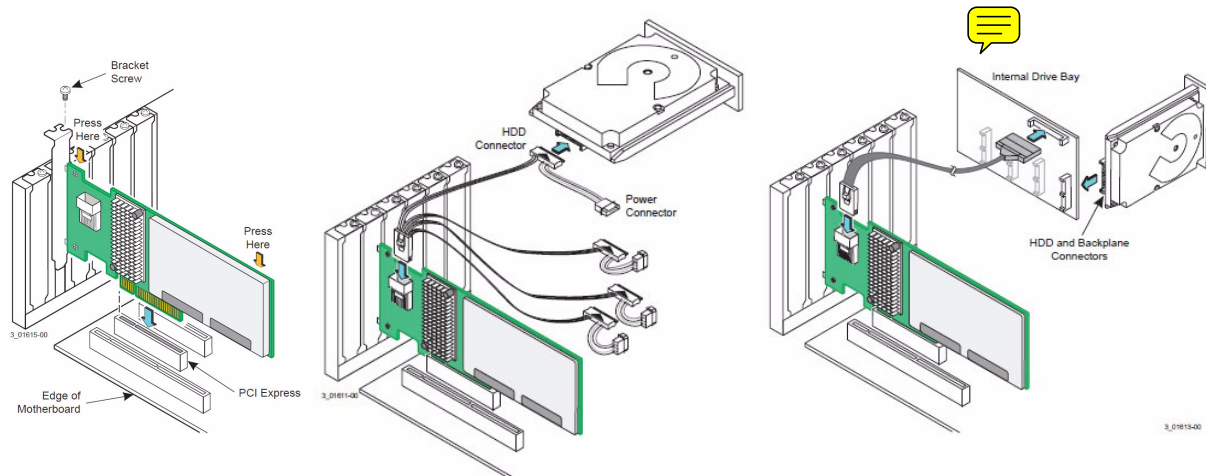
1. **Unpack the card and inspect it for damage.** Unpack the card in a static-free environment, and follow good antistatic grounding procedures. Remove the card from the antistatic bag, and carefully inspect the device for damage. If you notice any damage or if any component is missing, contact Intel® or your reseller support person.

Caution: *Back up your data before changing your system configuration.*

2. **Prepare the computer.** Turn off the power to the server, all drives, enclosures, and server components, and disconnect the AC power cord.
3. **Open the cabinet.** Follow the instructions in the server technical documentation.
4. If required, **replace the mounting bracket (server dependent)** and install light pipe in the Life (upper) position.
5. If required, **install optional SuperCap and external LED** before installing the card in the PCIe slot.
6. **Insert the Intel® RAID SSD Cache Controller RCS25ZB040/RCS25ZB040LX in an available PCIe slot.** Locate an empty PCIe slot that offers the maximum airflow. Remove the blank bracket panel on the server chassis that aligns with the empty PCIe slot. Save the bracket screw, if applicable.

Align the card to a PCIe slot. Press down gently, but firmly, to correctly seat the card in the slot. The following figure shows how to insert the card in a PCIe slot.

Caution: *The PCIe slot must meet the 300 linear feet per minute (LFPM) minimum airflow requirement but 500 LFPM is optimal for thermal performance.*



7. **Secure the card to the server's chassis.** Install the bracket screw, if applicable, or engage the server retention mechanism to secure the card to the server's chassis.
8. **Connect SAS or SATA devices to the Intel[®] RAID SSD Cache Controller RCS25ZB040/RCS25ZB040LX.** Make sure that the cable you use conforms to all specifications.
9. **Perform a safety check.** Make sure the cables and card are installed correctly, then close cabinet.
10. **Reconnect the AC power cord** to the server.
11. **Turn on the power to the server.** The server powers-up and auto configuration creates a Nytro Cache Virtual Drive Group 0, RAID 1, Write Back configuration.

Intel[®] RAID SSD Cache Controller RCS25ZB040/RCS25ZB040LX installation is complete.

4 Operating Systems Supported

The Intel® RAID SSD Cache Controller RCS25ZB040/RCS25ZB040LX supports the following operating systems:

- Microsoft Windows XP-SP2* (64-bit only), Windows Server 2003-SP2*, Windows Vista-SP2*, Windows Server 2008-SP2*, Windows 7-SP1*, and Windows Server 2008 R2-SP1*
- Linux* SLES10-SP4, Linux* SLES11 GA, and Linux* SLES11-SP1
- Linux* RHEL 5.6, Linux* RHEL 6.0, Linux* RHEL 6.1, and Linux* RHEL 6.2
- VMware* 4.0 ESX, VMware* 4.0 ESXi, VMware* 4.1 ESX, VMware* 4.1 ESXi, and VMware* 5.0 ESXi
- Solaris* 10U8, Solaris* 10U9, Solaris* 10U10, and Solaris* 11

See the *Nytro MegaRAID SAS Device Driver Installation User Guide* for more information about the drivers. To download the latest operating system drivers, go to: http://www.intel.com/p/en_US/support/server/.

The Intel® RAID SSD Cache Controller RCS25ZB040/RCS25ZB040LX uses Fusion-MPT architecture for all major operating systems, thinner drivers, and technical support.

For your operating system to communicate with your Nytro MegaRAID card, you need to install a driver that matches your OS. The drivers perform these functions:

- Support the PCI Express* protocol.
- Support multiple RAID storage adapters.
- Provide the ability to see newly configured logical drives in the configuration software utility without rebooting the system.
- Permit the random deletion of logical drives that were created by using Intel® RAID Web Console 2 (refer to the *Intel® RAID Software User's Guide* for more information).
- Support the use of the remaining array capacity by Intel® RAID Web Console 2.

5 Installing an Operating System Driver

Installing the Driver in Windows*

Perform the following steps to install the MegaSAS device driver in a Windows* system.

1. The server first starts up.
2. Intel® RAID SSD Cache Controller firmware gets initialized.
3. The system starts up OS. After successful log in, the OS finds new hardware, the install driver wizard appears,

'Welcome to the Found New Hardware Wizard'

if not, select **My Computer > Manage > Device Manager** to start the Hardware Wizard.

4. Follow the prompts to install the OS driver.
5. The system prompts you to restart the server.

Installing the Driver in a New Red Hat* Enterprise Linux* 4, 5, or 6 OS

You can install the MegaRAID device driver in a new system from the Red Hat* Enterprise Linux* CD, DVD, or from a driver update disk.

Installing from a CD or a DVD

Perform the following steps to install the MegaSAS device driver in a new Red Hat* Linux* OS from the Red Hat* Enterprise Linux* installation media:

1. Refer to your system documentation, if needed, and boot the server with the installation CD or DVD.
2. Follow the installation procedure for the Red Hat* OS. The driver is loaded automatically during install.

Installing from a Driver Update Diskette

Perform the following steps to install the MegaSAS device driver in a new Red Hat* Enterprise Linux* OS, create the driver update diskette using the Linux* driver image:

1. Boot the server with the installation CD or DVD. Refer to your system documentation, if needed.
2. Enter the following boot option to load the driver disk during installation: `linux dd`.
3. Press Enter to continue the install.
4. When prompted, insert the driver diskette. The utility locates and loads the driver for your controller.
5. Press Alt+Ctrl+F4 to verify that the driver is loaded.
6. Press Alt+Ctrl+F1 to return to the installation.
7. Follow the Red Hat* installation procedure to complete the installation.

Installing the Driver in a New SuSE Linux* Enterprise Server System

You can install the MegaRAID device driver in a new system from the SuSE SLES Linux* CD, DVD, or from a driver update diskette.

Installing from a CD or a DVD

Perform the following steps to install the driver in a new SuSE Linux* Enterprise Server system from the SuSE Linux* Enterprise Server installation CD or DVD:

1. Boot the server with the SuSE Linux* Enterprise Server SP CD or DVD. The system BIOS must support booting from a CD-ROM. BIOS settings might require changes to allow CD-ROM booting. Refer to your system documentation.
2. Follow the installation procedure for the SuSE OS. The driver is loaded automatically during installation.

Installing from a Driver Update Diskette

To install the MegaSAS device driver in a new SuSE Linux* Enterprise Server, create the driver update diskette by using the Linux* driver image. Perform the following steps to install the driver:

1. Refer to your system documentation, if needed, and boot the server with the installation CD or DVD.
2. At the installation message, perform one of these actions:
 - Press F5 for SuSE Linux* Enterprise Server 10.

- Press F6 for SuSE Linux* Enterprise Server 11.
- 3. Continue the installation procedure and, when prompted, insert the driver diskette. The utility locates and loads the driver for your controller.
- 4. Press Alt+Ctrl+F4 to verify that the driver is loaded.
- 5. Press Alt+Ctrl+F1 to return to the installation.
- 6. Follow the SuSE installation procedure to complete the installation.

Note: If you use Service Pack (SP) 1 or SP 2, you need to load the driver. If you use SP 3 RC 2, the MegaSAS driver is already on the SuSE SLES Linux* CD.

For details on these drivers and for other OS driver installation instructions see the *Intel® RAID Software User's Guide*.

Creating a RAID 1 Virtual Drive with WebBIOS Configuration Utility

These steps describe how to create the virtual drive used for an OS. You can add other virtual drives to the running OS after the OS has been installed. The Nytro MegaRAID pre-boot BIOS utility (WebBIOS) that creates the virtual disk for the OS is accessible during the power-on self-test (POST) part of boot-up.

Refer to the *Intel® RAID Software User's Guide, Chapter 8* for more information about the WebBIOS configuration utility (CU).

The following procedure describes the creation of a RAID 1 array. You can use other RAID levels, and the steps are the same except when selecting the RAID level. In RAID 1, the RAID controller duplicates all data from one drive to a second drive. RAID 1 provides complete data redundancy, but at the cost of doubling the required data storage capacity. It is appropriate for small databases or any other environment that requires fault tolerance but small capacity. Follow these steps to create the virtual disk in WebBIOS:

1. When the host computer is booting, hold down the Ctrl key and press the H key when the following text appears on the window:

```
Copyright© Intel Corporation Press <Ctrl><G> for WebBIOS
```

The **Controller Selection** window appears.

2. If the system has multiple SAS/SATA controllers, select a controller.
3. Click **Start**. The main **WebBIOS CU** window appears.
4. Click **Configuration Wizard**. The first **Configuration Wizard** window appears.
5. Click **New Configuration**.

Note: If you choose the first or second option, all of the existing data in the configuration is deleted. Make a backup copy of any data that you want to keep before you choose an option.

6. Click **Next**. A dialog warns that you will lose data if you click **Clear Configuration** or **New Configuration**. The **WebBIOS Configuration Method** window appears.
7. Select **Manual Configuration**. Manual configuration lets you control all attributes of the new storage configuration as you create drive groups and virtual drives, and set their parameters.
8. Click **Next**. The **Disk Group Definition** window appears. You use this window to select drives to create drive groups.
9. Hold down the Ctrl key while you select two ready drives in the Drives panel on the left. You must select an even number of drives.
10. Click **Add To Array** to move the drives to a proposed drive group configuration in the Disk Groups panel. If you need to undo the changes, click **Reclaim**.
11. Choose whether to use power save mode.
12. Choose whether to use drive encryption.

***Note:** A RAID 1 virtual drive can contain up to 16 drive groups and up to 32 drives in a single span. (Other factors, such as the type of controller, can limit the number of drives.) You must use two drives in each RAID 1 drive group in the span.*

13. When you have finished selecting drives for the drive group, click **Accept DG**.
14. Click **Next**. The **Virtual Drive Definition** window appears. You use this window to select the RAID level, stripe size, read policy, and other attributes for the new virtual drives.
15. Change the virtual drive options from the defaults listed on the window as needed. Here are brief explanations of the virtual drive options:
 - **RAID Level:** The drop-down menu lists the possible RAID levels for the virtual drive. Select **RAID 1**.
 - **Strip Size:** The strip size specifies the length of the data segments that the RAID controller writes across multiple drives, not including parity drives. For example, consider a stripe that contains 64 KB of drive space and has 16 KB of data residing on each drive in the stripe. In this case, the stripe size is 64 KB and the strip size is 16 KB. You can set the strip size to 8, 16, 32, 64, 128, 256, 512, or 1024 KB. A larger strip size produces higher read performance. If your computer regularly performs random read requests, choose a smaller stripe size. The default is 64 KB.
 - **Access Policy:** Select the type of data access that is allowed for this virtual drive.
 - RW:** Allow read/write access. This setting is the default.
 - Read Only:** Permit read-only access.
 - Blocked:** Do not permit access.
 - **Read Policy:** Specify the read policy for this virtual drive.
 - Normal:** Disable the read-ahead capability. This setting is the default.

- Ahead:** Enable read-ahead capability, which permits the controller to read sequentially ahead of requested data and to store the additional data in cache memory, anticipating that the data will be needed soon. This setting speeds up reads for sequential data, but little improvement exists when accessing random data.
- **Write Policy:** Specify the write policy for this virtual drive.
 - WBack:** In Writeback mode, the controller sends a data transfer completion signal to the host when the controller cache has received all of the data in a transaction. This setting is recommended in Standard mode.
 - WThru:** In Writethrough mode, the controller sends a data transfer completion signal to the host when the drive subsystem has received all of the data in a transaction. This setting is the default.
 - Write Back with BBU:** Select this mode if you want the controller to use Writeback mode, but the controller either has no battery backup unit (BBU) or the BBU is bad. If you do not choose this option, the controller firmware automatically switches to Writethrough mode if it detects a bad or missing BBU.
 - Note:** You can use Writeback mode with or without a battery. You should use either a battery to protect the controller cache or an uninterruptible power supply (UPS) to protect the entire system. If you do not use a battery or a UPS, and a power failure occurs, you risk losing the data in the controller cache. Although you can enable or disable the disk cache, you should disable it. If you enable the disk cache, the drive sends a data transfer completion signal to the controller when the drive cache has received all the data in a transaction. However, the data has not been actually transferred to the disk media, so you risk losing the data in the disk cache if a power failure occurs. The data is unrecoverable.*
 - **IO Policy:** The IO policy applies to reads on a specific virtual drive. It does not affect the read-ahead cache.
 - Direct:** Reads are not buffered in cache memory. Data is transferred to the cache and the host concurrently. If the same data block is read again, it comes from cache memory. This setting is the default.
 - Cached:** Reads are buffered in cache memory before they are sent to the host.
 - **Drive Policy:** Specify the drive cache policy.
 - Enable:** Enable the drive cache.
 - Disable:** Disable the drive cache.
 - NoChange:** Leave the current drive cache policy as is. This setting is the default.
 - **Disable BGI:** Specify the background initialization status.
 - No:** Leave background initialization enabled. A new configuration can be initialized in the background while you use WebBIOS to perform other configuration tasks. This setting is the default.
 - Yes:** Select **Yes** if you do not want to allow background initializations for configurations on this controller.
 - **Select Size:** Specify the size of the virtual drive or drives in MB, GB, or TB. Usually, this size would be the full size for RAID 1 shown in the Configuration

panel on the right. You may specify a smaller size if you want to create other virtual drives on the same drive group.

- **Update Size:** Click **Update Size** to update the Select size field value for the selected RAID levels.
16. Either click **Accept** to accept the changes to the virtual drive definition, or click **Reclaim** to return to the previous settings.
 17. Click **Next** when you are finished defining virtual drives. The **Configuration Preview** window appears.
 18. Check the information in the configuration preview.
 19. If the virtual drive configuration is acceptable, click **Accept** to save the configuration. Otherwise, click **Back** to return to the previous screens and change the configuration.
 20. If you accept the configuration, click **Yes** at the prompt to save the configuration and initialize the new virtual drive.
 21. After the initialization is complete (the elapsed time depends on the RAID level and the disk size), click the **Home** button and then click **Exit** in the left hand window frame.
 22. Select **Exit Application**, and reboot the computer with the Windows OS in the DVD drive or the CD drive.

6 Installing Intel® RAID Web Console 2 (RWC2)

This section explains how to install (or reinstall) the Intel® RAID Web Console 2 on your workstation or on your server for the supported operating systems: Microsoft Windows*.

To install the Intel® RAID Web Console 2 on Red Hat* Linux* (except RHEL 3/4), and SUSE Linux*, see the *Intel® RAID Software User's Guide*.

Hardware and Software Requirements

The hardware requirements for the Intel® RAID Web Console 2 are as follows:

- PC-compatible computer with an IA-32 (32-bit) Intel® Architecture processor or an EM64T (64-bit) processor.
- Minimum 256 MB of system memory (512 MB recommended).
- A hard drive with at least 400 MB available free space. The supported operating systems for the Intel® RAID Web Console 2 (RWC2) are as follows:
 - Microsoft Windows Server 2003*, Microsoft Windows Server 2008*, Microsoft Windows Server 2008 R2*, Microsoft Windows XP*, Microsoft Windows Vista*, and Microsoft Windows 7*.
 - Red Hat* Linux* 5.0, 5.8, and 6.0. The Intel® RAID Web Console 2 supports 64-bit environment from RHEL 6 onwards.
 - SUSE Linux*/SLES 9, 10, 11, and 11 SP2 with the latest updates and service packs.
 - VMware* ESX 4.0, 4.1, and 5.0.

Refer to your server documentation and to the operating system documentation for more information on hardware and operating system requirements.

Note: *The Intel® RAID Web Console 2 is supported in the Network Address Translation (NAT) environment also. If the server is installed in a remote machine and you want to connect to that server over a NAT environment, through a remote client, you can connect to the remote server by providing the NAT IP address.*

Note: *The Intel® RAID Web Console 2 uses the local IP address in the same subnet as the SMTP server to deliver e-mail notifications to the SMTP server.*

You can use the Intel® RAID Web Console 2 to remotely monitor the systems running the VMware* ESXi (3.5 and above) operating system.

Note: *StoreLib libraries need the capability to be installed with more than one version. All the storeLib libraries have been moved to a private location. Please do a clean un-installation and only then install the Intel® RAID Web Console 2 to avoid any conflicts.*

Installing Intel® RAID Web Console 2

To install the Intel® RAID Web Console 2 on a system running the Microsoft Windows Server 2003*, Microsoft Windows Server 2008*, Microsoft Server 2008 R2*, Microsoft Windows XP*, Microsoft Windows Vista*, or Microsoft Windows 7* operating system, perform the following steps:

1. Insert the Intel® RAID Web Console 2 installation CD in the CD-ROM drive. If necessary, find and double-click the `setup.exe` file to start the installation program.
2. In the **Welcome** screen that appears, click **Next**. If the Intel® RAID Web Console 2 is already installed on this system, then an upgraded installation occurs.
3. Read and accept the user license and click **Next**. The **Customer Information** window appears, as shown in the following figure.

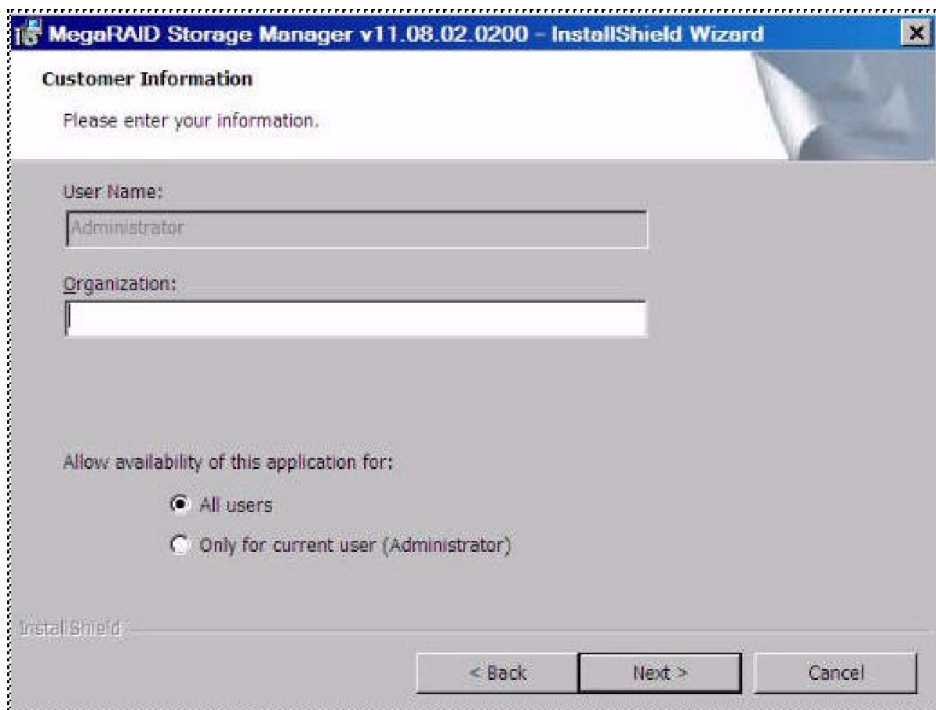


Figure 4. Customer Information Window

Note: *With the software update, the screen and content may be different in this guide.*

4. Enter your user name and organization name. In the bottom part of the screen, select an installation option:

- If you select the **All users** radio button, any user with administrative privileges can use this version of the MegaRAID Storage Manager software to view or change storage configurations.
 - If you select the **Only for current user** radio button, the MegaRAID Storage Manager software shortcuts and associated icons are available only to the user with this user name.
5. Click **Next** to continue.
 6. Accept the default destination folder, or click **Change** to select a different destination folder, as shown in the following figure.

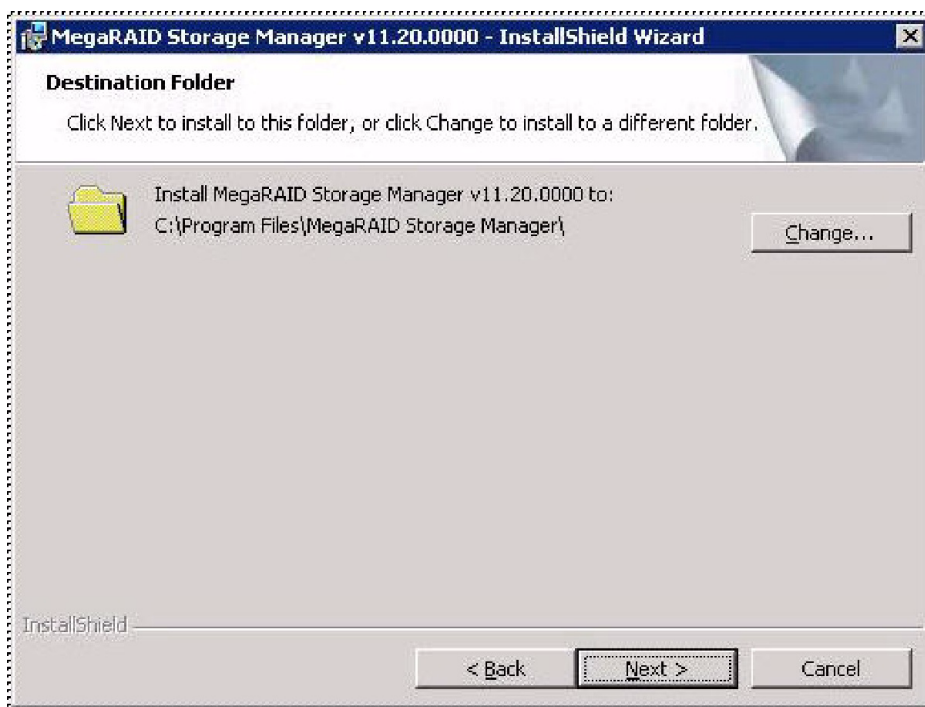


Figure 5. Destination Folder Window

7. Click **Next** to continue. The **Setup Type** window appears, as shown in the following figure.

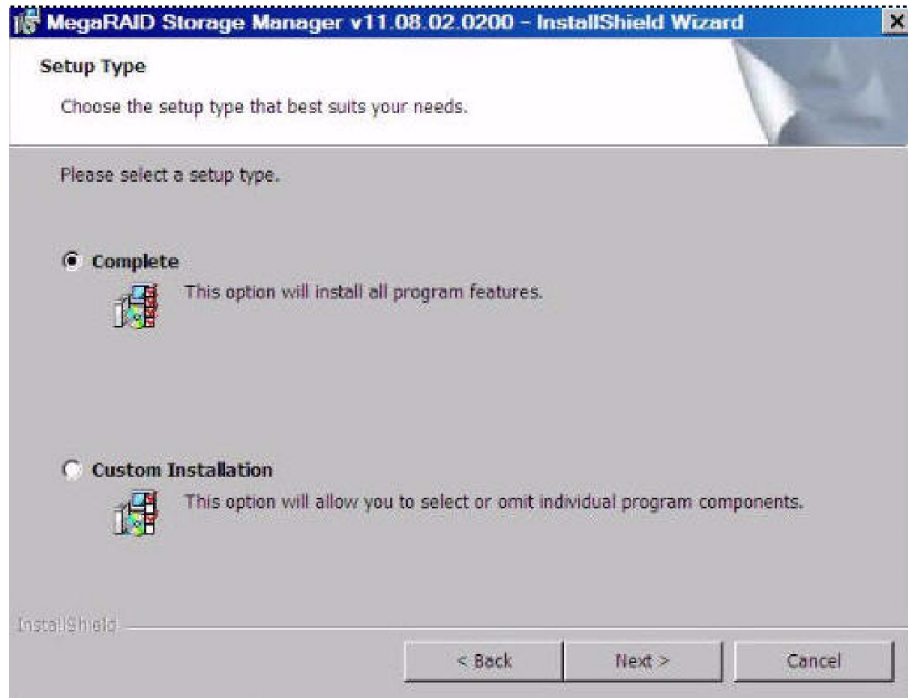


Figure 6. Setup Type Window

8. Select one of the setup options. The options are fully explained in the window text.
 - Select the **Complete** radio button if you are installing the Intel[®] RAID Web Console 2 on a server.
 - Select the **Custom Installation** radio button if you want to select individual program components.
9. Click **Next** to continue.

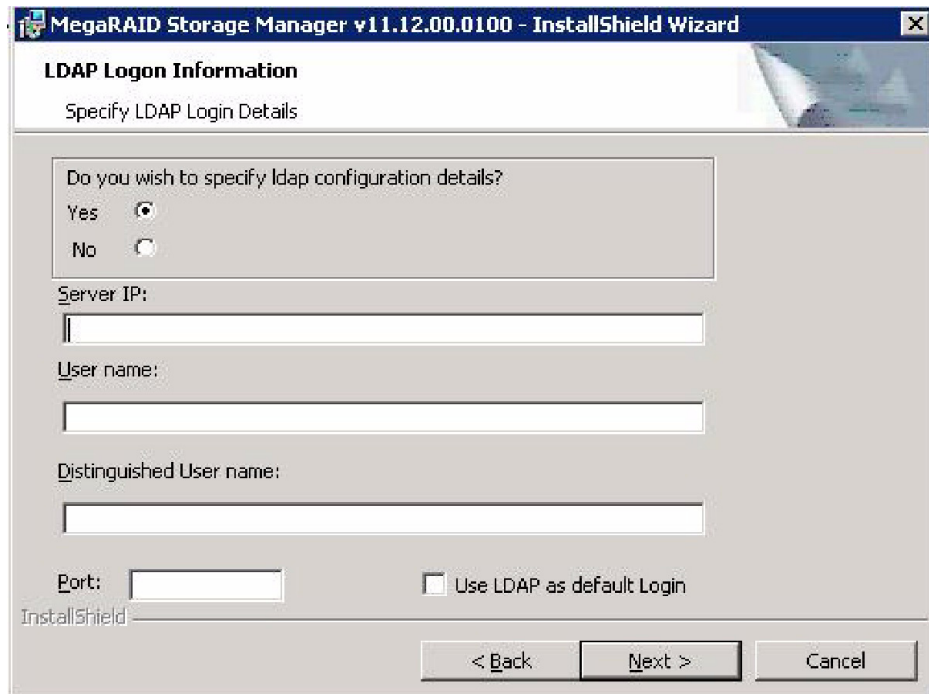


Figure 7. LDAP Logon Information

10. To specify LDAP configuration details, select **Yes**, and perform the following sub steps, or if you do not want to specify LDAP configuration details, click **No** and click **Next**.
 - a. Enter the LDAP server's IP address in the **Server IP** field.
 - b. Enter the LDAP server's user name in the **User name** field. An example of a user name can be `username@testldap.com`.
 - c. Enter the name of the Domain Controller in the **Distinguished User name** field. As an example, the Domain Controller name can be `dc= TESTLDAP, dc=com`.
 - d. Enter the LDAP server's port number in the **Port** field.
 - e. Select the **Use LDAP as default Login** check box to always connect to the LDAP server. All the values entered in this dialog are saved in the `ldap.properties` file.
11. Click **Next**.
12. In the dialog that appears, click **Install** to begin the installation.

13. Select one of the setup options. See [Setup Options](#), for specific information.

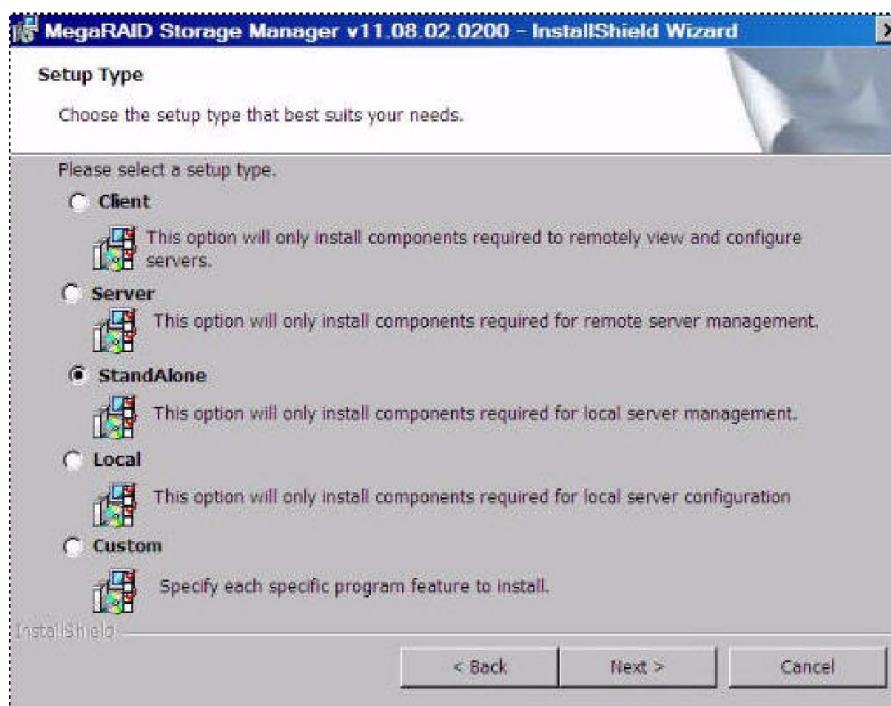


Figure 8. Custom Setup Window

14. Click **Next** to proceed.
15. Click **Install** to install the program.
16. When the final **Configuration Wizard** window appears, click **Finish**. If you select **Client** installation for a computer that is used to monitor servers, and if no available servers exist with a registered framework on the local subnet (that is, servers with a complete installation of the MegaRAID Storage Manager software), the server window appears. The **Intel® RAID Web Console 2 - Host View** window does not list any servers. You can use the **Intel® RAID Web Console 2 - Host View** window to manage systems remotely.

Setup Options

The Intel® RAID Web Console 2 enables you to select from one of the following setup options when you install it:

- Select the **Client** radio button if you are installing the Intel® RAID Web Console 2 on a computer that is used to view and configure servers over a network. To begin installation, click **Install** on the next window that appears. In the Client mode of installation, the Intel® RAID Web Console 2 installs only client-related components, such as the Intel® RAID Web Console 2 GUI. Use this mode when you want to manage and monitor servers remotely. When you install the Intel® RAID Web

Console 2 in Client mode on a laptop or a desktop, you can log in to a specific server by providing the IP address.

- Select the **Server** radio button to install only those components required for remote server management. To begin installation, click on **Install** on the next window that appears.
- Select the **StandAlone** radio button if you want to use the Intel[®] RAID Web Console 2 to create and manage storage configurations on a stand-alone workstation.
- To begin installation, click on **Install** on the next window that appears.

***Note:** If you select Client or Standalone as your setup option, the LDAP Logon Information dialog appears.*

- Select the **Local** radio button if you want to view only the workstation that has the Intel[®] RAID Web Console 2 installed. You will not be able to discover other remote servers and other remote servers will also not be able to connect to your workstation. In a local mode installation, you will be using the loopback address instead of the IP address.
- Select the **Custom** radio button if you want to specify individual program features to install. If you select **Custom**, a window listing the installation features appears. Select the features you want on this window.

7 Getting Started With Intel® RAID SSD Cache Controller

Note: Intel® RAID SSD Cache Controller Caching group is created by default when you install a Intel® RAID SSD Cache Controller for the first time. If you want to create a Intel® RAID SSD Cache Controller Caching group manually, use the steps provided in the section below, Manual Configuration.

Auto Configuration

Note: The Auto configuration method, R1 using the Flash Memory module is created with WB write policy option only.

The Default or Auto configuration is created on system initialization by firmware using the Flash memory modules present on the Intel® RAID SSD Cache Controller.

Any modification made by you is treated as a change in the configuration, and the configuration is changed from Default or Auto configuration to Manual configuration. If you modify the Default configuration, the new Manual configuration data is stored in NVRAM, and you cannot revert to Auto or Default configuration. To revert to Auto or Default configuration, you must select the factory default settings at the controller level. When the Auto or Default configuration is modified, firmware generates an event to notify the administrating application.

- Based on the type of the RAID level and over provisioning, the size of the Nytro cache varies.
- Intel® RAID SSD Cache Controller software 1.0 supports only RAID 0 and RAID 1 levels for Flash-based cache volume based on the Intel® RAID SSD Cache Controller Firmware Configuration parameters. Intel® RAID SSD Cache Controller software 1.0 supports RAID 0 write and write back. If for some reason, the Auto or Default configuration fails, it is switched to the Manual configuration.
- You cannot create a cache volume from a combination of Flash memory modules and external SSD drives, however if there are external SSD connected, they are treated as normal SATA physical drives.
- Operations, such as spare commission, rebuild, consistency check, initialization, and copy back are not supported on cache volume. Multiple volumes can be created using the Flash drives. Using either RAID 0 or RAID 1 level.
- By default, auto configuration creates only one Nytro cache volume; you cannot change it unless you delete and create a new Nytro cache volume manually.

You can apply the factory default settings using the WebBIOS, CmdTool2, or PrebootCLI (not through RWC2).

These are the typical operations performed:

- Clear the configuration.
- Create configuration.
 - Create VD.
 - Create Nytro Cache.

For more information about using Intel® RAID SSD Cache Controller on WebBIOS, see Chapter 6, Configuration and Chapter 8, WebBIOS Configuration Utility.

For more information about using Intel® RAID SSD Cache Controller on CmdTool2, see Chapter 9, MegaRAID Command Tool.

For more information about using Intel® RAID SSD Cache Controller on RWC2, see Chapter 10, Intel® RAID Web Console 2 Overview and Installation and Chapter 11, Intel® RAID Web Console 2 Window and Menus.

Manual Configuration

The following procedure lets you perform the Manual configuration:

1. Right-click on a controller in the device tree in the left pane of the Intel® RAID Web Console 2 (RWC2) Window.
2. Select Create Nytro MR Cache Drive.

The Create Nytro MR Cache Drive group dialog appears.

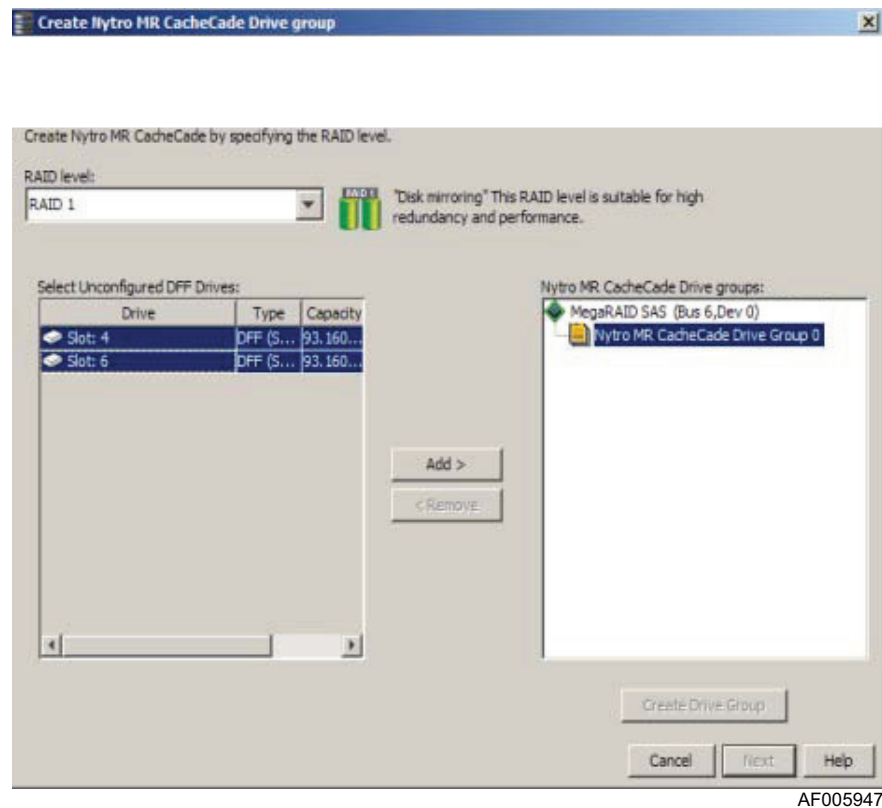
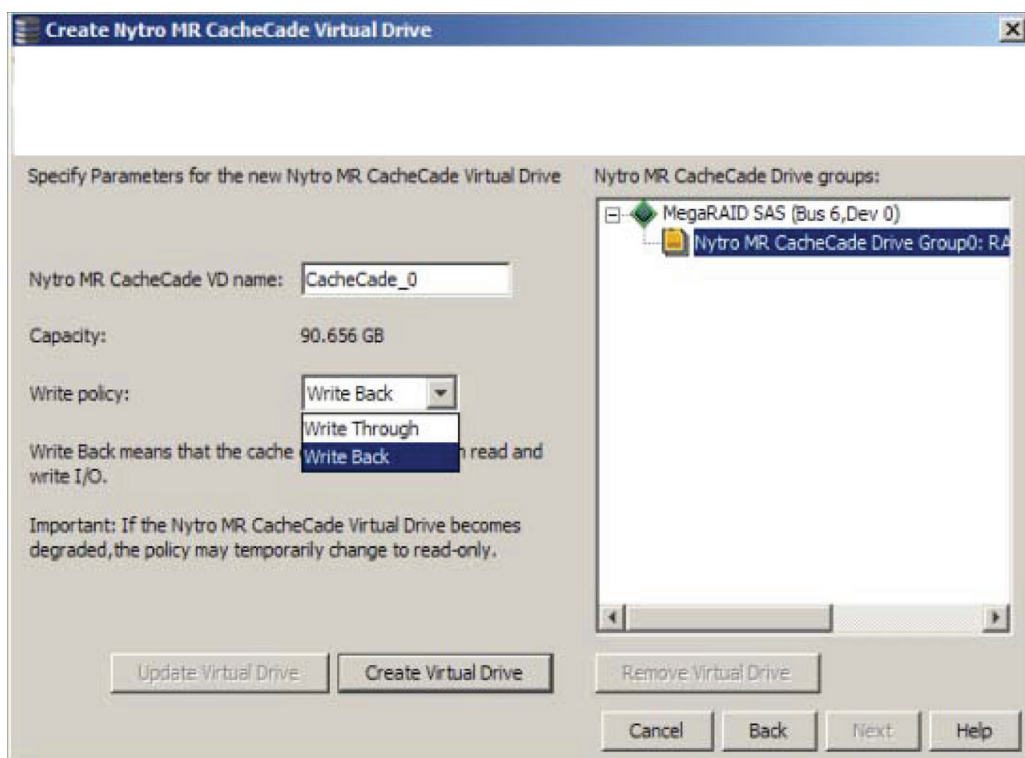


Figure 9. Create Nytro MR Cache Drive Group - First Screen

3. Select a RAID level for the Intel[®] RAID SSD Cache Controller Cache VD from the RAID level list. After you select an unconfigured Flash memory drive, the **Add** button is enabled.
4. Click **Add** to add the selected Flash memory drive into the **Nytro Cache Drive Group** box on the right pane. After you click **Add**, the **Create Drive Group** button is enabled.
5. Click **Create Drive Group**.
6. Click **Next**.
7. Provide a name in the **Nytro Cache Virtual Drive Name** box. Based on your selection, that is, R1 or R0, both the write policies (WB and WT) are shown in the drop-down list.

The following dialog appears.



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Figure 10. Create Nytro MR Cache Virtual Drive 1

The newly created Nytro MR Cache drive group appears in the Nytro Cache Drive Group box on the right pane.

8. Click Create Virtual Drive.
9. Click Next.

The following dialog appears.

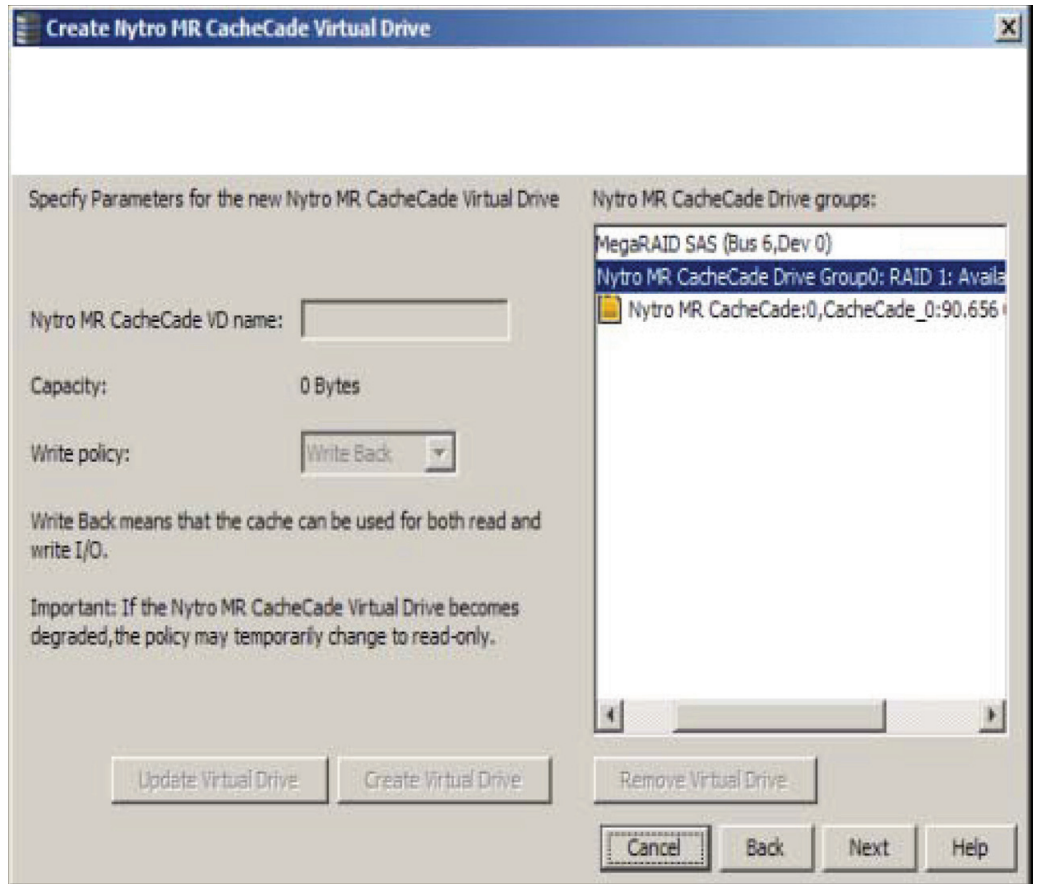
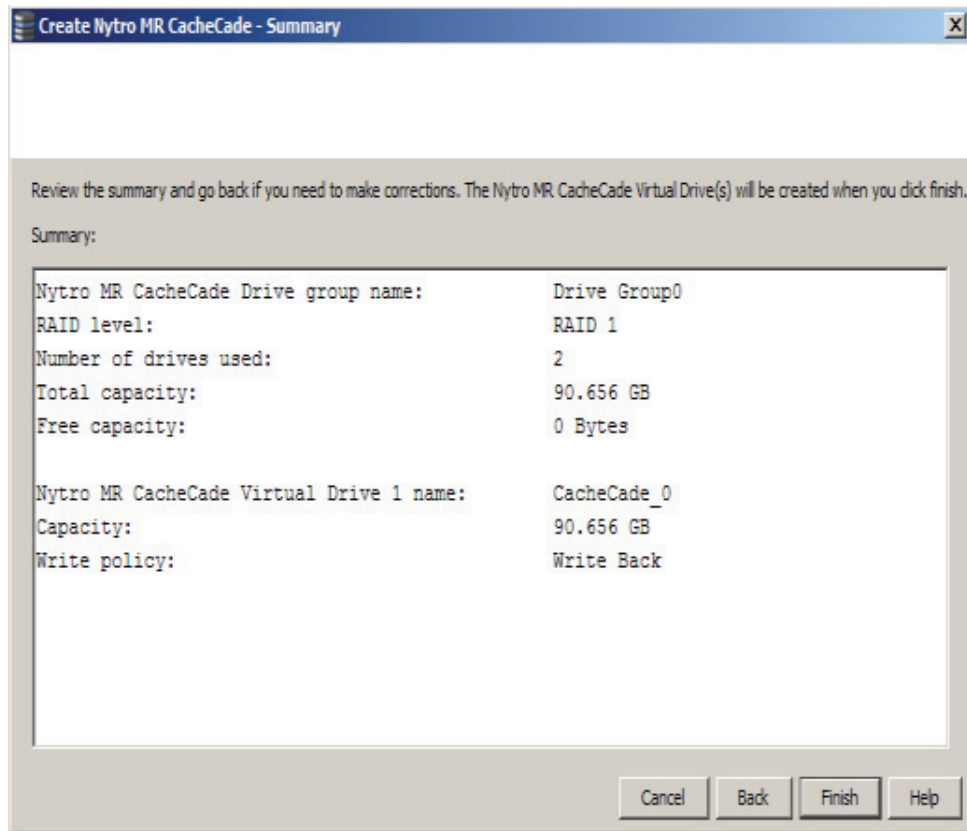


Figure 11. Create Nytro MR Cache Virtual Drive 2

The Nytro Cache VD is created under the Nytro Cache Drive Group as shown in the preceding figure.

10. Click **Next**.

The Summary dialog appears.

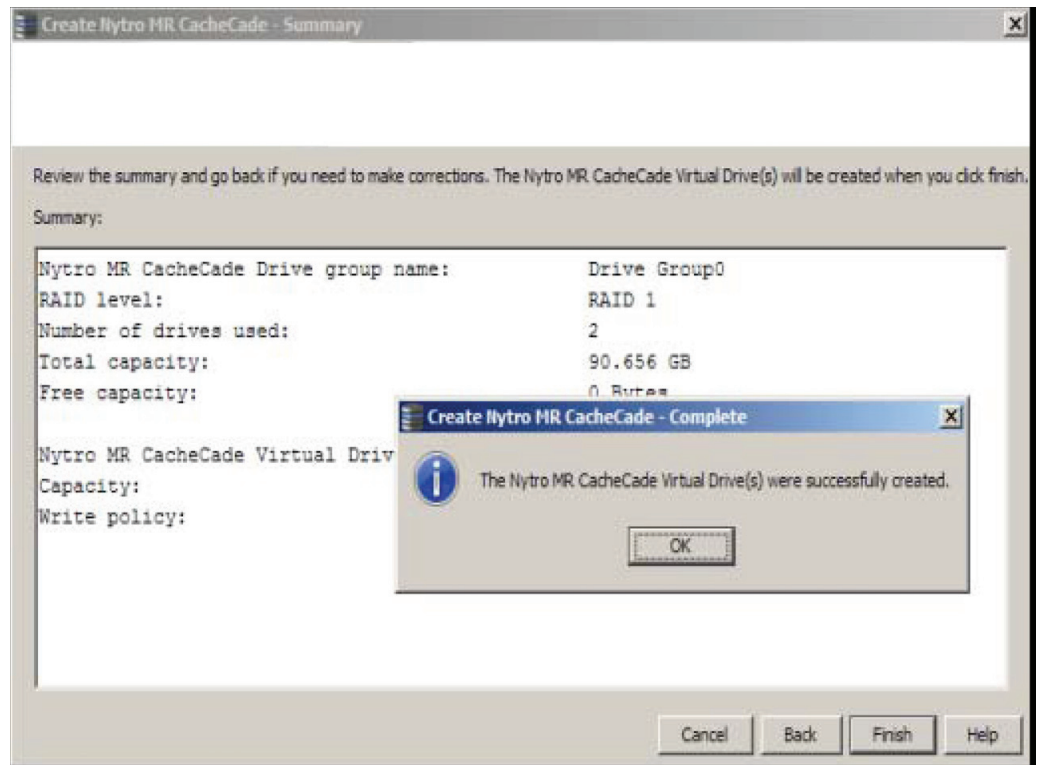


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Figure 12. Create Nytro MR Cache - Summary

11. Click **Finish**.

The following dialog appears confirming the creation of VD.



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Figure 13. Create Nytro MR Cache - VD Created Summary

The summary dialog appears. Check the details added.

12. Click **Finish** on the dialog.

Select the **Logical** tab to check the details of the VD.

Nytro Write Back Caching

R1 WB caching delivers high application performance acceleration for write-intensive random I/O workloads.

Nytro Write Through Caching

R0 and R1 Write Through caching delivers high application performance acceleration for read-intensive random I/O workloads.

8 Using Nytro Cache

This chapter helps you use Nytro Cache functionality.

Note: *Intel® RAID SSD Cache Controller firmware monitors the I/O performance; it accommodates the Nytro Cache statistics. The Intel® RAID SSD Cache Controller Cache metric are captured for each virtual drive (VD) that has Cache enabled. The Intel® RAID SSD Cache Controller Cache software collects information about the cache windows allocated for a VD, the number of new windows allocated in this metric collection period, the number of windows that are actively used, and the window hit rates.*

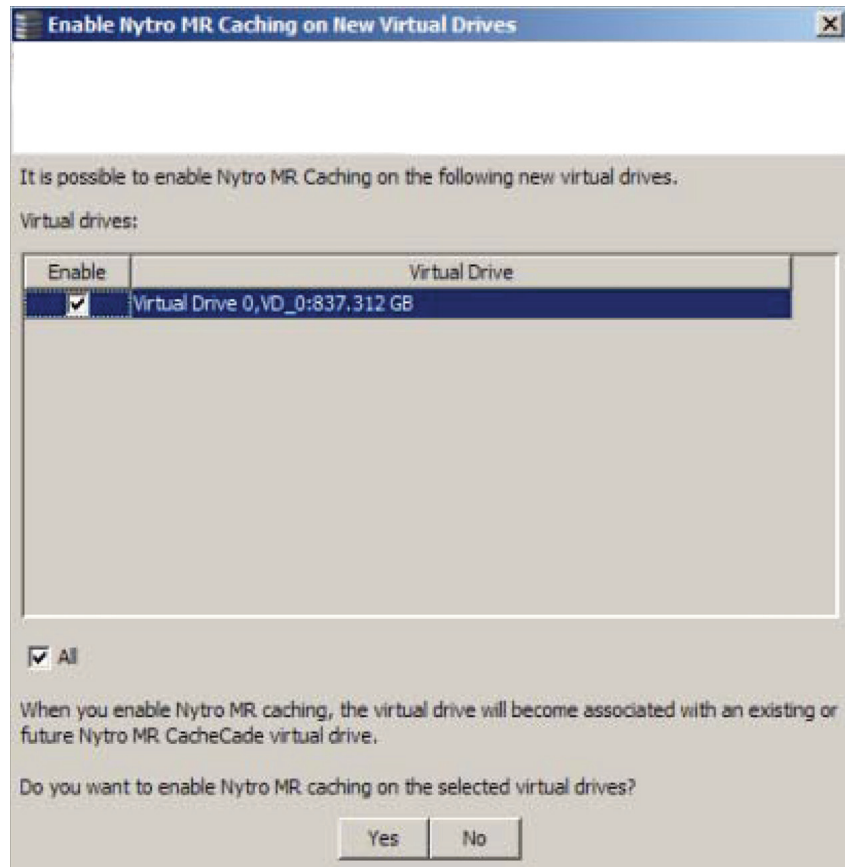
Associating a Source VD with a Nytro Cache VD

You can associate a source VD and then create a Nytro cache and vice versa.

Associating a Source VD to Nytro Cache VD

Perform these steps to associate a source VD.

- Scenario 1: Create a source VD or use an existing source VD.
 1. Right-click the controller and select **Enable Nytro Caching on New VD**.
 2. Select the **Enable** check box.



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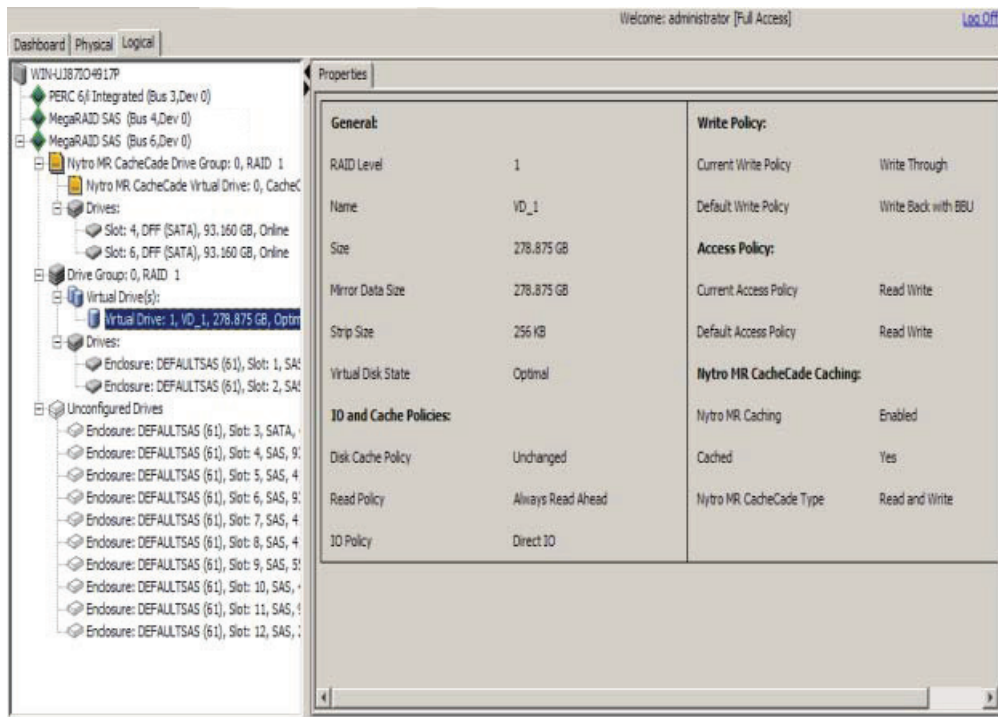
Figure 14. Enable SSD Caching on New Virtual Drives

If there are multiple VDs displayed, select the required VD and click **Yes**. The VD is now associated.

Note: During I/O, the controller automatically uses this Nytro Cache VD.

Note: You can select the **Enable** check box on the **Enable Nytro Caching on New VD** dialog to associate the Nytro Cache VD anytime later.

3. Check if the source VD is associated with Nytro Cache VD.
4. Click the source VD under the controller.
5. Check on the right pane of RWC2 Window for Nytro Cache caching properties as shown in the following figure.



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Figure 15. Nytro Cache Properties

6. Right-click the source VD to view whether the **Disable the Nytro Caching** option shows, (it must show).
 - Scenario 2: You do not have a source VD or Nytro Cache VD at all.
1. Create a source VD using the RWC2 application (normal RAID creation method), at the time of creating a source VD.
2. Click the **Finish** button. The **Enable Nytro Caching on New VD** dialog appears (see [Figure 12](#)).
3. Create the Nytro Cache VD using the steps mentioned in the section, Manual Configuration.

Dissociating a Source VD or Nytro Cache VD

If you do not want to associate the source VD to the Nytro Cache VD or vice versa, right-click the source VD and select **Disable the Nytro Caching**.

9 Booting the system

There are two ways to boot your system: Not booting from Intel® RAID SSD Cache Controller and booting from Intel® RAID SSD Cache Controller.

Booting from a device not managed by a Intel® RAID SSD Cache Controller

Boot system and install Windows driver

After installing the Intel® RAID SSD Cache Controller, boot the system by turning it on. For detailed information, see chapters 5 and 6 of this document.

Booting from a device managed by a Intel® RAID SSD Cache Controller

This section contains information on how to configure your system to boot from a device managed by a Intel® RAID SSD Cache Controller. This can be done using the WebBIOS utility.

Using WebBIOS to check Nytro Cache Virtual Drive Auto-configuration

To start the WebBIOS configuration utility, perform the following steps:

1. When the host computer is booting, press and hold down the Ctrl key and press the H key when the following text appears on the dialog:
Copyright© Intel Corporation Press <Ctrl><G> for WebBIOS
The **Controller Selection** dialog appears.
2. If the system has multiple Intel® RAID SSD Cache Controllers, select a controller.
3. Click **Start** to continue. The main **WebBIOS Configuration Utility** dialog appears.

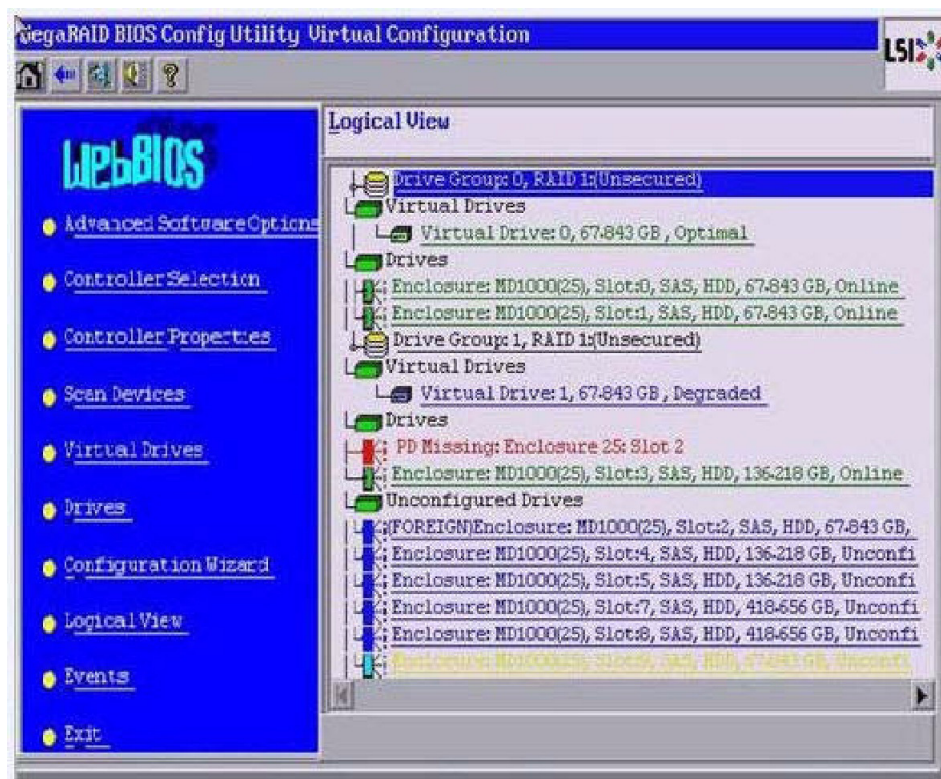


Figure 16. WebBIOS Configuration Utility Main Dialog

When in the Logical View, on the left you can select the Physical View and when in the Physical View you can select the Logical View. Each view is different but of the same configuration.

Using WebBIOS to Configure a HDD Virtual Drive as a Boot drive

For detailed information on how to use the webBIOS to configure a HDD VD as a boot drive, see the *Intel® RAID Software User's Guide*.

If you make changes to the options on this dialog, click **Submit** to register them. To cancel your changes, click **Reset** to return the options to their default values.

10 Types of Caching Configurations

There are three different levels of Intel® RAID SSD Cache Controller data caching:

- Drive cache (enabled/associated or disabled/disassociated)
- Intel® RAID SSD Cache Controller DRAM caching used for optimizing RAID operations (Write Through or Write Back requires power backup)
- Nytro caching VD used to accelerate frequently accessed application data

Nytro Cache Related Options with CmdTool2

Creating a Nytro Cache Volume

Use the *CmdTool2* command in the following table to create a cache drive using the Nytro Cache. You can use that cache as secondary cache. The Nytro Cache has much greater capacity than DRAM cache.

Table 1. Create a Solid State Cache Drive to Use as Secondary Cache

Convention	<code>Cmdtool2 -CfgCacheCadeAdd -Physdrv[E0:S0,...] {-Name LdNamestring} -aN -a0,1,2 -aALL</code>
Description	This command is used to create CacheCade software that you can use as secondary cache.
	- Physdrv[E0:S0,...]: Specifies the physical drive enclosure and the slots to use to construct a drive group.
	- Name LdNamestring: This is the name given to the Nytro Cache software cache drive.

Deleting a Nytro Cache Drive

Use the *CmdTool2* command in the following table to delete a Nytro Cache VD or multiple cache drives on the selected controllers.

Table 2. Delete Nytro Cache Drive

Convention	<code>Cmdtool2 -CfgCacheCadeDel -LX -L0,2,5... -LALL -aN -a0,1,2 -aALL</code>
Description	Deletes the specified Nytro Cache drives or drives on the selected controllers. You can delete multiple Nytro Cache drives or all of the Nytro Cache drives.

Intel® RAID SSD Cache Controller DRAM Cache

Cache Offload is a method to backup the contents of the cache into the Flash drives, which are nonvolatile on-board Flash components on the Intel® RAID SSD Cache Controller. This feature deploys a method to backup, save, and persist the controller cache for Intel® RAID SSD Cache Controllers during unexpected power loss conditions. A SuperCap is used to provide power while the controller offloads the cache contents from the DRAM to the Flash drives, where the contents persist for extended periods. Upon system restart, Intel® RAID SSD Cache Controller firmware restores the cache contents from the Flash drive and flush into disks. The SuperCap based cache vaulting addresses a number of issues associated with the battery based cache backup, such as battery maintained (learn cycles), temperature tolerance, backup support time, and maintaining cache across controller replacements.

For more information on how to create and modify cache, see the *Intel® RAID Software User's Guide*.

11 Other Documents

Following is a list of documents that support the Intel® RAID SSD Cache Controller RCS25ZB040/RCS25ZB040LX. These documents help you customize Nytro Cache VD RAID level and caching modes. They also help with customizing HDD VD configuration and settings.

- *Intel® RAID Controller RCS25ZB040/RCS25ZB040LX User Guide*
- *Intel® RAID Controller RCS25ZB040/RCS25ZB040LX Quick Install Guide*
- *Intel® RAID Software User's Guide*

