VERITAS Volume Manager™ 3.5

User's Guide - VERITAS Enterprise Administrator

Solaris

VERITAS

Contents

Preface

Introduction

This guide describes how to use the VERITAS Volume Manager™ Graphical User Interface (GUI).

Audience

This guide is intended for system administrators responsible for configuring and maintaining systems using the VERITAS Volume Manager (VxVM) with the VERITAS Enterprise Administrator (VEA). This guide assumes the following:

◆ A basic understanding of system administration

◆ A working knowledge of the UNIX operating system

◆ Familiarity with VxVM and related concepts

Organization

This guide is organized as follows:

◆ Chapter 1, "Introducing the VEA GUI," describes the main components of the GUI.

◆ Chapter 2, "Getting Started with VxVM VEA," describes how to set up and start using VxVM with VEA.

◆ Chapter 3, "Disk Tasks," describes how to set up and use disks using VxVM with VEA.

◆ Chapter 4, "Volume Tasks," describes how to create and use volumes and related objects using VxVM with VEA.

◆ Chapter 5, "File System Tasks," describes the tasks associated with file systems.

◆ Chapter 6, "Cluster Tasks," describes the tasks associated with clusters.

◆ Chapter 7, "Troubleshooting," provides information about VxVM alerts, object states, and other troubleshooting topics.

◆ Chapter 8, "Icons," lists the icons available with VxVM.

◆ The Glossary defines terms that relate to VxVM.

Related Documents

The following documents provide related information:

◆ *VERITAS Volume Manager Administrator's Guide*

◆ *VERITAS Volume Manager Troubleshooting Guide*

◆ *VERITAS Volume Manager Hardware Notes*

◆ *VERITAS Volume Manager Installation Guide*

◆ *VERITAS Volume Manager Release Notes*

◆ VERITAS Volume Manager manual pages

The following table describes terms associated with the use of the mouse:

Term	Definition
Click	Press and release the mouse button.
Double-click	Click the mouse button twice (quickly).
Right-click	Press and release the right mouse button.
Press and Hold	Press and continue to hold down the mouse button.
Point	Move the cursor onto an item on the screen.
Select	Click the mouse button while the pointer is directly over the item to be selected.
Drag	Select the object and drag it while pressing the mouse button.

Getting Help

If you have any comments or problems with the VERITAS products, contact VERITAS Technical Support:

◆ U.S. and Canadian Customers: 1-800-342-0652

◆ International Customers: +1 (650) 527-8555

◆ E-mail: support@veritas.com

For license information (U.S. and Canadian Customers):

◆ Phone: 1-925-931-2464

◆ E-mail: license@veritas.com

◆ Fax: 1-925-931-2487

For software updates:

◆ E-mail: swupdate@veritas.com

For additional technical support information, such as TechNotes, product alerts, and hardware compatibility lists, visit the VERITAS Technical Support Web site at:

◆ http://support.veritas.com (U.S. and Canada Customers)

For additional information about VERITAS and VERITAS products, visit the Web site at:

◆ http://www.veritas.com

Downloading and Running VRTSexplorer

If you have access to the Internet, you can use the VRTSexplorer program to assist Technical Support in diagnosing the cause of your problem. Refer to the *VERITAS Volume Manager Release Notes* for information on using the VRTSexplorer program.

Introducing the VEA GUI 1

Before using the VERITAS Volume Manager VEA GUI, you should familiarize yourself with the following introductory topics:

◆ VxVM VEA Features

◆ Main Window

◆ Task Roadmap

VxVM VEA Features

You use the VxVM VEA to administer disks, volumes, and file systems on local or remote machines.

VxVM VEA is a Java-based interface that consists of a server and a client. The server runs on a UNIX machine that is running VxVM. The client runs on any machine that supports the Java Runtime Environment.

VxVM VEA provides the following features:

◆ Accessibility - Using the Mouse and Keyboard

Accelerators and mnemonics are provided as alternatives to using the mouse (refer to the VEA online help for more information).

◆ Ease of Use

The task-based user interface provides access to tasks through menus or a task list. Administrators can easily navigate and configure their systems, and browse through all of the objects on the system or view detailed information about a specific object.

◆ Remote Administration

Administrators can perform VxVM administration remotely or locally. The VEA client runs on UNIX or Windows machines.

◆ Java-based Interface

A pure Java-based interface is used. Administrators can run VxVM VEA as a Java application.

◆ Scalability

VxVM VEA can handle systems containing large numbers of disks. Administrators can view all of the objects on the system, or focus on a specific object or set of objects.

◆ Security

VxVM VEA does not support communication between the client and server across a firewall.

◆ Multiple VEA Support

The VxVM VEA client can provide simultaneous access to multiple host machines. The administrator can use a single client session to connect to multiple hosts, view the objects on each host, and perform administrative tasks on each host. Each host machine must be running the VxVM VEA server.

◆ Multiple Views of Objects

VxVM VEA provides multiple views of objects:

- The main window tree and grid view lists objects on the system.

- The Disk View window displays a graphical view of volumes, disks, and other objects in a disk group.

- The Volume View window displays a graphical view of the volumes on a host.

- The Volume to Disk Mapping window shows the relationships between volumes and their underlying disks.

Main Window

The VxVM VEA Main Window consists of:

◆ The Object Tree and Grid

◆ The Menu Bar

◆ The Toolbar

◆ The Status Area

Main Window
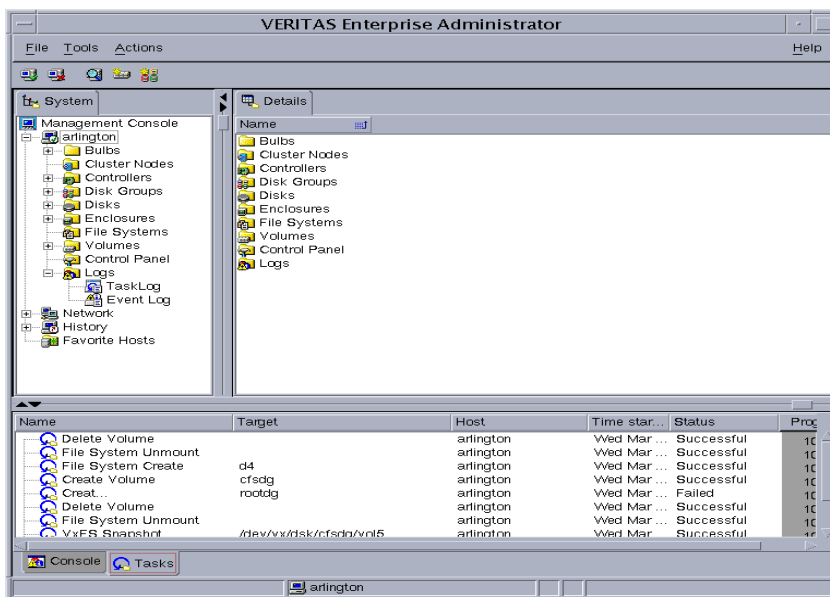
The toolbar can be separated from and reattached to the main window (this is known as *docking*). The grid can be replicated in a separate window.

The Object Tree and Grid

The VxVM VEA main window is divided into two main panes:

◆ Left Pane (Object Tree)

The following object groups typically appear as nodes in the object tree:

- **Hosts** – Any host machines connected to the current VxVM VEA client session.

- **Controllers** – All controllers on the system.

- **Disk Groups** – All disk groups on the system.

- **Disks** – All disks on the system.

- **Enclosures** – All enclosures (disk arrays) on the system.

- **File Systems** – All mounted file systems on the system.

- **Volumes** – All volumes on the system.

◆ Right Pane (Grid)

The right pane contains a *grid,* which is a tabular display of objects and their properties. The grid displays objects that belong to the group icon that is currently selected in the object tree (left pane).

The *splitter* is the vertical bar that separates the object tree from the grid. You can resize the left and right panes by pressing and holding the mouse button over the splitter and dragging the splitter to the left or right.

The Menu Bar

The menu bar at the top of the main window contains the following menus:

◆ **File**

The **File** menu establishes new host connections, closes the main window, provides access to an object Properties window, or exits VEA.

◆ **Tools**

The **Tools** menu saves or loads user preferences, removes any alert icons from the status area, and sets VxVM VEA to read-only mode.

◆ **Actions**

The **Actions** menu is a context-sensitive menu that launches tasks on a selected object. It is inactive until you connect to a host. The **Actions** menu is dynamic and changes its options based on the type of object that is selected. When an object is selected, the **Actions** menu provides access to tasks appropriate for the selected object.

◆ **Help**

The **Help** menu provides access to online help for VxVM VEA.

The Toolbar

The toolbar provides quick access for performing some of the program's most common tasks.

🖥️	Connect	Brings up the Connection Dialog.

	Disconnect	Disconnects from selected machine.
	Search	Brings up the Search Wizard.

The *toolbar handle* is the thin bar next to the toolbar. You can use the toolbar handle to separate the toolbar from the main window or move the toolbar to the bottom, side, or top of the main window. To reposition the toolbar, press and hold the mouse button over the toolbar handle and drag the toolbar to its new location.

The Status Area

The status area is at the bottom of the main window. When an object fails or experiences an error, an alert (error) icon appears in the status area. The Alert Monitor window provides details about the error. You can access the Alert Monitor window by clicking on the alert icon in the status area.

Task Roadmap

VxVM VEA tasks are grouped into:

◆ Setup Tasks

◆ Maintenance Tasks

◆ Repair/Recovery Tasks

Setup Tasks

If you are using VxVM and VEA for the first time, you need to install both products, place your disks under VxVM control, and create volumes.

▼ **Setting Up Your System**

◆ Installing and initializing VxVM.

◆ Installing VEA.

◆ Starting VEA.

These tasks are described in the *VERITAS Volume Manager Installation Guide.*

▼ **To set up disks**

◆ Placing disks under VxVM control.

◆ Creating additional disk groups for the new disks (optional).

◆ Designating one or more disks as hot-relocation spares (optional).

These tasks are described in Chapter 3, "Disk Tasks."

▼ **To set up volumes**

◆ Creating volumes.

◆ Creating mirrors for any volumes that need to be redundant.

These tasks are described in Chapter 4, "Volume Tasks."

▼ **To set up file systems**

◆ Placing file systems on volumes.

◆ Mounting a file system.

These tasks are described in Chapter 5, "File System Tasks."

▼ **To set up clusters**

◆ Setting up a shared disk group.

◆ Starting a cluster.

These tasks are described in Chapter 6, "Cluster Tasks."

Maintenance Tasks

After you have set up your disks and volumes, you need to perform some or all of the following maintenance tasks.

▼ **Monitor objects**

◆ Use the Main Window tree (left pane) and grid (right pane) to view disks, volumes, file systems, and other objects on the system.

◆ Use the Disk View Window to display a graphical view of disks, volumes, and other objects in a particular disk group.

◆ Use the Volume View window to display a graphical view of the volumes for a host.

◆ Use the Volume to Disk Mapping Window to view the relationships between volumes and their underlying disks.

◆ Use the Object Properties Window to view detailed information about a selected object.

◆ Use the Alert Tab to view information about errors or failures associated with objects that are marked with alert icons.

(Windows are described in Chapter 2, "Getting Started with VxVM.")

▼ **Maintain disks**

◆ Adding a Disk to VxVM.

◆ Creating a Dynamic Disk Group.

◆ Upgrading a Dynamic Disk Group Version.

These tasks are described in Chapter 3, "Disk Tasks."

Note "Dynamic Disk Groups" were formerly known as "Disk Groups." They are still sometimes referred to as "Disk Groups" in menu displays and the CLI.

▼ **Maintain volumes**

◆ Resizing a Dynamic Volume as users and applications require more space.

◆ Changing a Volume Layout.

◆ Adding a Mirror to a Volume to any unmirrored volume that should be redundant.

These tasks are described in Chapter 4, "Volume Tasks."

▼ **Maintain file systems**

◆ Adding a New File System to a Volume.

◆ Increase the size of file systems as users and applications require more space.

◆ Create snapshot copies of file systems and then back up the file systems.

These tasks are described in Chapter 5, ""File System Tasks."

▼ **Maintain clusters**

◆ Creating a Shared Dynamic Disk Group

◆ Importing a Shared Dynamic Disk Group

These tasks are described in Chapter 6, "Cluster Tasks."

Repair/Recovery Tasks

If disk and/or system failures occur, VxVM generally performs any necessary recovery operations automatically. However, depending on the circumstances, you may need to attempt to recover from the situation as follows.

▼ **Protect volumes from disk failure**

 ◆ Adding a Disk to VxVM.

 ◆ Replacing Disk.

These tasks are described in Chapter 3, "Disk Tasks."

▼ **Repair/recover volumes**

 ◆ Recovering a Volume.

 ◆ Recover all volumes on a failed disk.

 ◆ Recovering Volumes in Dynamic Disk Groups.

 ◆ If a volume is not recoverable, restore the volume from backup.

These tasks are described in Chapter 3, "Disk Tasks," and Chapter 4, "Volume Tasks."

▼ **Repair/recover file systems**

 ◆ Perform a file system consistency check on any file systems that may be damaged.

(Refer to Chapter 5, "File System Tasks.")

Getting Started with VxVM VEA 2

Before using VEA, you need to familiarize yourself with the following:

- ◆ Setting Up Your System
- ◆ Starting VEA
- ◆ Viewing Objects and Object Properties
  - ‑ Tree and Grid View
  - ‑ Disk View Window
  - ‑ Volume View Window
  - ‑ Volume Layout Details Window
  - ‑ Volume to Disk Mapping Window
- ◆ Viewing Task History
- ◆ Command Log
- ◆ Search/Report
- ◆ Performance Tuning
- ◆ Load Balancing
- ◆ Setting Preferences
- ◆ Disk Failure or Removal

Setting Up Your System

VEA consists of a server (`vxsvc`) and a client (vea). You must install and run the VEA server on a UNIX machine running VxVM. You can install and run the VEA client on any machine that supports the Java Runtime Environment.

Before you can use VEA, you need to:

1. Install VxVM on the machine to be administered.

2. Install the VEA server and client on the machine to be administered. Run `vxinstall` to create the `rootdg` disk group and initialize at least one disk.

3. If users other than root need to access VEA, set up security to specify which users can run VEA.

4. If you plan to run the VEA client from a machine other than the machine to be administered, install the VEA client on the machine where the client will run.

5. Start the VEA server on the machine to be administered.

6. Start the VEA client.

Refer to the *VERITAS Volume Manager Installation Guide* for details on how to install and set up VEA.

Starting VEA

Only users with appropriate privileges can run VEA. Refer to the *VERITAS Volume Manager Installation Guide* for information on security and access permissions.

You can use VEA to administer the local machine or a remote machine. The VxVM daemon (`vxconfigd`) and the VEA server (`vxsvc`) must be running on the machine to be administered. Once VEA is installed, the VEA server starts up automatically at system startup.

Viewing Objects and Object Properties

VEA provides the following views of objects and their properties:

-   Tree and Grid View

    The main window tree and grid view displays volumes, disks, file systems, and other objects on the system. The grid also displays a limited set of properties for listed objects.

-   Disk View Window

    The Disk View window displays a graphical view of disks, volumes, and other objects in a particular disk group.

-   Volume View Window

The Volume Layout Details window displays a close-up graphical view of a single volume and its components (mirrors/plexes and subdisks).

- Volume to Disk Mapping Window

The Volume to Disk Mapping window shows the relationships between volumes and their underlying disks.

- Object Properties Window

The object Properties window contains detailed information about a specific object.

Tree and Grid View

The main window tree and grid view displays volumes, disks, file systems, and other objects on the system. The object tree is a hierarchical display of object groups. The grid is a tabular display of objects and a limited set of properties. VEA constantly monitors objects on the system and makes appropriate changes to the tree and grid displays.

Disk Usage Legend

The disk usage legend is displayed at the bottom of the right pane; and shows how to interpret the colors with respect to Disk Usage (Normal Usage, High Usage, and Critical Usage).

Disk View Window

The Disk View window displays a graphical view of disks. It is dynamic, so the objects displayed in this window are automatically updated when their properties change. You can select objects or perform tasks on objects in the Disk View window.

The Disk View window can be accessed by clicking on a disk and selecting **Actions** > **Disk View**.

You can move the horizontal splitter to adjust the relative heights of both panes. To resize the volume and disk panes, place the pointer over the horizontal splitter and then press and hold the mouse button to drag the splitter to the desired position.

Using the Menu Bar

The menu bar at the top of the Disk View window contains the following menus:

◆ **File**

The **File** menu enables you to:

- Access to the page setup menu
- Print the properties of a selected object
- Close the Disk View window
- Access the Properties window
- Display selected disks

◆ **Options**

The **Options** menu provides you with the following selections:

- Refresh View
- Collapse—provides basic information for all disks in the view
- Expand—provides detailed information for all disks in the view
- Vol Details—basic volume information
- Full Volume Display—volume objects also display the volume size, free space, and state of the volume
- Projection—highlights associated objects

With the exception of Refresh View and Full Volume Display, these options are also available from the icons under the Disk View menu bar.

◆ **Action**

The **Action** menu provides all the tasks available on the corresponding object in the main window.

Using the Toolbar

The toolbar at the top of the Disk View window has the following set of buttons:

◆ **Expand**

The **Expand** button shows more detailed information about all disks in the Disk View, including subdisks and free space. This button displays objects in layout mode or detailed mode, depending on the previous mode.

◆ **Collapse**

The **Collapse** button hides details for all disks in the Disk View. This button displays objects in layout mode or basic mode, depending on the previous mode.
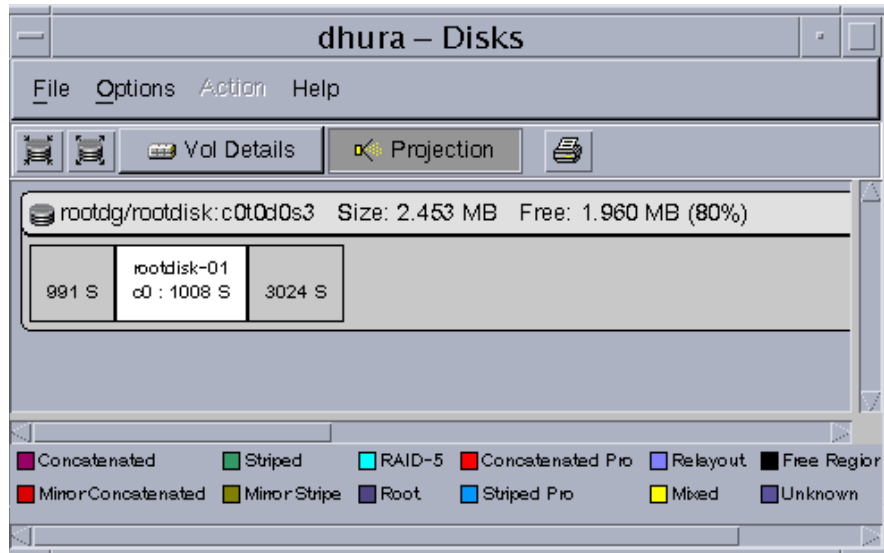
◆ **Projection**

The **Projection** button highlights objects associated with the selected subdisk or volume.

Projection shows the relationships between objects by highlighting objects that are related to or part of a specific object. When disks are in layout mode or detailed mode, clicking on a subdisk highlights the location of the subdisk on the corresponding disk.

◆ **Print**

The **Print** button prints the properties of the selected object.

The *toolbar handle* is the thin bar next to the toolbar. You can use the toolbar handle to separate the toolbar from the window or move the toolbar to the bottom, side, or top of the window. To reposition the toolbar, press and hold the mouse button over the toolbar handle and drag the toolbar to its new location.

In the Disk View, you can move subdisks by dragging the subdisk icons to their new locations. You can drag a subdisk to another disk or a gap on the same disk. To move a subdisk, place the pointer over the subdisk and then press and hold the mouse button to drag the subdisk to another location.

Caution   Moving subdisks reorganizes volume disk space and must be done with care.

The Disk View window displays plexes and subdisks that are associated with volumes. To view Volume Manager objects that are not associated with volumes (such as dissociated plexes), open the Dissociated Object View window (see **Dissociated Plex View Window**).

Mapping Disks to Volumes
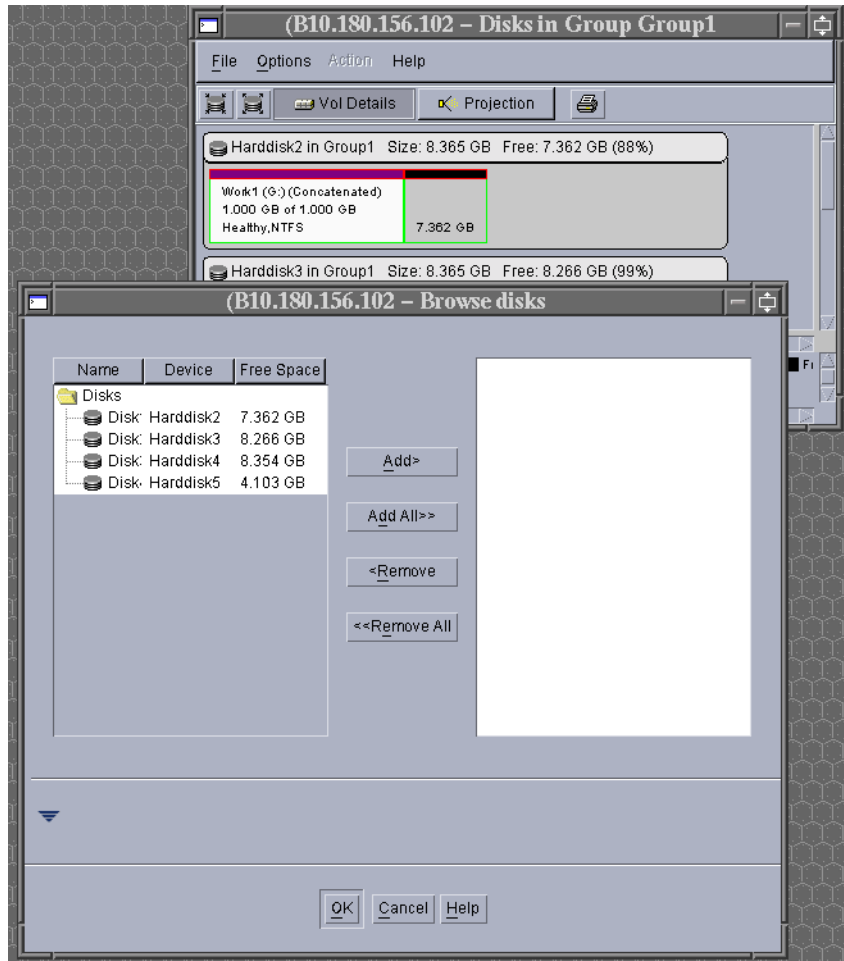
You can map a disk to the associated volume by bringing up both the Disk View and the Volume View (see Volume View Window). When you click on the disk in the Disk View, the corresponding plex in the Volume View is highlighted.

Volume View Window

The Volume View window gives the characteristics of the volumes on the disks.

The Volume View window can be accessed by clicking on a volume and selecting **Actions** > **Volume View.**

You can move the horizontal splitter to adjust the relative heights of both panes. To resize the volume and disk panes, place the pointer over the horizontal splitter and then press and hold the mouse button to drag the splitter to the desired position.

The menu bar at the top of the Volume View window contains the following menus:

◆ **File**

The **File** menu prints the properties of a selected object, closes the Volume View window, and provides access to the Properties window.

◆ **Action**

The **Action** menu provides access to all the tasks available on the corresponding object in the main window.

The toolbar at the top of the Volume View window has the following set of buttons:

◆ **Collapse all volumes**

The **Collapse Volume** button hides details for all volumes in the Volume View. This button displays objects in layout mode or basic mode, depending on the previous mode.

◆ **Expand all volumes**

The **Expand Volume** button shows more detailed information about all disks in the Volume View. This button displays objects in layout mode or detailed mode, depending on the previous mode.

◆ **New volume**

The **New Volume** button brings up the create volume dialog box.

The *toolbar handle* is the thin bar next to the toolbar. You can use the toolbar handle to separate the toolbar from the window or move the toolbar to the bottom, side, or top of the window. To reposition the toolbar, press and hold the mouse button over the toolbar handle and drag the toolbar to its new location.
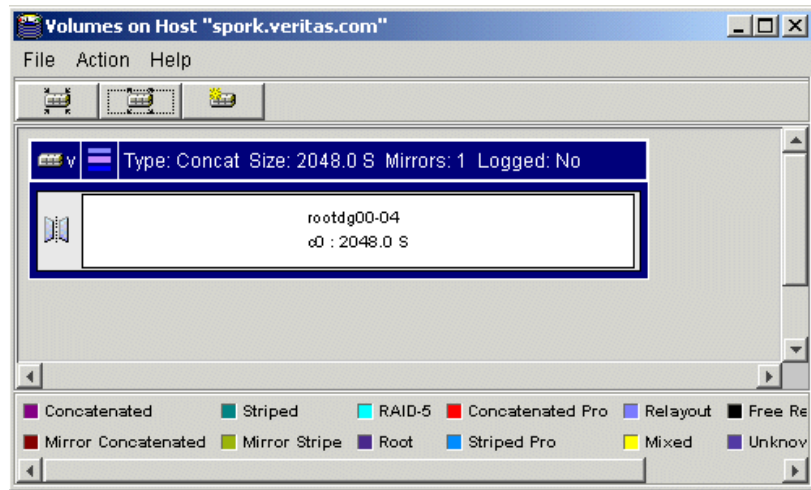
Dissociated Plex View Window

The Dissociated Plex View window shows the dissociated plexes for a particular disk group.
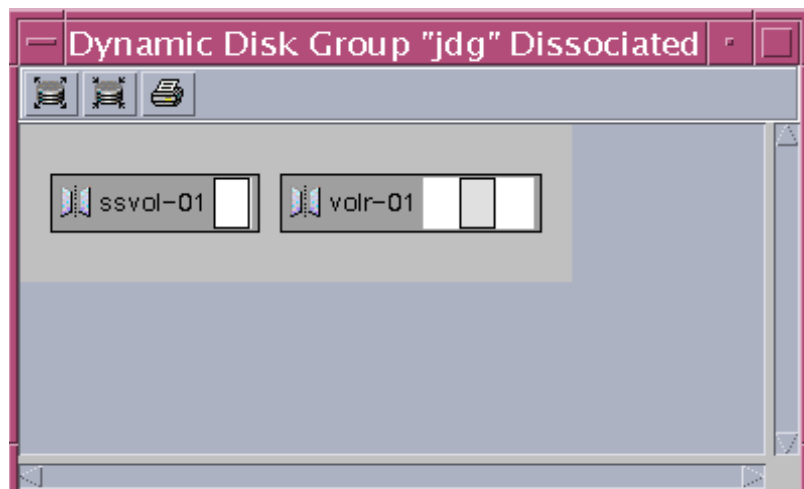
The Dissociated Plex View window can be displayed by clicking on a disk group and selecting **Actions** > **Dissociated Plex View**.

Volume Layout Details Window

The Volume Layout Details window displays a graphical view of the selected volume's layout, components, and properties. You can select objects or perform tasks on objects in the Volume Layout Details window. The Volume Layout Details window is dynamic, so the objects displayed in this window are automatically updated when the volume's properties change.

The **View** menu changes the way objects are displayed in this window. To access the popup menu for an object, right-click on the object, or use the **Actions** menu.

Volume Layout Details Window

You can view objects in the Volume Layout Details window in the following ways:

❖ To display the Volume Layout Details window for a volume, click on the volume (in the main window grid) and then choose **Actions** > **Layout View**.

❖ To view a different volume, go back to the main window and select the required volume.

❖ To zoom in and out of the view, use the scroll bar on the left side of the window.

◆ To access the popup menu for an object, right-click on the object.

Use the **File** menu to close the window.

Volume to Disk Mapping Window

The Volume to Disk Mapping Window displays a tabular view of volumes and their underlying disks. Volumes are listed in the top row of the table and disks are listed in the left column of the table. Each circle icon in the table indicates that part of the corresponding volume is located on the corresponding disk.

This window can also display details such as the subdisks and gaps (free space) on each disk. Each subdisk or gap is listed with its disk offset and length. When subdisks are shown, circles show the relationship between volumes and subdisks.

The Volume to Disk Mapping window is dynamic, so the contents of this window are automatically updated when objects are added, removed, or changed. For instructions on navigating the Volume to Disk Mapping window, see "Navigating the Volume to Disk Mapping Window" on page 19.

❖ To display the Volume to Disk Mappng window, click on the disk group (in the main window grid) and then choose **Actions** > **Disk/Volume Map**.

The **File** menu displays volume and disk property information, or closes the window.

The **View** menu changes the way objects appear in the Volume to Disk Mapping window, and allows you to set up collection of statistics for the disk group.

The context-sensitive **Actions** menu allows you to perform tasks for a selected object. To access the popup menu for an object, right-click on the object.

The Volume to Disk Mapping window has a performance monitoring feature that ranks volume response time. When performance monitoring is turned on, the icons in the table change. The volumes with the slowest reads/writes are shown as red icons. Volumes with relatively slow response time are shown as yellow icons. All other volumes are shown as green icons.

"Volume to Disk Mapping Window" shows the relationships between volumes and disks.

Volume to Disk Mapping Window
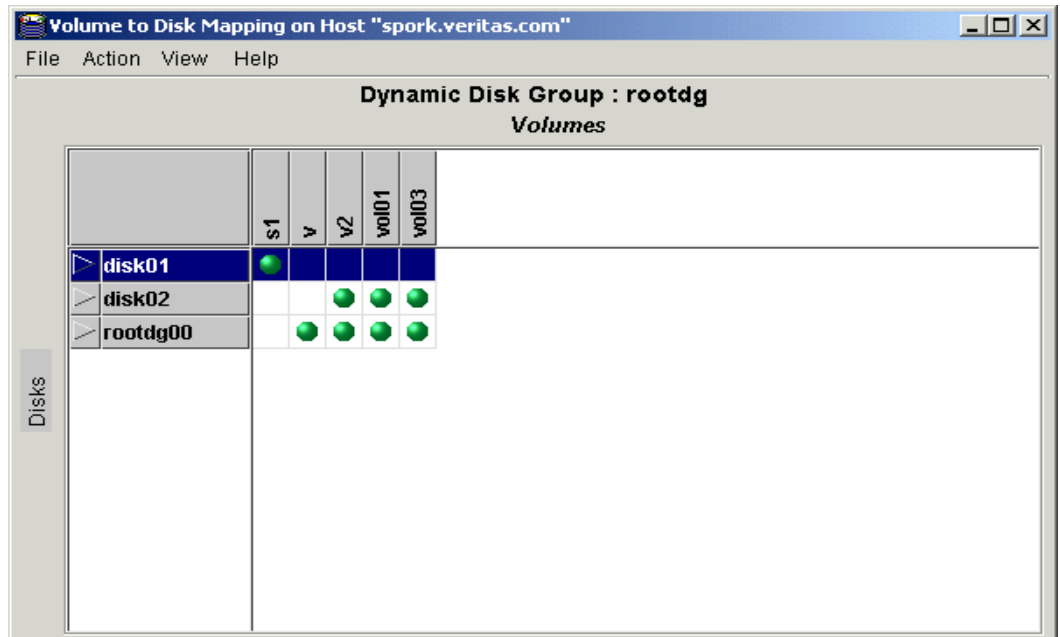
Navigating the Volume to Disk Mapping Window

You can view volumes and their associated disks using the following procedures:

◆ To display the Volume to Disk Mapping window for all volumes in a disk group, click on the disk group (in the main window grid) and then choose **Actions** > **Disk/Volume Map**.

◆ To display all of the subdisks and gaps on a particular disk, click the arrow to the left of the disk name. Any subdisks and gaps are listed below the disk name. To hide the subdisks and gaps, click the arrow again.

◆ To display all of the subdisks and gaps on all disks, choose **View** > **Expand All**. To hide all of the subdisks and gaps on all disks, choose **View** > **Collapse All**.

◆ To use the statistics collection feature, see Viewing Real-Time Statistics.

◆ To highlight a disk row, click on the disk name. To highlight a volume column, click on the volume name. To highlight both the disk and volume associated with a particular circle, click on the circle.

◆ Volumes with relatively slow read/write performance are shown as circular red icons.

◆ To change the criteria that determine which disks are displayed as slow performers, see Monitoring Performance.

◆ To print the properties of a particular object, select the object and then choose **File** > **Print** and complete the Print dialog box.

Mapping Volumes to Disks

You can map a plex to the associated disk by bringing up both the Volume View and the Disk View. When you click on the plex in the Volume View, the corresponding disk in the Disk View is highlighted.

Object Properties Window

The Object Properties window contains detailed information about the selected object. The Properties window contains a set of tabbed pages, each of which contains information about the object and related objects. The tab labels and page contents vary, depending on the type of object selected. You can display a different page by clicking on the appropriate tab label. Some object properties can be changed through the Properties window for the object. For instructions on navigating the Object Properties window, see "Navigating the Object Properties Window" on page 22.

"Volume Properties Window" shows how a volume appears in the Volume Properties window.

Volume Properties Window

Properties [spork]	
General	
▥	11
Layout:	Mirror Concatenated
Status:	Healthy
Copies:	2
Read policy:	Based on layouts
Group name:	rootdg
Raw Device Path:	/dev/vx/rdsk/rootdg/11
Block Device Path:	/dev/vx/dsk/rootdg/11
Size:	11 MB ▽
Comment:	

OK   Apply   Cancel

Navigating the Object Properties Window

You can view object properties using the following procedures:

◆ To view the properties of an object, click on the object (in the main window grid) and then choose **Properties** from the **Selected** or popup menu. You can also access the Properties window by double-clicking on the object.

Example:

To display volume properties, either click on a volume and then choose **Volumes** > **Properties** or double-click on a volume.

Note Double-clicking on an object that has children may display the children of the object instead of the Properties window.

◆ To go to a tab in a properties window, click the appropriate tab label.

◆ To update the contents of the Properties window to reflect current properties for the object, click Refresh.

◆ To change any of the editable items in the Properties window, make the appropriate changes and then click **OK**. This changes the settings for *all* properties tabs in the Properties window.

Multiple Selections

You can select more than one object from a list (for example, when you need to add several disks into a disk group) using the SHIFT and CONTROL keys in conjunction with the left mouse button.

Use the SHIFT key to select a range of objects.

Use the CONTROL key to select individual objects.

Accessing Tasks

Most VEA tasks are performed by selecting objects and/or tasks and then completing the resulting dialog boxes. With VEA, you can access tasks from the menu bar and from a context-sensitive popup menu.

Viewing Task History

VEA logs all task requests. You can view the task history (including tasks in progress) using the Task History window, or the Command Log file.

The Task History window displays a history of tasks performed in the current session (and any other sessions running on the machine). Each task is listed with properties such as the task name, the task status, and the start/finish times.

To display the Task History window, click on **Tasks** at the bottom of the main window.
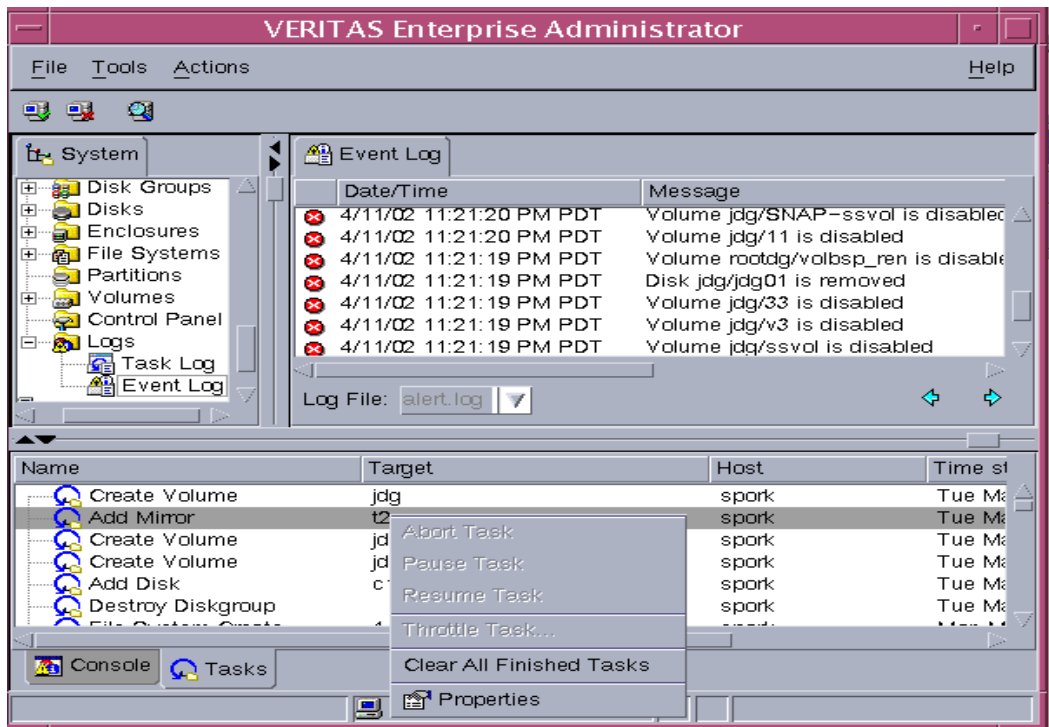
For a selected task, you can use the popup menu options: **Abort Task** to cancel the task; **Pause Task** to temporarily stop a task, **Resume Task** to continue the task; and **Throttle Task** to throttle a task.

Task Throttling

Task Throttling causes an operation to pause for the allowed amount of time whenever a disk I/O is performed, allowing the CPU to perform other tasks.

Select the popup menu option **Throttle Task** to change the task priority. You can change the priority for a single task, or select **Throttle All Tasks** to apply the priority to all Volume Manager Tasks. Click **Ok** to complete your selection.

Clearing Finished Tasks

Tasks are persistent in the Tasks console. To remove completed tasks from the window, select **Clear All Finished Tasks** from the popup menu.

Viewing Task Properties

To view task properties and the low-level commands used to perform a task, select the task and choose **Properties** from the popup menu. You can also access task properties by double-clicking on the task.

Command Log

The command log file contains a history of VEA tasks performed in the current session and previous sessions. It contains a description of each task, along with properties such as the start/finish times and the low-level commands used to perform the task. For failed tasks, the command log includes any relevant error messages. The command log file resides, and can be viewed, at /var/vx/isis/command.log.

The following example shows a sample command log file entry:

```
Description: Add Log to Volume
Date: Wed April 17 4:36:11 2002
Command: /usr/sbin/vxassist  -g datadg addlog data vol
Output: vxvm:vxassist: ERROR: Volume datavol-L01: Volume's logging
type not supported
Exit Code: 20
```

Search/Report

The Search/Report feature allows you to search for objects on the system running VxVM.

To invoke the Search/Report feature, choose **Tools** > **Search**. This brings up the "Search on Host" dialog.
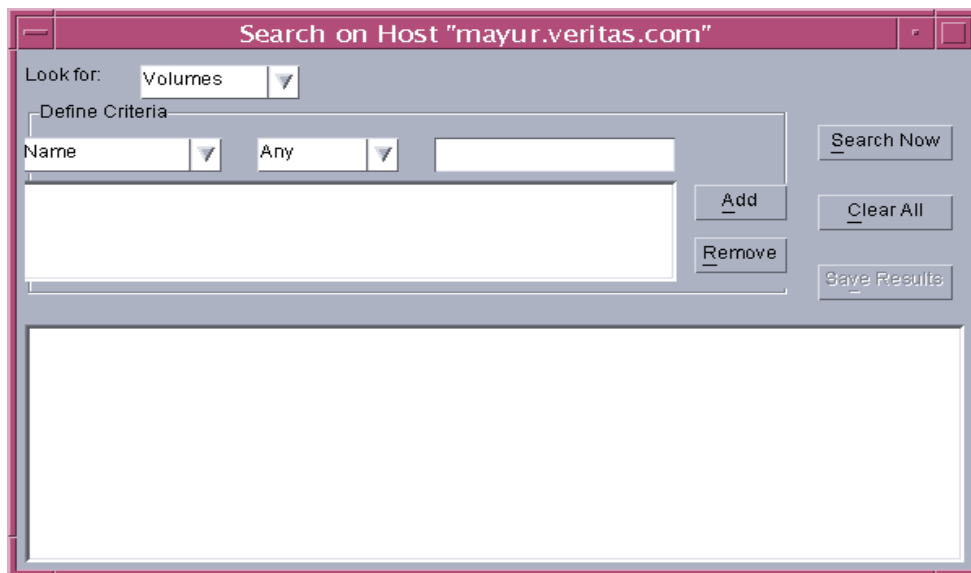
How to use the Search/Report Feature

1. In order to find an object, you must first select the object type (under **Look for:**).

   Object types include:

   - Volumes
   - Disks
   - Dynamic Disk Groups
   - Controllers
   - Enclosures
   - File systems

2. Once you have chosen the object type, you define the search criteria (under **Define Criteria**):

   The criteria menu selection is based on the object type you have selected.

   If you chose Volumes, the available Attributes are:

   - Name
   - Dynamic group name
   - Size

- Status

- Disk

- Device

If you chose Disks, the available Attributes are:

- Name

- Dynamic group name

- Size

- Status

- Device name

- Free space

If you chose Dynamic Disk Group, the available Attributes are:

- Name

- Imported

- Size

- Free space

3. Once you have chosen an Attribute, you must choose how to compare the object.

The possible ways to compare the object change with your previous selections, and are limited to:

- Any

- Contains

- Starts with

- Ends with

- Is

- Is not

- True

- False

- Greater than

- Less than

- Equal to

4. If you did not select the Status or Imported attribute, you must enter a number into the value box. The attribute of the object type you selected will be compared with the value you enter in the way you selected. If you selected the Status attribute, you will need to select a value from Unitialized, Healthy, Stopped, Degraded, and Failed.

5. If you selected the Size or Free space attribute, you will also need to define the unit of measurement (Sectors, KB, MB, GB, TB).

6. Use the **Add** and **Remove** buttons to add and remove search statements.

7. Click the **Search Now** button to perform the search.

Example:

If you search for a Volume (object type), with a Size (attribute), of greater than (compare), 10 MB(value), the search will only display volumes with a capacity of greater than 10 MB.

8. If you wish to save the search results, click the **Save Results** button.

   - The Save Dialog box appears. Select the path or folder you want the file to save to.

   - Enter a name for the file into the File name field.

   - Click Save to save the file and close the dialog box.

Note If you save the file with the .XML file extension, the file will be in XML format.

Performance Tuning

When a program or device uses too much disk I/O, bottlenecks can occur, creating a hot spot and degrading performance. You can make adjustments by moving subdisks from an area of high I/O usage to another disk that has lower usage.

The VxVM statistics function provides I/O statistics to allow you to do performance tuning to improve overall disk and system performance.

You can improve disk and system performance by identifying I/O bottlenecks, or *hot spots;* then moving data among physical drives to evenly balance the I/O load among the disk drives. This is known as *load balancing*.

See also:

◆ Real-time Statistics Collection and Display

◆ Load Balancing

◆ Disk Failure or Removal

◆ Disk Phaseout

Real-time Statistics Collection and Display

To set up real-time statistics collection and display, you need to Select Online Display Options.

Select Online Display Options

Use the following procedure to set the display options.

▼ **To select the online data display options:**

1. Choose **Tools > Statistics > Online Data Display Options** to bring up the Online Display Options window.
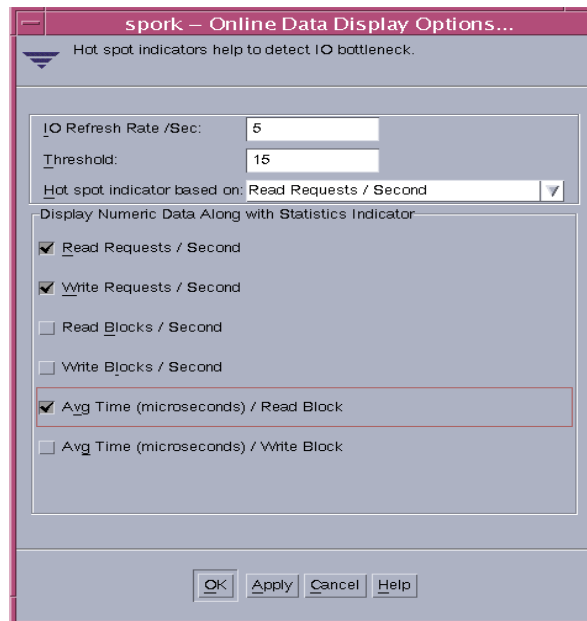
2. Select the checkboxes for the required statistics parameters.

- **Read Requests/Second**

  The number of read requests per second for selected storage objects.

- **Write Requests/Second**

  The number of write requests per second for selected storage objects.

- **Read Blocks/Second**

The amount of read request data (in blocks per second) that is processed for selected storage objects. It is the throughput on the read requests made.

- **Write Blocks/Second**

  The amount of write request data (in blocks per second) that is processed for selected storage objects. It is the throughput on the write requests made.

- **Avg Time (microseconds)/Read Block**

  The average time in microseconds that it takes to process a read block from the time a request is made until the data is returned.

- **Avg Time (microseconds)/Write Block**

  The average time in microseconds that it takes to process a read block from the time a request is made until the data is returned.

By default, all the statistical parameters will be enabled.

3. Set **I/O Refresh Rate/Sec**.

   This is the time interval of the refresh of the data collection screen display. The program continuously runs the actual statistics in the background, but changes the display of them on the Online Monitoring according to the refresh rate you set.

4. Set **Threshold**.

   The Threshold is the minimum amount of I/O per second that a disk or subdisk has to have to display a color other than blue. Blue is the lowest state, Low I/O activity. The default threshold is 15.

5. Set **Hot spot indicator based on** category.

6. When you are finished with your changes, click **OK**.

Viewing Real-Time Statistics

You can view real-time statistics in the Volume to Disk Mapping Window. By default, the Volume to Disk Mapping Window comes up with statistics collection switched off. To turn it on, you need to:

◆ Select the disk group to be monitored

◆ Select **Actions > Disk/Vol Map**

◆ Select:

- **View** > **Collect Statistics**

Statistics are accumulated from when they were reset (usually they are reset when the system boots/reboots, or at object creation, whichever is most recent).

- **View** > **Compare on Refresh**

Each statistic request is compared with the last one to determine where the current high I/O activity is occurring.

Monitoring Performance

You can change the criteria that determine which disks are displayed as slow performers. Select **View** > **Perf. Monitoring Parameters** and complete the Performance Monitoring Parameters dialog box. This dialog box allows you to configure how many disks are shown as slowest and next slowest performers, the sampling interval, and whether to show the slowest performers for reading, for writing, or for both reading and writing.

Load Balancing

If disk activities are heavily concentrated on one or a small number of disks in the storage subsystem, it may create bottlenecks. You can use the **Moving a Subdisk** and possibly the **Splitting a Subdisk** features to spread out disk accesses more evenly across all the disks to balance the load.

If a disk has High or Critical I/O activity (shown by a red or yellow pie symbol), you may consider moving one or more of its subdisks to another disk that shows below average I/O activity (shown by a blue pie symbol). The idea is to move just enough activity to achieve balance. A careful study of the statistics for the disk with Critical activity may identify the best subdisks to move. You should move subdisks only when a disk has High or Critical I/O activity over a prolonged period of time and performance is affected. Moving a subdisk to another disk has an effect on I/O as well, but it should be compensated for by the other disk having much lower I/O activity. You would need to look at the statistics after the subdisk move to see whether the move was effective in balancing the load.

Disk Failure or Removal

Moving a subdisk for redundant volumes (mirrored or RAID-5) will use the redundant data to recreate the subdisk on the healthy disk. However, for nonredundant volumes (concatenated or striped), the data cannot be recreated and doing subdisk move will therefore lose data, which could be recovered if the disk can be repaired. Thus, when you attempt to move a subdisk from a failed or missing disk that has nonredundant data, a dialog box comes up that asks you if you want to force the move. You may want to force

the move if you don't need the data anymore or you can no longer recover the data. By doing so, you will retain the volume structure but there is no guarantee that the data will be recoverable.

Use the **Moving a Subdisk** feature to move the part of a volume that is on a failed or missing disk to a healthy one.

Disk Phaseout

When a disk starts getting intermittent I/O errors and shows signs of hardware fatigue, you can use the **Moving a Subdisk** feature to move all its subdisks to healthier disks. The benefit of moving subdisks instead of copying the volumes is that you need only enough space on the receiving disks for the subdisks on the one failed disk, not for entire volumes that may span multiple disks. Another advantage is that there is no interruption in I/O.

Moving subdisks provides you a flexible means of making adjustments in your storage system while it is up and running.

Setting Preferences

To set VxVM view and dialog preferences, select **Tools** > **Preferences** > then select the **Volume Manager** tab. The VxVM Preferences window appears. When you have made your changes:

◆　Press **Apply** to apply the changes.

◆　Press **Reset** to revert back the changes.

◆　Press **OK** to apply and dispose the Preference window.

◆　Press **Cancel** to discard and close the Preference window.

Preferences Window
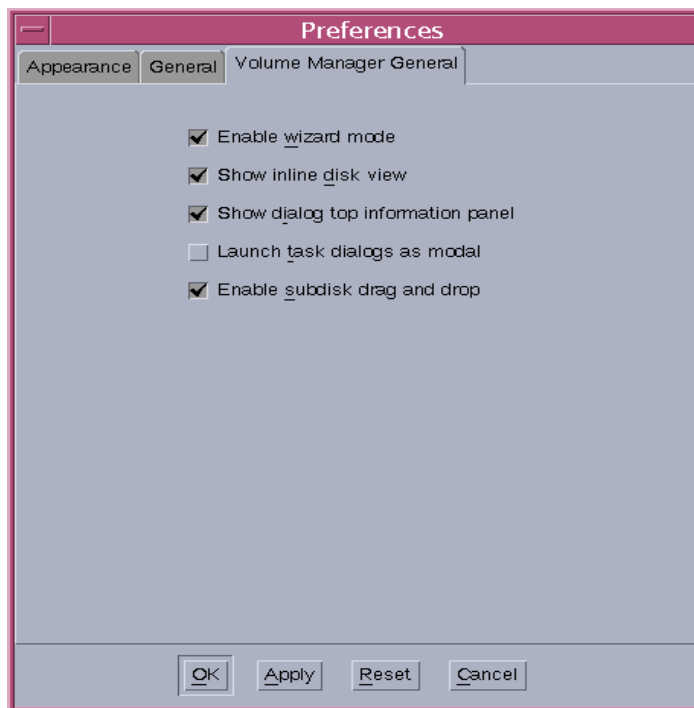
Enable Wizard Mode

Check this box if you want to use the VxVM wizards.

Show Inline Disk View

Check this box if you want to show the disk view tab on any objects that have associated disks. (This view can take a long time to render in a configuration having a large number of objects.)

Show Dialog Top Information Panel

Check this box if you want to show information about an object selected in the tree while you are viewing its related objects in the table.

Launch Task Dialogs as Modal

Check this box if you want to prevent access to other dialogs until the task dialog box is closed.

Enable Subdisk Drag and Drop

Check this box if you want to use the drag and drop feature for subdisks.

Disk Tasks 3

VxVM VEA provides you with easy-to-use interfaces for performing tasks and procedures associated with:

◆ Managing Disks

◆ Managing Dynamic Disk Groups

The Disk Task Roadmap summarizes these tasks.

Managing Disks

The following tasks are associated with disk management:

- Adding a Disk to VxVM

- Scanning Disks

- Commands for Hot Relocation

- Reserving a Disk

- Renaming a Disk

- Onlining a Disk

- Mirroring a Disk

- Evacuating a Disk

- Disconnecting a Disk

- Replacing Disk

- Recovering Volumes on a Disk

- Removing a Disk from a Dynamic Disk Group

- Forcing Initialization of a Disk

- Viewing Disk Properties

- Disabling a Controller

- Enabling a Controller
- Renaming an Enclosure

Managing Dynamic Disk Groups

Note "dynamic disk groups" are sometimes referred to as "disk groups" in CLI and menu displays.

The following tasks are associated with dynamic disk group management:

- Creating a Dynamic Disk Group
- Upgrading a Dynamic Disk Group Version
- Renaming Dynamic Disk Groups
- Deporting Dynamic Disk Groups
- Importing Dynamic Disk Groups
- Recovering Volumes in Dynamic Disk Groups
- Clearing Relocation Information for Dynamic Disk Groups
- Destroying a Dynamic Disk Group
- Moving Objects Between Dynamic Disk Groups
- Splitting A Dynamic Disk Group
- Joining Dynamic Disk Groups
- Activating Dynamic Disk Groups
- Viewing Dynamic Disk Group Properties

Disk Task Roadmap

The following table provides a summary of common VxVM disk and dynamic disk group tasks.

To perform this task …	Use this procedure …
Disk Setup Tasks:	
Place new disks under VERITAS Volume Manager (VxVM) control	Adding a Disk to VxVM
Set up new dynamic disk groups	Creating a Dynamic Disk Group
Precautionary Tasks:	
Place the boot (root) disk under Volume Manager control	Adding a Disk to VxVM
Make an alternate boot (root) disk	Mirroring a Disk
Maintenance Tasks:	
Place additional disks under VxVM control	Adding a Disk to VxVM
Add more disk space to a dynamic disk group	Adding a Disk to VxVM
Create additional dynamic disk groups	Creating a Dynamic Disk Group
Upgrade a dynamic disk group	Upgrading a Dynamic Disk Group Version
Recovery Tasks:	
Move volumes off failing disks	Evacuating a Disk
Replace failed disks	To replace a disk drive
Attempt to recover all volumes on a disk	Recovering Volumes on a Disk
Attempt to recover all volumes in a dynamic disk group	Recovering Volumes in Dynamic Disk Groups
Other Tasks:	
Change a disk name	Renaming a Disk
Change a dynamic disk group name	Renaming Dynamic Disk Groups
Move objects between dynamic disk groups	Moving Objects Between Dynamic Disk Groups
Split a dynamic disk group	Splitting A Dynamic Disk Group
Join dynamic disk groups	Joining Dynamic Disk Groups
Restore access to an offline disk	Onlining a Disk

To perform this task …	Use this procedure …
Temporarily prevent access to a dynamic disk group	Deporting Dynamic Disk Groups
Restore access to a deported dynamic disk group	Importing Dynamic Disk Groups
Remove a disk from VxVM control	Removing a Disk from a Dynamic Disk Group
Destroy a dynamic disk group (permanently)	Destroying a Dynamic Disk Group

Adding a Disk to VxVM

New disks must be set up on the system, placed under VxVM control, then added to a dynamic disk group before they can be used for volumes. The **Actions** > **Rescan** task scans for new devices.

When you place a disk under VxVM control, the disk is either encapsulated (if your system supports encapsulation) or initialized. Encapsulation preserves any existing data on the disk in volumes. Initialization destroys any existing data on the disk. (You can encapsulate a disk to preserve the data.)

This task assigns a default VxVM disk name to the disk. Once the disk is under VxVM control, you can use the **Rename Disk** task (Renaming a Disk) to change the VxVM disk name (see "Renaming a Disk" on page 41).

Adding a Disk to a Dynamic Disk Group

Select the uninitialized disk to be placed under VxVM control.

1. Choose **Actions** > **Add Disk to Dynamic Group**. The Add Disk to Dynamic Group wizard appears. Click **Next** to continue.

2. Complete the Add Disk to Dynamic Group wizard as follows:

Dynamic disk group name:	Select the dynamic disk group into which the disks will be added. To add the disk(s) to a new dynamic disk group, select **New dynamic disk group** , and enter the name of the new dynamic disk group in the new dialog box.
Available disks: Selected disks:	Move the disks to be added from Available disks to Selected disks.

When you have provided all necessary information in the dialog box, click **Next**.

3. When the confirmation dialog box appears, click **Yes** to confirm your selection.

4. Click **Finish** to add the disk to the selected group.

5. If your system supports encapsulation, you now indicate whether the disk should be initialized or encapsulated. (It is necessary to reboot the system before encapsulation takes effect.)

Notes:

- The **Add Disk to Dynamic Group** task sets up disks for VxVM use. Disks must be under VxVM control and in a dynamic disk group before they can be used to create volumes.
- Disks must be online before they can be added to a dynamic disk group.
- Disks that already belong to a dynamic disk group cannot be added to another dynamic disk group.
- Disks cannot be added to deported dynamic disk groups.

Scanning Disks

When VxVM rescans disks, it scans all attached disks for disk configuration changes. It also updates information on removable media, CD-ROM drives, basic volumes, file systems, and drive letters.

Rescanning disks can take several minutes, depending on the number of hardware devices installed.

- You should rescan disks when you remove disks from or add disks to a computer.

- From the **Actions** menu, select **Rescan**.

  A dialog box comes up with the message "Getting hardware configuration. Please wait." The box also displays a progress bar showing the percentage of completion for the rescan process.

Reserving a Disk

The **Set Disk Usage** feature can be used to designate a disk as a reserved disk. A reserved disk is not considered part of the free space pool. If you perform a task that requires disk space and you do not specify a disk, VxVM VEA allocates space from disks other than the reserved disk.

▼ **To reserve a disk**

1. Follow the instructions in Adding a Disk to VxVM to place the disk under VxVM control and in a dynamic disk group.

2. Select the disk to be reserved.

3. Choose **Action** > **Set Disk Usage**.

4. In the Set Disk Usage window, check the **Reserve Disk** option. Click **OK**.

(To cancel the disk reservation, open the Set Usage window, and uncheck the **Reserve Disk** option.)

Notes:

- Before you select the **Reserve Disk** option, make sure the disk is under VxVM control and in a dynamic disk group.
- A reserved disk is not available for general use.
- A reserved disk can only be used if you specify the reserved disk when you perform a task.

Renaming a Disk

The **Rename Disk** procedure changes the VxVM name assigned to a disk. The VxVM disk name is the name given to the disk by the administrator or VxVM. This procedure does not change the physical disk name (device name).

▼   **To rename a disk**

1. Select the disk to be renamed.

2. Choose **Actions** > **Rename Disk**.

3. Complete the Rename Disk dialog box as follows:

Disk Name:	If the correct disk name does not already display in this field, enter the disk name to be changed.
New Name:	Enter the new VxVM disk name.

When you have provided all necessary information in the dialog box, click **OK**.

Notes:
◆   The **Rename Disk** task requires the current disk name and a new disk name.
◆   The new disk name must be unique within the dynamic disk group.
◆   The disk must be in an imported dynamic disk group.

Onlining a Disk

The **Online Disk** procedure restores access to a disk that has been taken offline. The disk is made accessible to VxVM again. After bringing a disk back online, the disk must be added to a dynamic disk group before it can be used for volumes (see "Adding a Disk to VxVM,").

▼ **To bring a disk online**

1. Select the disk to be brought online.

2. Choose **Actions** > **Online Disk**.

3. Enter **Yes** to confirm disk offline.

Notes:

- When a disk is brought online, the disk is accessible again.
- Only disks in the offline state can be brought online.

Mirroring a Disk

The **Mirror Disk** procedure mirrors (copies) all concatenated and striped volumes on a disk onto another disk. You can use this procedure to mirror any disk that contains concatenated or striped volumes.

▼ **To mirror all volumes on a disk**

1. Select the disk that contains the volumes to be mirrored onto another disk.

2. Choose **Actions > Mirror Disk**.

3. Enter the target disk name in the Mirror Disk. Click **OK**.

Notes:
- The **Disk Mirror** task requires a disk name.
- Only concatenated and striped volumes that reside on a single disk are mirrored onto the other disk. Any RAID-5 or spanned volumes on the disk are ignored.
- Only disks in the same dynamic disk group can be used to create the new mirrors.
- The target disk must contain sufficient space to accommodate the mirrors.
- A new mirror cannot be created on a disk that already contains a copy of the volume.
- If no disks are assigned, VxVM uses available disk space to create the mirrors.

Evacuating a Disk

This feature is similar to disk replacement, but it involves moving the contents of the volumes on one dynamic disk to another dynamic disk. If a disk begins to fail, you can attempt to protect/preserve the volumes on that disk by evacuating the disk. You can also evacuate a disk if you plan to remove the disk or use the disk elsewhere. The other dynamic disk does not have to be empty. The active redundant volumes on the replacement disk will be synchoronized automatically.

To Evacuate a disk:

1. Right click on the disk you wish to evacuate.

2. Select **Evacuate Disk**.

3. The Evacuate Disk dialog will appear. Select either "Auto Assign destinations disks" or "Manually assign destination disks".

   a. If you chose "Manually assign destination disks" add the destination disks by clicking on the disk and clicking the **Add** button.

   Remove disks from the selected destination disks by clicking on the disk and clicking the **Remove** button.

4. Click the **OK** button to Evacuate the disk.

   When you have provided all necessary information in the dialog box, click **OK**.

Notes:

- The contents of a disk must be evacuated/moved to another disk in the same dynamic disk group with sufficient free space.
- If no target disk is specified, VxVM uses an available disk with sufficient free space.
- If the disk being evacuated contains part of a mirrored, striped, or RAID-5 volume, do not move the contents of the disk to another disk containing a copy of the mirrored volume or part of the striped/RAID-5 volume.

Disconnecting a Disk

The **Disconnect Disk** procedure disconnects a VxVM disk from its underlying physical disk. You can disconnect a disk in preparation for the replacement of a physical disk. After disconnecting a disk, you can use the Replacing Disk task to reconnect the disk (see "Replacing Disk" on page 46).

▼ **To disconnect a disk**

1. Select the disk to be disconnected.

2. Choose **Actions** > **Disconnect Disk**.

3. Press **OK** to confirm disconnection.

Notes:
◆ Disconnecting a disk that contains volumes can result in loss of data or redundancy.

Replacing Disk

Disks most often need replacing when they fail or start to behave strangely. A failed or removed dynamic disk can be replaced, and active redundant volumes (mirrored and RAID-5) on the replaced disk will be resynchronized automatically after disk replacement.

Failed volumes on the replaced disk, however, will stay failed after disk replacement because no valid data is available for copy. These underlying steps are handled automatically when the disk replacement is performed using VxVM VEA.

Caution This operation alters the partitioning of a disk.

The disk replacement procedure can only be performed on a disk that has failed. VxVM VEA indicates a failed disk by renaming it "Missing Disk". If the disk replacement is successful, the replacement disk will take on the attributes of the failed disk, including the Disk Name.

Note This option is only available on Missing Disks.

To replace a disk drive

1. Right click on the missing disk.

2. Select **Replace Disk**.

   A Dialog box appears containing a list of Empty Basic Disks.

3. Select the Disk you wish to use to replace the Missing Disk. To select a disk, click on the corresponding circle next to the Disk or Disks.

4. Click **OK** to perform the Disk Replacement.

Notes:

- ◆ The **Replace Disk** task requires the name of the disk to be replaced and the replacement disk name.
- ◆ The disk to be replaced must be disconnected or removed from its dynamic disk group. If the disk has not failed, remove the disk from its dynamic disk group before you replace the disk.
- ◆ The new disk can be a disk in the free disk pool or an uninitialized disk. If the new disk is uninitialized, the **Replace Disk** task places the disk under Volume Manager control.
- ◆ The new disk is placed in the dynamic disk group of the old disk.

Recovering Volumes on a Disk

The **Recover Disk** procedure performs any necessary volume recovery operations on the volumes on a given disk. The recovery operations depend on the types of volumes on the disk and include starting disabled volumes, resynchronizing mirrors in mirrored volumes, and resynchronizing parity in RAID-5 volumes. After successful recovery, the volumes are again available for use.

Alert icons and the Alert Monitor window may provide clues to let you know that volume recovery is needed.

▼ **To recover all volumes on a disk**

1. Select the disk containing the volumes to be recovered.

2. Choose **Actions** > **Recover Disk**.

3. Click **OK** to complete the recover disk procedure.

> **Note:**
>
> In some cases, recovery is not possible. If the volume recovery fails, you can attempt to restore the volume from backup.

Removing a Disk from a Dynamic Disk Group

You can remove a disk from a dynamic disk group if there are no volumes on the disk. If volumes exist, you must delete them before you can revert the disk. Disks shown in Volume Manager to be **Unreadable** as well as **Foreign** can be removed, but doing so causes you to lose all existing data on the disk that is removed from the group. If a disk has failed and is marked as Missing, you can also remove it from the dynamic disk group.

To remove a disk from a dynamic disk group, use the **Remove Disk from Dynamic Disk Group** command.

Note You cannot remove the last disk from a disk group.

The steps for removing a disk from a dynamic disk group are as follows:

1. Right-click on the selected disk or on the Dynamic Disk Group and select **Remove Disk from Dynamic Disk Group**.

2. The first screen of the Remove Disk wizard appears. Click **Next** to continue.

3. Make sure the proper disk or disks that you want to remove are showing in the right pane of the window and click **Next** to continue.

The **Remove Disk from Dynamic Disk Group** procedure removes the disk from VxVM control. If the disk to be removed contains volumes, you must evacuate the disk before you remove the disk.

When you have provided all necessary information in the dialog box, click **OK**.

Notes:
◆ If the disk contains a volume that has only one mirror and either has a mounted file system or is used as a swap area, you must evacuate the disk before you remove it.
◆ When a disk is removed from a dynamic disk group or VxVM control, the disk cannot be accessed.
◆ A disk that is in use (that is., contains volumes) must not be removed. Removing a disk with volumes can result in loss of data or data redundancy. If volumes exist on the disk to be removed, use the **Evacuate Disks** task to move the volumes to another disk.
◆ The last disk in a dynamic disk group cannot be removed. To remove the last disk in a dynamic disk group, the dynamic disk group must be destroyed. The last disk in the `rootdg` dynamic disk group can never be removed.
◆ Any non-redundant volumes on the removed disk become disabled.

Forcing Initialization of a Disk

> **Caution**   Forcing the initialization or reinitialization of a disk can result in data loss.

The **Initialize Disk** procedure forces the initialization of a disk. This task is intended for use in troubleshooting disks that have already been placed under VxVM control. To initialize a disk for VxVM use, use the **Add Disks** task instead (see Adding a Disk to VxVM).

▼ **To (re)initialize a disk**

1. Select the disk to be initialized.

2. Choose **Actions** > **Initialize Disk**.

3. Complete the **Initialize Disk** dialog box as follows:

Disk Name:	If the correct disk name does not already display in this field, enter the disk name.

When you have provided all necessary information in the dialog box, click **OK**.

Notes:

♦   The **Initialize Disk** task requires a disk name.

♦   The **Initialize Disk** task forces the (re)initialization of a disk and can result in data loss.

♦   The **Initialize Disk** task overwrites existing disk header and configuration information on the disk. Any volume copies or regions located on the disk are not accessible after you reinitialize the disk.

Viewing Disk Properties

The Disk Properties window contains detailed information about the selected disk. The following information is displayed.

Category	Description
Disk	Name of disk in VxVM.
Group Name	Name of dynamic disk group associated with the disk.
Type	Field is Dynamic.
Status	Fields are Imported and Deported.
Capacity	Size in megabytes or gigabytes
Unallocated Space	Amount of free space that is available to create a partition or volume.
Spare	Indicates whether or not the disk has been designated as a hot spare.
Reserved	Indicates whether the disk is reserved Not to be used as a dynamic disk.
No Hot Use	Indicates whether the disk is not to be used as a hot spare or to receive volumes from the Hot Relocation procedure.

Disabling a Controller

The controller **Disable** procedure disables I/O to a controller.

Caution	If your system supports the Dynamic Multipathing (DMP) feature; it should be noted that performing the controller Disable procedure will prevent DMP from accessing the paths associated with a controller.

You can disable access to a controller in preparation for hardware maintenance.

▼ **To disable a controller**

1. Select the controller to be disabled.

2. Choose **Actions > Disable**.

3. Complete the Disable Controller dialog box as follows:

Options	◆ To disable all enclosures (disk arrays) associated with this controller, select **All Enclosures**.
	◆ To disable specific enclosures associated with this controller, enter the enclosure names in the Selected Enclosures field.

When you have provided all necessary information in the dialog box, click **OK**.

Notes:
◆ For systems that support rootability, the specified controller cannot contain the last enabled path to the root disk.

Enabling a Controller

The controller **Enable** procedure enables I/O to a controller. (If your system supports the DMP feature, and if DMP is enabled, then the **Enable** procedure also restores access to the paths associated with a controller.)

▼ **To enable a controller**

1. Select the controller to be enabled.

2. Choose **Actions > Enable**.

3. Complete the Enable Controller dialog box as follows:

Options	- To enable all enclosures (disk arrays) associated with this controller, select **All Enclosures**. - To enable specific enclosures associated with this controller, enter the enclosure names in the Selected Enclosures field.

When you have provided all necessary information in the dialog box, click **OK**.

Renaming an Enclosure

The **Enclosure Rename** procedure changes the name of an enclosure (disk array).

▼ **To rename an enclosure**

1. Select the enclosure to be renamed.

2. Choose **Actions** > **Enclosure Rename**.

3. Complete the Rename Enclosure dialog box as follows:

Enclosure Name:	If the correct enclosure name does not already display in this field, enter the name.
New Name:	Enter the new enclosure name.

When you have provided all necessary information in the dialog box, click **OK**.

Notes:
◆ The **Enclosure Rename** task requires the current enclosure name and a new enclosure name.
◆ The new enclosure name must be unique within the dynamic disk group.

Creating a Dynamic Disk Group

The **New Dynamic Disk Group** procedure creates an additional dynamic disk group. Disks must be placed in dynamic disk groups before they can be used by VxVM. The default disk group (`rootdg`) is usually created during VxVM installation and always exists on a system running VxVM. You can create additional dynamic disk groups to organize your disks into logical sets of disks.

When you place a disk under VxVM control, the disk is initialized. Initialization destroys any existing data on the disk. (If your system supports encapsulation, you can use encapsulation to preserve disk data.)

The steps for creating a new dynamic disk group are:

1. Select the Disk Groups folder, or select a disk.

2. Select **Actions > New Dynamic Disk Group**.

   The New Dynamic Disk Group wizard screen appears.

3. Click **Next** to continue. A new screen appears.

4. Enter a name for the dynamic disk group and select which disks you want to include in the group. Make sure the disks you want to include are in the right pane of the window, and click **Next**.

   When you have provided all necessary information in the dialog box, click **OK.**

5. The next screen confirms the disks you have selected. Choose **Next** to continue if you are satisfied with the disk selection. If you are not satisfied, you can click the **Back** button to go back to the previous screen in order to modify your disk choices.

6. Normally, you would add all the disks you want in the group at this point. You can always add more disks later with the **Add Disk to Dynamic Disk Group** command.

   Indicate whether the disk should be initialized or encapsulated. If you initialize the disk, any existing data on the disk will be destroyed. If you encapsulate the disk, any existing data will be preserved in volumes.

7. If you chose to encapsulate the disk, reboot the system.

Notes:

- The **New Dynamic Disk Group** task requires a dynamic disk group name and the name of at least one disk.
- The dynamic disk group name must be unique.
- The new dynamic disk group must contain at least one disk.
- Only disks that are online and do not belong to a dynamic disk group can be used to create a dynamic disk group.
- The Volume Manager disk name must be unique within the dynamic disk group.
- If multiple disks are specified in the Disk Device(s) field and only one disk name is specified in Disk Name(s) field, VxVM appends numbers to the disk name so that each disk name is unique within its dynamic disk group.

Upgrading a Dynamic Disk Group Version

Note This procedure is not to be confused with upgrading to a dynamic disk.

The **Dynamic Disk Group Upgrade** procedure upgrades a dynamic disk group to the dynamic disk group version that is compatible with the current VxVM release. Some new features and tasks only work on dynamic disk groups with the current dynamic disk group version, so you must upgrade existing dynamic disk groups before you perform these tasks. However, after you upgrade a dynamic disk group, you cannot access that dynamic disk group from machines running earlier releases of VxVM that do not support a higher current disk group version.

To determine if a dynamic disk group needs to be upgraded, select the dynamic disk group and open the Disk Group Properties window. The Version field of the Properties window indicates whether the dynamic disk group has been upgraded to the current dynamic disk group version.

▼ **To upgrade a dynamic disk group**

1. Select the disk group to be upgraded to the current version.

2. Choose **Actions > Upgrade Dynamic Disk Group Version**).

3. Confirm the upgrade by clicking **OK**.

Notes:
◆ If you have dynamic disk groups created with earlier releases of VxVM, these must be upgraded before they can take advantage of new features and tasks in the current release.
◆ If a dynamic disk group is upgraded to the current dynamic disk group version, you cannot import that dynamic disk group on a machine running an earlier VxVM release. Disk groups that must remain backward compatible with earlier releases of VxVM must not be upgraded.

Renaming Dynamic Disk Groups

The **Rename Dynamic Disk Group** procedure changes the name of an existing dynamic disk group. You can rename a dynamic disk group to provide a more appropriate name or to avoid a name conflict with a dynamic disk group to be imported.

▼ **To rename a dynamic disk group**

1. Select the dynamic disk group to be renamed.

2. Choose **Actions > Rename Dynamic Disks Group**.

3. Complete the Rename Dynamic Disk Group dialog box.

4. When you have provided all necessary information in the dialog box, click **OK**.

Notes:
◆ The **Rename Dynamic Disk Group** task requires the current dynamic disk group name and a new dynamic disk group name.
◆ The new dynamic disk group name must be unique.
◆ The **Rename Dynamic Disk Group** task deports and re-imports the dynamic disk group. If volumes in the dynamic disk group are in use, the deport fails and the dynamic disk group is not renamed.
◆ The **Rename Dynamic Disk Group** task updates the file system table file, if necessary.
◆ If the dynamic disk group contains volumes with mounted file systems, you may need to unmount the file systems.

Deporting Dynamic Disk Groups

The **Deport Dynamic Disk Group** procedure makes a dynamic disk group and its volumes inaccessible. Once deported, a dynamic disk group cannot be used until it is imported. You can deport a dynamic disk group to make the dynamic disk group *temporarily* unavailable.

While a dynamic disk group is deported, you cannot remove and reuse any of its disks. To remove disks, you must import the dynamic disk group and then either destroy the dynamic disk group (to remove all of its disks) or remove selected disks from the dynamic disk group.

▼ **To deport a dynamic disk group**

1. Select the dynamic disk group to be deported.

2. Choose **Actions** > **Deport Dynamic Disk Group**.

3. Click **OK** to complete the deportation.

Notes:

◆ The **Deport Dynamic Disk Group** task requires a dynamic disk group name.

◆ A deported dynamic disk group cannot be accessed. To access a deported dynamic disk group, the dynamic disk group must be imported.

◆ The `rootdg` disk group cannot be deported.

◆ A dynamic disk group cannot be deported if any volumes in that dynamic disk group are in use (open).

◆ When a dynamic disk group is deported, the host ID stored on all disks in the dynamic disk group is cleared and the dynamic disk group is not re-imported automatically when the system is rebooted. However, if you specify a host in New Host option, the specified host imports the dynamic disk group at reboot.

Importing Dynamic Disk Groups

The **Import Dynamic Disk Group** procedure makes a deported (inaccessible) dynamic disk group and its volumes accessible again. To import a deported dynamic disk group, you must know the former name of the dynamic disk group, and this name must not be in use. In addition, at least one disk name formerly assigned to the deported dynamic disk group must not be in use.

▼ **To import a dynamic disk group**

   1. Select the appropriate host machine node.

   2. Choose **Actions** > **Import Dynamic Disk Group**.

   3. Complete the Import Dynamic Disk Group dialog box as follows:

New Name:	Enter a new dynamic disk group name in the New Name field. to change the name of the dynamic disk group at import.
Clear host ID	Select **Clear host ID** to clear the existing host ID stamp on all disks in the dynamic disk group at import, Do not use this option if another host is using any disks in the dynamic disk group.
Force	Select **Force t**o force the dynamic disk group import when the host cannot access all disks in the dynamic disk group This option can be used to import a dynamic disk group that contains a failed disk, but can lead to dynamic disk group inconsistency if all disks are still usable.

When you have provided all necessary information in the dialog box, click **OK**.

Notes:
◆ Only deported dynamic disk groups can be imported.
◆ A deported dynamic disk group cannot be imported if another dynamic disk group with the same name has been created since the dynamic disk group was deported.
◆ When a dynamic disk group is imported, the system stamps its host ID on all disks in the dynamic disk group. A dynamic disk group import fails if one of the disks is stamped with a host ID that does not match the others. This ensures that dual-ported disks cannot be managed (and possibly corrupted) by two systems at the same time. If you are *sure* that the dynamic disk group is *not* in use by another host, you can clear the host IDs and import the dynamic disk group by selecting the **Clear host ID** option.

Recovering Volumes in Dynamic Disk Groups

The **Recover Dynamic Disk Group** procedure performs any necessary volume recovery operations on the volumes in a given dynamic disk group. The recovery operations depend on the types of volumes in the group and include starting disabled volumes, resynchronizing mirrors in mirrored volumes, and resynchronizing parity in RAID-5 volumes. After successful recovery, the volumes are again available for use.

Alert icons and the Alert Monitor window may provide clues to let you know that volume recovery is needed.

▼ **To recover all volumes in a dynamic disk group**

1. Select the dynamic disk group containing the volumes to be recovered.

2. Enter the dynamic disk group name if the correct dynamic disk group name is not shown in the dialog box.

3. Choose **Actions** > **Recover Dynamic Disk Group**.

4. Click **OK**.

Note:

In some cases, recovery is not possible. If the volume recovery fails, you can attempt to restore the volume from backup.

Commands for Hot Relocation

The Hot Spare and Hot Relocation procedures enable a system to automatically react to I/O failures on redundant (mirrored or RAID-5) volumes, and to restore redundancy and access to those volumes. The following commands can be used to perform relocation tasks:

◆ Undoing Hot Relocation

◆ Clearing Relocation Information for Dynamic Disk Groups

◆ Customizing Disks for Hot Relocation

Note The Hot Relocation and Hot Spare operations are only performed for redundant (mirrored or RAID-5) subdisks on a failed disk. Non-redundant subdisks on a failed disk are not relocated, but the system administrator is notified of their failure.

About Hot Spare and Hot Relocation

One or more disks in each dynamic disk group can be designated as hot spares by using the "set disk usage" command. These hot spare disks provide a location where data can be moved from failed disks or volumes.

In Hot Spare mode, all subdisks containing redundant volumes will be moved together from a failed disk to a spare disk. In order for the Hot Spare operation to occur, there must be enough free space on the spare disk for all the redundant volumes from the original disk.

When a disk fails, hot relocation automatically moves all subdisks containing redundant volumes from the failed disk to hot spare disks. If no disks have been designated as spares or there is not enough spare disk space, a combination of spare space and free space is used. Depending on available disk space, the subdisks are not always all moved to the same disk, but may be scattered within the dynamic disk group.

When a partial disk failure occurs (that is, a failure affecting only some subdisks on a disk), redundant data on the failed portion of the disk is relocated and the existing volumes comprised of the unaffected portions of the disk remain accessible.

When selecting space for relocation, hot relocation preserves the redundancy characteristics of the Volume Manager object that the relocated subdisk belongs to. For example, hot relocation ensures that subdisks from a failed plex are not relocated to a disk containing a mirror of the failed plex. If redundancy cannot be preserved using any available spare disks or free space, hot-relocation does not take place. If relocation is not possible, the system administrator is notified and no further action is taken.

When hot relocation takes place, the failed subdisk is removed from the configuration database and Volume Manager takes precautions to ensure that the disk space used by the failed subdisk is not recycled as free space.

Undoing Hot Relocation

The **Undo Hot Relocation** procedure relocates subdisks back to their repaired original disk or replacement disk and restores a system to its original configuration. If hot relocation scattered subdisks from a failed disk to several disks within a dynamic disk group, the undo hot relocation command will summon all of them back to a single disk without you having to find and move each one individually.

Note The **Undo Hot Relocation** procedure is only available after a hot relocation or hot sparing procedure has occurred.

1. Right-click on the dynamic disk group that contains the hot relocated volumes.

2. Select **Actions > Undo Hot Relocation**.

   A window appears showing the disks that failed and from which subdisks were hot relocated.

3. Select the disks you wish to unrelocate by clicking on the corresponding circle in the column under the check mark. The hot relocated subdisks will return to this disk.

4. Click **OK**.

Clearing Relocation Information for Dynamic Disk Groups

The **Clear Hot Relocation Info** command deletes the information that describes the original location of any subdisks that have been hot relocated. Use this command if you do not plan to move the subdisks back to their original configuration.

1. Right-click on a disk group that contains hot relocated subdisks.

2. Select **Actions > Clear Hot Relocation Info**.

3. A dialog box will appear asking if you are sure you want to clear the relocation information on the dynamic disk group. Click **Yes** if you want to clear the hot relocation information.

Caution   Once you clear the Hot Relocation Information, you will not be able to perform an Undo Hot Relocation on that dynamic disk group.

Notes:

- The **Clear the Relocation Info** procedure requires the name of the original disk (even if an alternate disk is specified).
- When a disk fails, the hot-relocation feature attempts to move subdisks from the failed disk to other disks. The **Clear the Relocation Info** procedure can be used to return the relocated subdisks to their original disk locations after the original disk is repaired or replaced.
- It is not possible to return relocated subdisks to their original disks after their dynamic disk group relocation information has been cleared with the **Clear the Relocation Info** task.

Customizing Disks for Hot Relocation

You can customize your disks in the following ways:

◆ Specify individual disks to act as Hot Spares

◆ Prevent a disk from being used for Hot Relocation or Hot Spare

◆ Mark a disk as Reserved

Each disk must be customized individually, you cannot set disk usage for a group of disks:

1. Click on the disk to be customized.

2. Choose **Actions** > **Set Disk Usage**.

   A window appears offering three options. The default is no options are selected.

   The Reserved disk option allows a disk to be marked so that it will not be used in automatic selection operations. For example, if a disk is marked as reserved, during the create new volume wizard using the default option to auto select disks, the volume would not be created on the reserved disk. However, if you wish to create a volume on that specific disk, you could choose the option to manually select the disks for the new volume and then select that disk.

3. A disk can be marked for use for spare only, or for neither hot spare or hot relocation. When you are satisfied with your selection, click **OK**.

You can review the settings for all your disks by selecting the Disks folder in the tree pane and then viewing Disks tab in the right pane. The settings for each disk are listed in the Spare, Reserved, and Hot Use columns.

Destroying a Dynamic Disk Group

> **Caution** Destroying a dynamic disk group can result in data loss.

The **Destroy Dynamic Disk Group** procedure *permanently* removes a dynamic disk group from VxVM control. This procedure also reinitializes all of the disks in the dynamic disk group as empty disks and places them in the free disk pool for reuse.

Destroy a dynamic disk group *only* if you are sure that you no longer need the volumes and data in the dynamic disk group. Since the last disk in a dynamic disk group cannot be removed, destroying a dynamic disk group is useful for freeing the last disk in a dynamic disk group for reuse.

▼ **To destroy a dynamic disk group**

1. Right-click on the appropriate host machine node.

2. Choose **Destroy Dynamic Disk Group**.

3. Complete the Destroy Dynamic Disk Group dialog box as follows:

Disk Group Name:	Enter the name of the dynamic disk group to be destroyed.

When you have provided all necessary information in the dialog box, click **OK**.

Notes:

- Use the **Destroy Dynamic Disk Group** task with caution. Destroying a dynamic disk group permanently removes the dynamic disk group from VxVM control and can result in data loss.
- When a dynamic disk group is destroyed, its disks are returned to the free disk pool. Any volumes in the dynamic disk group are removed.
- The `rootdg` disk group cannot be destroyed.
- A dynamic disk group cannot be destroyed if any volumes in that dynamic disk group are in use (open) and/or contain mounted file systems.

Moving Objects Between Dynamic Disk Groups

The following procedure moves a self-contained set of VxVM VEA objects between imported dynamic disk groups. This operation is performed on VxVM VEA objects such as disks or top-level volumes, and includes all component objects such as sub-volumes, plexes and subdisks.

▼ **To perform a dynamic disk group move operation:**

1. Right-click on the dynamic disk group to be moved.

2. Select Move Dynamic **Disk Groups**.

3. Complete the Move Dynamic Disk Group Dialog Box as follows:

Disk Group Name:	Enter the name of the dynamic disk group from which objects are to be moved or click **Browse** to select the dynamic disk group.
Target Disk Group Name:	Enter the name of the dynamic disk group into which objects are to be moved.
Select Objects to move:	Enter the objects to be moved. ♦ To select volumes to move, click **Move dynamic disk group by volumes**. To select all of the listed volumes, click **Add All.** ♦ To select disks to move, click **Move dynamic disk group by disks**. ♦ Click on **OK.**
Expand:	Click **Expand** to specify that the objects to be moved should include all other disks that contain subdisks that are associated with the specified objects or with objects that they contain. For example, if you specify that disk01 should be moved and disk01 contains vol1 which is also located on disk02, then by using the **Expand** button, you ensure that disk02 will also be moved.
Show Dependencies:	Click **Show Dependencies** to display the objects affected by the move.

Notes:

- Before moving volumes between dynamic disk groups, stop all applications that are accessing the volumes, and unmount all file systems that are configured in the volumes.
- The objects to be moved must be self-contained, meaning that the disks that are moved must not contain any other objects that are not intended for the move.
- This operation fails if it would remove all the disks from the source dynamic disk group.
- Volume states are preserved across the move.
- The reconfiguration must involve an integral number of physical disks.
- Objects to be moved must not contain open volumes.
- Data change objects (DCOs) and snap objects that have been dissociated by Persistent FastResync cannot be moved between dynamic disk groups.
- If your system supports VERITAS Volume Replicator (VVR), then it should be noted that VVR objects cannot be moved between dynamic disk groups.
- For a dynamic disk group move to succeed, the source dynamic disk group must contain at least one disk that can store copies of the configuration database after the move.
- For a dynamic disk group move to succeed, the configuration database in the target dynamic disk group must be able to accommodate information about all the objects in the enlarged dynamic disk group.
- The operation can only be performed on the master node of a cluster if either the source dynamic disk group or the target dynamic disk group is shared.

Splitting A Dynamic Disk Group

The dynamic disk group split operation involves splitting the contents of an imported dynamic disk group and creating a new dynamic disk group (the Target dynamic disk group) with the objects defined in the dialog box. This operation is performed on VxVM VEA objects such as disks or top-level volumes, and includes all component objects such as sub-volumes, plexes and subdisks.

▼ **To perform a dynamic disk group split operation:**

1. Select the dynamic disk group to be split.

2. Select **Actions > Split Dynamic Disk Groups**.

3. Complete the Split Dynamic Disk Group Dialog Box as follows:

Disk Group Name:	Enter the name of the dynamic disk group from which objects are to be split.
Target Disk Group Name:	Enter the name of the target dynamic disk group which will consist of the objects to be split.
Select Objects to move:	◆ To select volumes to move, click the checkbox **Split dynamic disk group by volume,** and choose from the displayed list. ◆ To select disks to move, click the checkbox **Split dynamic disk group by disk,** and choose from the displayed list.
Expand:	Click **Expand** to specify that the objects to be split should include all other disks that contain subdisks that are associated with the specified objects or with objects that they contain. For example, if you specify that disk01 should be split off and disk01 contains vol1 which is also located on disk02, then by using the **Expand** button, you ensure that disk02 will also be split off.

Notes:

- Before carrying out the split operation, stop all applications that are accessing the volumes, and unmount all file systems that are configured in the volumes.
- The objects to be split off must be self-contained, meaning that the disks that are split must not contain any other objects that are not intended for the move.
- This operation fails if it would remove all the disks from the source dynamic disk group.
- Volume states are preserved across the split.
- An existing deported dynamic disk group is destroyed if it has the same name as the target dynamic disk group.
- The reconfiguration must involve an integral number of physical disks.
- Objects to be split off must not contain open volumes.
- Data change objects (DCOs) and snap objects that have been dissociated by Persistent FastResync cannot be moved between dynamic disk groups.
- If your system supports VVR, then it should be noted that VVR objects cannot be moved between dynamic disk groups.

Joining Dynamic Disk Groups

This procedure joins two dynamic disk groups by moving all VxVM objects from an imported source dynamic disk group to an imported target dynamic disk group. The source dynamic disk group is removed when the join is complete. This operation is performed on VxVM VEA objects such as disks or top-level volumes, and includes all component objects such as sub-volumes, plexes and subdisks.

▼ **To perform a dynamic disk group join operation:**

1. Select the dynamic disk group to be joined.

2. Select **Actions > Join Dynamic Disk Group**.

3. Use the source dynamic disk group name shown or replace it with one from the pull-down menu.

4. Use the target dynamic disk group name shown, or replace it with one from the pull-down menu.

5. Click **OK**.

Note:

- Before performing a join operation, stop all applications that are accessing the volumes, and unmount all file systems that are configured in the volumes.
- The reconfiguration must involve an integral number of physical disks.
- Objects to be joined must not contain open volumes.
- Data change objects (DCOs) and snap objects that have been dissociated by Persistent FastResync cannot be moved between dynamic disk groups.
- If your system supports VVR, then it should be noted that VVR objects cannot be moved between dynamic disk groups.
- For a dynamic disk group join to succeed, both the source and target dynamic disk groups must contain at least one disk that can store copies of the configuration database after the split.

Activating Dynamic Disk Groups

If supported on your platform, the **Disk Groups Activation** procedure sets the activation mode for a dynamic disk group. The dynamic disk group activation mode controls read and write access to volumes in the specified dynamic disk group.

▼ **To activate a dynamic disk group**

1. Select the dynamic disk group to be activated.

2. Choose **Disk Groups > Activation**.

3. Complete the Activate Disk Group dialog box as follows:

Disk Group Name:	Enter the name of the dynamic disk group to be activated.
Activation Mode:	Select one of the following dynamic disk group activation modes: ◆ To disallow read and write access for volumes in the dynamic disk group, select **Off**. ◆ To allow read and write access for volumes in the dynamic disk group, select **Read Write**. ◆ To allow read only access for volumes in the dynamic disk group, select **Read Only**. If your system supports a cluster environment, you can select one of the following additional options for shared dynamic disk groups: ◆ To give the current node exclusive write access for volumes in the shared dynamic disk group, select **Exclusive Write**. No other nodes in the cluster can have write access to the dynamic disk group. ◆ To give the current node write access for volumes in the shared dynamic disk group, select **Shared Write**. Other nodes in the cluster can share write access to this dynamic disk group. ◆ To give the current node read access for volumes in the shared dynamic disk group, select **Shared Read**. The current node cannot have write access to the dynamic disk group, but other nodes in the cluster may have write access.

When you have provided all necessary information in the dialog box, click **OK**.

> **Notes:**
>
> - The **Disk Groups Activation** task requires a dynamic disk group name.
> - In a cluster environment, you must specify the dynamic disk group activation mode on a per-node basis.
> - If your system supports a cluster environment, then the **Exclusive Write**, **Shared Write**, and **Shared Read** modes are also applicable. The **Read Write** mode is not available for shared dynamic disk groups.
> - For shared dynamic disk groups, the default activation mode is **Off**. For non-shared dynamic disk groups, the default activation mode is **Read Write**.
> - Disk group activation settings are not persistent, so you may need to reset the activation mode after rebooting the machine.

Viewing Dynamic Disk Group Properties

The Disk Group Properties window contains detailed information about the selected dynamic disk group.

◆ To view the properties of a dynamic disk group, select the dynamic disk group and then choose **Properties** from the popup menu.

Setting Disk Usage

This command is used to exclude a disk from certain operations by marking it as a spare, excluding it from Hot Relocation, or marking it as a reserved disk.

To set disk usage:

1. Right click on the disk you wish to modify.

2. Select **Set Disk Usage.**

3. The Set Disk Usage dialog will appear. Select any options you wish to implement.

4. Click **Ok**.

Volume Tasks   4

VxVM Volumes tasks include:

- **Creating a Dynamic Volume**
- **Resizing a Dynamic Volume**
- **Renaming a Volume**
- **Changing a Volume Layout**
- **Adding a Mirror to a Volume**
- **Adding a Log to a Volume**
- **Stopping and Restarting a Volume**
- **Using the Volume Snapshot Feature**
- **Recovering a Volume**
- **Removing a Mirror From a Volume**
- **Removing a Log From a Volume**
- **Deleting a Volume**
- **Associating a Plex**
- **Moving, Splitting, and Joining Subdisks**
- **Viewing Volume Properties**

Volume Task Roadmap

The following table provides a summary of common VxVM volume tasks.

To perform this task …	Use this procedure …
Volume Setup Tasks:	
Create new volumes	Creating a Dynamic Volume
Precautionary Tasks:	
Mirror (copy) volumes onto other disks for redundancy	Adding a Mirror to a Volume
Create mirrored volumes	Creating a Dynamic Volume
Add a log to a volume	Adding a Log to a Volume
Maintenance Tasks:	
Add space to volumes	Resizing a Dynamic Volume
Change volume layouts	Changing a Volume Layout
Add mirrors to volumes that should be redundant	Adding a Mirror to a Volume
Create a snapshot copy of a volume for backup	Using the Volume Snapshot Feature
Merge a snapshot copy of a volume with the original volume	Merging a Snapshot Volume (Volume Snapback)
Permanently break the association between a snapshot and its original volume	Dissociating a Snapshot Volume (Volume Snap Clear)
Abort the taking of a snapshot	Aborting a Snapshot
Move portions of volumes to other disk space	Moving a Subdisk
Recovery Tasks:	
Attempt to recover a volume	Recovering a Volume
Attempt to recover all volumes on a disk	Recovering Volumes on a Disk (see Chapter 3)
Attempt to recover all volumes in a disk group	Recovering Volumes in Dynamic Disk Groups (see Chapter 3)
Prepare to restore a volume from backup	Aborting a Snapshot

To perform this task …	Use this procedure …
Other Tasks:	
Change a volume name	Renaming a Volume
Restore access to a stopped volume	Recovering a Volume
Remove a mirror from a volume	Removing a Mirror From a Volume
Remove a DRL log from a volume	Removing a Log From a Volume
Remove a RAID-5 log from a volume	Removing a Log From a Volume
Remove a volume	Deleting a Volume
Starting a volume	Recovering a Volume
Temporarily prevent access to a volume	Stopping and Restarting a Volume
Temporarily prevent access to a volume mirror	Removing a Mirror From a Volume

VxVM Volumes

VxVM uses logical volumes to organize and manage disk space. A volume is made up of portions of one or more physical disks, so it does not have the physical limitations of a physical disk.

A volume can provide greater capacity and better availability and performance than a single physical disk. A volume can be extended (grown) across multiple disks to increase capacity, mirrored (copied) on another disk to provide data redundancy, and/or striped across multiple disks to improve I/O performance.

You can use VxVM to create the following types of volumes:

◆ Concatenated Volume

A concatenated volume is made up of one or more disk regions that are linked together (concatenated) in a linear fashion. A concatenated volume can consist of disk regions on multiple disks; a concatenated volume that extends across two or more disks is also known as a *spanned volume*.

Note Data in this type of volume cannot be recovered if the underlying disk fails. However, a concatenated volume can be mirrored (copied) onto other disks to protect its data against disk failure.

◆ Striped Volume

Striped volume data is interleaved (striped) across two or more physical disks. Striped volume data is spread across the disks alternately and evenly in small, equal-sized portions of data called *stripe units*. Striping improves performance.

Note Data in this type of volume cannot be recovered if one of the underlying disks fails. However, a striped volume can be mirrored (copied) onto other disks to protect its data against disk failure.

◆ RAID-5 Volume

RAID-5 volume data is interleaved (striped) across three or more physical disks. Within each stripe across the set of disks, the data on one of the disks is parity data. If one of the physical disks fails, the parity data can be used to reconstruct and recover the lost data.

Note RAID-5 volumes cannot be mirrored.

◆ Mirrored Volume

Volumes with concatenated or striped layouts can be mirrored to increase data availability. All of the data in a mirrored volume is duplicated on at least one other physical disk. If one of the disks fails, the data can still be accessed from one of the remaining disks.

The plexes in a mirrored volume typically have the same layout, but a volume can consist of plexes with different layouts. A mirrored volume has a "mixed" layout if the plexes in the volume have different layouts.

◆ Layered Volume

A layered volume is built on one or more other volumes. The underlying volumes are typically mirrored. In layered volumes, mirroring is done at a lower level and with smaller granularity than with non-layered volumes, so each mirror covers a relatively small storage region.

Layered volumes tolerate disk failure better than non-layered volumes and provide improved data redundancy. If a disk in a layered volume fails, only a portion of the redundancy is lost and recovery time is usually quicker than it would be for a non-layered volume. Layered volumes also reduce the chance that two disk failures will result in lost data.

The underlying volumes in a layered volume are used exclusively by VxVM and are not intended for user manipulation.

With VxVM, you can create the following types of layered volumes:

- Concatenated Pro Volume

  A concatenated pro volume is a layered volume that concatenates several underlying mirror volumes.

- Striped Pro Volume

  A striped pro volume is a layered volume that stripes several underlying mirror volumes.

The following table summarizes the advantages and disadvantages of each volume layout.

Layout Comparison

Layout	Advantages	Disadvantages
Concatenated	- The volume can consist of disk regions that are not adjacent. - The volume can span multiple disks. A spanned volume can have a greater capacity than a single disk. - The volume can be mirrored to protect data against disk failure and reduce the risk of data loss.	- There is a risk of data loss if the volume is not mirrored. - Spanning a volume across multiple disks increases the chance that a disk failure will result in the failure of the volume. - Concatenation does not improve I/O performance.
Striped	- Striping provides improved read and write performance. - Striping can help to balance the I/O load from multi-user applications across multiple disks. - The volume can be mirrored to protect data against disk failure.	- There is a risk of data loss if the volume is not mirrored. - Striping a volume across multiple disks increases the chance that a disk failure will result in the failure of the volume. - A striped volume requires at least two disks.
RAID-5	- RAID-5 provides protection against disk failure and reduces the risk of data loss. - RAID-5 provides data redundancy by storing parity (a calculated value) on the disks. If a disk fails, the parity is used to reconstruct the missing data. - RAID-5 requires less storage space than mirroring. - RAID-5 provides improved read performance.	- RAID-5 provides relatively slow write performance. - RAID-5 volumes cannot be mirrored. - A RAID-5 volume requires at least three disks. If logging is enabled, a RAID-5 volume requires at least four disks. - A RAID-5 volume cannot survive multiple disk failures. However, optional RAID-5 logs reduce this risk. - If one of the volume disks is inaccessible, performance is degraded.

Layout Comparison

Layout	Advantages	Disadvantages
Mirrored	- Mirroring provides protection against disk failure and reduces the risk of data loss. - Mirroring provides data redundancy by maintaining multiple complete copies of volume data on different disks. - Mirroring provides improved read performance.	- A mirrored volume requires extra disk space. Each mirror requires enough disk space to contain a complete copy of the volume.
Concatenated Pro	- The volume is layered, and concatenates several underlying mirror volumes. This provides improved data redundancy and reduces the impact of disk failures. This type of volume is also known as a concatenated-mirror volume. - Recovery time is quicker than with regular concatenated volumes that are mirrored. - The volume can consist of disk regions that are not adjacent. - The volume can span multiple disks. A spanned volume can have a greater capacity than a single disk.	- A concatenated pro volume requires at least two disks. - Concatenation does not improve I/O performance. - Layered volumes consist of more VxVM objects than non-layered volumes and are likely to fill up the disk group configuration database sooner. When the configuration database is full, you cannot create more volumes in the disk group.
Striped Pro	- The volume is layered, and stripes several underlying mirror volumes. This provides improved data redundancy and reduces the impact of disk failures. This type of volume is also known as a striped-mirror volume. - Recovery time is quicker than with regular striped volumes that are mirrored. - Striping provides improved read and write performance. - Striping can help to balance the I/O load from multi-user applications across multiple disks.	- A striped pro volume requires at least four disks. - Layered volumes consist of more VxVM objects than non-layered volumes and are likely to fill up the disk group configuration database sooner. When the configuration database is full, you cannot create more volumes in the disk group.

> **Note** The total volume size you indicate for the volume in the Create Volume Wizard is the *usable* size for storing the data. Depending on the layout type, the volume can take more space on the disk. The size shown in the Wizard for simple, striped, and spanned volumes is the actual volume size on the disk. A RAID-5 volume requires additional space for parity information, and a mirrored volume is a multiple of the space taken by the original plex of the volume. The Wizard provides a **Query Max Size** button to determine the size of the volume. Again, this is the usable size of the volume rather than the actual size taken by the volume on the disk.

Creating a Dynamic Volume

You can create the following dynamic volumes:

◆ Concatenated (Concatenated and Concatenated Pro)

◆ Striped (Striped and Striped Pro)

◆ RAID-5

◆ Mirrored

▼ **To create a dynamic volume**

1. Right-click a dynamic disk group in the tree view the right pane, and select **New Volume** from the context menu. The Create Volume wizard appears.

You can also select the command from the Actions menu or click the New Volume tool on the toolbar (the third tool from the left side of the toolbar).

2. Click **Next** to continue.

The screen for selecting attributes comes up next. Your screen should be similar to the sample screen that follows.
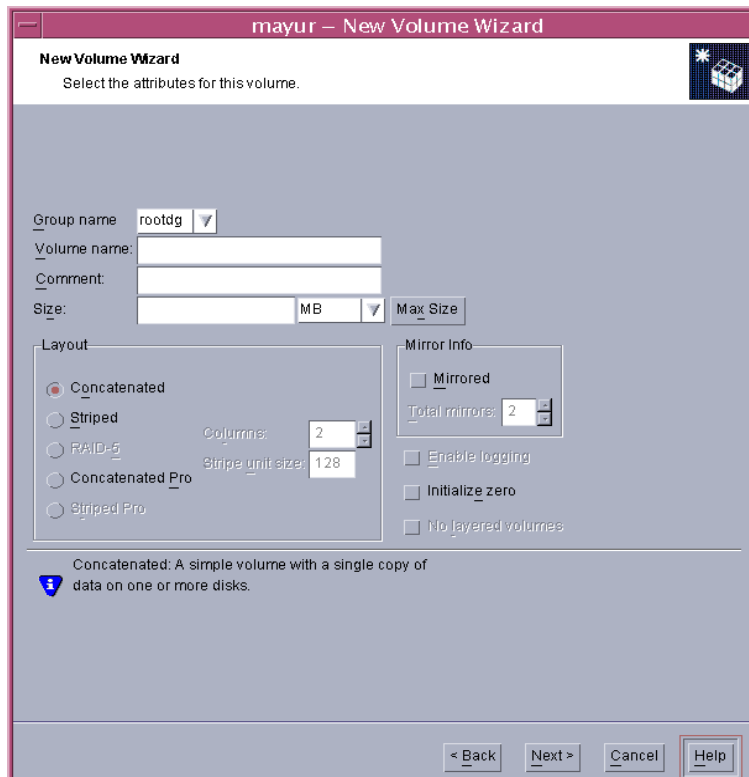
3. If necessary, select the dynamic Group name for the volume from the pull-down list.

4. Type in the Volume Name. This is a Volume Manager-specific name that is used in some Volume Manager commands. It is different from the volume label for the file system.

5. Specify the volume size, or select Maxsize.

   The **Maxsize** button works differently, depending on whether you have a disk selected.

   - If you do not have a disk selected when you start the Create Volume wizard, no figure displays in the volume size box. If you then click on a volume type and also click the **Maxsize** button, a size appears in the volume size box that represents the maximum volume for that layout for all disks in the dynamic group.

- If you do have a disk selected when you start the Create Volume wizard, a size is shown in the volume size box that represents the maximum concatenated (simple or spanned) volume size on the selected disk. If you then click the **Maxsize** button, a new number appears in the volume size box that represents the maximum size for a spanned volume that spans all the disks in the dynamic group. You can also click on another volume layout and then click the **Maxsize** button to get the maximum size for that layout that involves unallocated space on all disks in the dynamic group.

    If you choose Striped or RAID-5, Number of Columns and Stripe Unit Size need to have an entry. Defaults are provided.

6. Select the volume type:

◆ Concatenated (Concatenated and Concatenated Pro)

◆ Striped (Striped and Striped Pro)

◆ RAID-5

◆ Mirrored

7. Make your selections in the **Select disks for use for volume** screen.

    The default setting is for Volume Manager to assign the disks for you. To manually select the disks, click the "Manually select disks to create volume" radio button. The disks that you select should be in the right pane when you click **Next**.

Notes:

- If you select disks manually, you can specify that the volume is to be mirrored or striped across controllers, trays, targets, or enclosures. You can also select ordered allocation. Ordered allocation uses the specified storage to first concatenate disks, then to form columns, and finally to form mirrors.

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8. Check your selections in the final screen. When you are satisfied with your choices, click **Finish**.

    By clicking the **Previous** button, you can go back and make changes before you click **Finish**.

Concatenated

A concatenated volume consists of one or more regions of the specified disks. You have the option of placing a file system on the new volume or mirroring the volume. You can create a regular concatenated volume or a concatenated pro volume. A concatenated pro volume is layered and mirrored.

Layout:	Choose **Concatenated** or **Concatenated Pro** for the volume layout.
Options:	- To mirror the volume, select **Mirrored**. In the Total Number of Mirrors field, enter the total number of mirrors for the volume. **Note** Concatenated pro volumes are mirrored by default. To enable logging for a mirrored volume, select **Enable Logging**. - To place a file system on the volume, click **Create a file system** and specify the file system type and mount point in the New File System dialog box. - To clear the volume before enabling it for general use, select **Initialize Zero**. - To prevent the creation of a layered volume, select **No Layered Volumes**. In cases where a layered volume layout is appropriate, VxVM can create a layered volume when a non-layered layout is specified. This option ensures that the volume has a non-layered layout. If a layered (Pro) layout is selected, this option is ignored.

Notes:

- If no disks are assigned, VxVM uses available space on disks in the selected disk group.
- The data in a concatenated volume is not protected against disk failure unless the volume is mirrored. At least one additional disk is required to mirror a concatenated volume.
- Concatenated pro volumes are mirrored by default, so a concatenated pro volume requires more disks than an unmirrored concatenated volume.
- If your system supports root volumes, then it should be noted that you cannot use a concatenated pro volume for a `root` volume.
- You cannot use a concatenated pro volume for a `swap` volume.
- If a file system is placed on the volume and the **Mount at Boot** option is selected, the file system table file automatically updates.

Striped

A striped volume spreads across two or more disks. You have the option of placing a file system on the new volume or mirroring the volume. You can create a regular striped volume or a striped pro volume. A striped pro volume is layered and mirrored.

Layout:	Choose **Striped** or **Striped Pro** for the volume layout.
	In the Number of Columns field, specify the number of columns (disks) across which the volume should be striped. A striped volume requires at least two disks.
	To specify a stripe unit size other than the default, enter the stripe unit size in the Stripe Unit Size field. To specify a size unit, attach an s (sectors), k (kilobytes), m (megabytes), or g (gigabytes) to the size.
Options:	- To mirror the volume, select **Mirrored**. In the Total Number of Mirrors field, enter the total number of mirrors for the volume.
	Note Striped pro volumes are mirrored by default.
	To enable logging for a mirrored volume, select **Enable Logging**.
	- To place a file system on the volume, click **Create a file system** and specify the file system type and mount point in the New File System dialog box.
	- To clear the volume before enabling it for general use, select **Initialize Zero**.
	- To prevent the creation of a layered volume, select **No Layered Volumes**. In cases where a layered volume layout is appropriate, VxVM can create a layered volume when a non-layered layout is specified. This option ensures that the volume has a non-layered layout. If a layered (Pro) layout is selected, this option is ignored.

Notes:

- A striped volume requires at least two disks.
- If no disks are assigned, VxVM uses available space on disks in the selected disk group.
- The data in a striped volume is not protected against disk failure unless the volume is mirrored. At least one additional disk is required to mirror a striped volume.
- Striped pro volumes are mirrored by default, so a striped pro volume requires more disks than an unmirrored striped volume.
- If your system supports root volumes, then it should be noted that you cannot use a striped pro volume for a `root` volume.
- You cannot use a striped pro volume for a `swap` volume.
- If a file system is placed on the volume and the **Mount at Boot** option is selected, the file system table file is automatically updated.

RAID-5

A RAID-5 volume spreads across two or more disks, and contains parity information. You have the option of placing a file system on the new volume.

Layout:	Choose **RAID-5** for the volume layout.
	In the Number of Columns field, specify the number of columns (disks) across which the volume should be striped. A RAID-5 volume requires at least three disks (or four disks if logging is enabled).
	To specify a stripe unit size other than the default, enter the stripe unit size in the Stripe Unit Size field. To specify a size unit, attach an s (sectors), k (kilobytes), m (megabytes), or g (gigabytes) to the size.
Options:	- To place a file system on the volume, click **Create a file system** and specify the file system type and mount point in the New File System dialog box.
	- To enable RAID-5 logging for the volume, select **Enable Logging**. VxVM adds an appropriate number of logs to the volume.
	- To clear the volume before enabling it for general use, select **Initialize Zero**.

Notes:

- A RAID-5 volume requires at least three disks. If logging is enabled, a RAID-5 volume requires at least four disks.
- RAID-5 volumes cannot be mirrored.
- For a RAID-5 volume, the size specified in the Size field is the usable space in the volume. Volume Manager allocates additional space for the volume parity information. The disks across which the RAID-5 volume is striped must, therefore, contain additional free space for the volume parity information.
- If no disks are assigned, VxVM uses available space on disks in the selected disk group.
- If a file system is placed on the volume and the **Mount at Boot** option is selected, the file system table file is automatically updated.

Mirrored

A concatenated or striped volume is mirrored (copied) on at least one other disk. If one of the disks fails, data on the volume can be accessed from the surviving disks. Concatenated pro and striped pro volumes are layered and mirrored by default.

Layout:	Choose **Concatenated**, **Striped**, **Concatenated Pro**, or **Striped Pro** for the volume layout. For a striped or striped pro volume, provide the following information: - In the Number of Columns field, specify the number of columns (disks) across which the volume should be striped. A striped volume requires at least two disks. - To specify a stripe unit size other than the default, enter the stripe unit size in the Stripe Unit Size field. To specify a size unit, attach an s (sectors), k (kilobytes), m (megabytes), or g (gigabytes) to the size.
Mirror Info:	Select **Mirrored**. In the Total Number of Mirrors field, enter the total number of mirrors for the volume.
Options:	- To place a file system on the volume, click **Create a file system** and specify the file system type and mount point in the New File System dialog box. - To enable Dirty Region Logging (DRL) for the volume, select **Enable Logging**. VxVM adds an appropriate number of logs to the volume. - To clear the volume before enabling it for general use, select **Initialize Zero**. - To prevent the creation of a layered volume, select **No Layered Volumes**. In cases where a layered volume layout is appropriate, VxVM can create a layered volume when a non-layered layout is specified. This option ensures that the volume has a non-layered layout. If a layered (Pro) layout is selected, this option is ignored.

Notes:

- A mirrored volume requires at least two disks. If logging is enabled, the volume requires at least one additional disk.
- Only concatenated or striped volumes can be mirrored.

Resizing a Dynamic Volume

The **Resize Volume** procedure changes the size of a volume. If users require more space on a volume, you can use this procedure to increase the size of the volume. If a volume contains unused space that you need to use elsewhere, you can use this procedure to shrink the volume. If the volume contains a file system, this procedure also resizes the file system.

▼ **To resize a volume**

1. Select the volume to be resized.

2. Choose **Actions > Resize Volumes**.

3. Complete the Resize Volume wizard as follows:

New Size:	Specify *one* of the following: - To increase the volume size *by* a specific amount of space, use the Add By field to specify how much space should be added to the volume. - To decrease the volume size *by* a specific amount of space, use the Subtract By field to specify how much space should be removed from the volume. - To specify the new volume size, enter the size in the New Volume Size field. To determine the largest possible size for the volume, click **Max Size** after choosing options.
Options:	To use a specific disk for the additional space, click **Manually assign destination disks**, then use the buttons for adding and removing disks to move the disk or disks you want assigned as a destination disk to the right pane of the window.

Notes:
- The **Resize Volume** task requires either the desired size or the amount of space to add to or subtract from the volume size. - A volume containing a file system other than VxFS cannot be shrunk. - Shrinking a volume with an unmounted file system can result in data loss, so a volume containing an unmounted file system cannot be shrunk. - When a volume is shrunk, the resulting extra space is returned to the free space pool. - When the volume size is increased, sufficient disk space must be available. When increasing the size of a volume, VxVM assigns the necessary new space from available disks..

Renaming a Volume

The **Rename Volume** procedure changes the name of a volume. If the volume has a file system, this procedure also makes the necessary changes to the file system table file and allows you to specify a new mount point for the file system.

▼ **To rename a volume**

1. Select the volume to be renamed.

2. Choose **Actions > Rename Volume.**

3. Complete the Rename Volume dialog box as follows:

Volume Name:	If the correct volume name does not already display in this field, enter the volume name.
New Name:	Enter the new name for the volume.

After you have provided all necessary information in the dialog box, click **OK**.

Notes:
- The **Rename Volume** task requires the current volume name and a new volume name. - The new volume name must be unique within the disk group. - If the volume contains a file system, the file system table file is automatically updated (if necessary). - The **Rename Volume** task requires **umount** file system if a file system is mounted.

Changing a Volume Layout

The volume **Change Layout** procedure changes the layout of a volume without interrupting access to data. You can use this task to change the redundancy or performance characteristics of an existing volume.

You can view the progress of the relayout task through the Relayout Status Monitor window. You can also use the Relayout Status Monitor window to pause, abort, continue, or reverse the relayout task. The Relayout Status Monitor appears automatically when a relayout task begins. When a volume relayout is in progress, paused, or aborted, you can also access the Relayout Status Monitor through the Volume Properties window.

▼ **To change a volume layout**

1. Select the volume to be changed to a different layout.

2. Choose **Actions** > **Change Layout**.

3. Complete the Change Volume Layout dialog box as follows:

Volume Name:	If the correct volume name does not already display in this field, enter the volume name.
Layout:	Choose the new volume layout (**Concatenated, Striped, RAID-5, Concatenated Pro,** or **Striped Pro**.) For a striped, RAID-5, or striped pro volume, provide the following information: - In the Number of Columns field, specify the number of columns (disks) across which the volume should be striped. - The stripe unit size in the Stripe Unit Size field. To specify a size unit, attach an s (sectors), k (kilobytes), m (megabytes), or g (gigabytes) to the size.

Options:	Click **Show Options** to access the optional settings for this task.
	- To retain the original volume size when the volume layout changes, click **Retain volume size at completion**.
	- To specify the size of the pieces of data that are copied to temporary space during the volume relayout, enter the size in the Temp space size field.
	- To specify additional disk space to be used for the new volume layout (if needed), specify the disk in the disk(s) field .
	- To specify the temporary disk space to be used during the volume layout change, specify the disk in the temp disk(s) field.
	- If the volume contains plexes with different layouts, specify the plex to be changed to the new layout in the Target Plex field.

4. After you have provided all necessary information in the dialog box, click **OK**. The Relayout Status Monitor window appears. This window provides you with the following information:

Volume Name:	The name of the volume that is undergoing a layout change.
Initial Layout:	The original layout of the volume.
Desired Layout:	The new layout for the volume.
Status:	The status of the relayout task.
% Complete:	The progress of the relayout task.

If you need to pause, abort, continue, or reverse a relayout task after you close the Relayout Status Monitor window, you can access the Relayout Status Monitor through the Volume Properties window.

Notes:

- The **Volume Change Layout** task requires a volume name and a different volume layout.
- Volumes remain accessible during online relayout.
- This task may take a long time, depending on the volume size and other factors. The Relayout Status Monitor shows the progress of the layout change and allows you to abort, pause, or reverse the task.
- If no disk space is specified, VxVM uses available space on disks in the current disk group.
- If the temporary space size is not specified, VxVM uses an appropriate size. Specifying a larger temporary space size speeds up the layout change process because larger pieces of data are copied at a time. If the specified temporary space size is too small, VxVM uses a larger size.
- If all of the plexes in the volume have identical layouts, VxVM changes all plexes (except log plexes) to the new layout. If the volume contains plexes with different layouts, a target plex must be specified. When a target plex is specified, VxVM changes the layout of the target plex and leaves the other plexes in the volume alone.
- Log plex layouts do not change. VxVM removes and/or replaces log plexes, depending on the new layout.
- If the volume length changes as a result of the layout change and the volume contains a file system, the file system length is automatically adjusted (if possible).
- A volume cannot undergo multiple relayouts at the same time.
- This task cannot be used to change the layout of a volume with a sparse plex.
- This task may fail for volumes that were not created by VxVM or the `vxassist` command.
- If the relayout is reversed, the volume returns to its original layout. However, data in the volume may not return to its original storage location.
- During a relayout, many other tasks are unavailable for the volume.
- A mirrored or striped volume requires at least two disks.
- A RAID-5 volume requires at least three disks.

Adding a Mirror to a Volume

The volume **Add Mirror** procedure creates a mirror (copy) of a volume on a disk that is not already being used by the volume. If one of the disks fails, the volume data can be accessed from the surviving disks. A volume can have multiple mirrors.

◆ To create a mirror on an existing volume, use the Add Mirror Wizard.

◆ To create a new mirrored volume, use the Create Volume Wizard. You select a mirrored layout when you create the volume. See "VxVM Volumes."

Note The mirroring process is disabled if the volume cannot be mirrored or if there is no unallocated space on another dynamic disk large enough to mirror the volume. A RAID-5 volume cannot be mirrored.

▼ **To add a mirror to an existing volume**

1. Select the volume to be mirrored.

2. Choose **Actions** > **Mirror** > **Add.**

3. Complete the Add Mirror dialog box as follows:

Options:	- To add more than one mirror, enter the number of mirrors in the Mirror Quantity field.
	- To place the mirror on a specific disk, select **Manually select disks for use by this volume**, and assign the destination disks for the mirrors.
	- To specify the layout for the mirror, select **Mirror Across** or **Stripe Across**. For a striped mirror, specify the number of columns and stripe unit size.

After you have provided all necessary information in the dialog box, click **OK**. Adding a mirror requires resynchronization, so this task may take some time.

Notes:

- The **Mirror Add** task requires a volume name.
- Once mirrored, the data in the volume is redundant. If a disk fails, the data remains available on the surviving mirror (on another disk).
- The new mirror cannot be created on a disk that already contains a copy of the volume. Each mirror must reside on a separate disk.
- Sufficient disk space must be available to accommodate the additional mirrors.
- Only disks in the same disk group as the volume can be used to create the new mirror.
- If no disks are assigned, VxVM uses available disk space to create the mirror.
- A RAID-5 volume cannot be mirrored.
- If your system supports root volumes, then you can mirror the root volume (and other volumes required to boot the system) onto an alternate boot disk, use the Mirror Disk task.
- A volume can contain up to 32 plexes (mirrors).
- If you create more than one mirror at a time, you may see inconsistent information on the progress bar. Also, the generation of multiple mirrors does affect system resources. After creating a mirror, you may want to wait until it has finished generating before creating another mirror.

Adding a Log to a Volume

The volume **Add Log** procedure adds the appropriate type of log to a mirrored or RAID-5 volume.

When used to add a Dirty Region Logging (DRL) log to a mirrored volume, DRL uses this log to track the regions of the volume that change due to I/O writes. If a system failure occurs, DRL uses the information in the log to recover only the portions of the volume that need recovery. This speeds up recovery time for mirrored volumes.

For DRL to be in effect, a mirrored volume must have at least one DRL log. You can create additional DRL logs (on different disks) to mirror the DRL information.

When used to add a log to a RAID-5 volume, the log speeds up the resynchronization time for RAID-5 volumes after a system failure. A RAID-5 log maintains a copy of the data and parity being written to the volume at any given time. If a system failure occurs, VxVM can "replay" the RAID-5 log to resynchronize the volume. This copies the data and parity that was being written at the time of failure from the log to the appropriate areas of the RAID-5 volume. You can create multiple RAID-5 logs (on different disks) to mirror the log information. Ideally, each RAID-5 volume has at least two logs.

1. Select the mirrored volume or RAID-5 volume to contain the log.

2. Select **Actions > Log** > **Add**.

3. By default the "Auto assign destination disks" option will be selected. To manually assign the destination disks, select the "Manually assign destination disks" option.

Available disks will appear in the left window. To add destination disks, select them in the left window and click the **Add** button. To add all of the available disks, click the **Add All** button.

To remove destination disks, select them in the right window and then click the **Remove** button. To remove all of the destination disks, click the **Remove All** button.

4. Click **Apply** to create the Log then **OK**.

Notes:
- When a log is added to a mirrored volume, DRL is activated for that volume.

Stopping and Restarting a Volume

The **Stop Volume** procedure disables a volume. When a volume is stopped, it is not available for use until it is restarted (refer to "Recovering a Volume" on page 107). Stopping a volume is a safe way of temporarily preventing access to a volume.

▼ **To stop a volume**

1. Select the volume to be stopped.

2. Choose **Actions** > **Stop Volume**.

3. In reply to the message "Are you sure you want to stop the volume ...," click **OK**. The volume state changes to STOPPED.

> **Note:**
>
> A volume cannot be stopped if it is in use (open) or it has a mounted file system.

Using the Volume Snapshot Feature

The snapshot feature can be used to take a snapshot of a mirrored or an unmirrored volume, but snapshot is not supported for RAID-5 volumes.

Note To take a snapshot of a volume, you must have an empty dynamic disk in the volume's disk group.

The snapshot feature enables quick and efficient online backup of volumes, with minimum disruption to the user. Snapshot automatically enables FastResync (FR) and creates a snapshot image of a volume, which can be detached from the volume. The detached snapshot image can be used for backup, or other purposes, while the original volume remains in service. The snapshot can then be quickly reattached and resynchronized with the volume, through the FR reconnection capability. The snapshot volume can also be permanently disconnected from the original volume.

You can attach more than one snapshot plex to a volume, by issuing successive snapstart commands on the volume. This enables you to take multiple snapshots of a single volume.

You can attach a snapshot to either the original volume or the snapshot volume.

The following five snapshot commands are supported by VxVM, and are accessed through the Volume context menu:

- Snap Start - Creating a Snapshot Copy of a Volume

  Attaches the snapshot mirror to the original volume.

- Snap Shot - Creating the New Volume

  Detaches the snapshot mirror from the original volume and creates a snapshot volume that is associated with the snapshot mirror.

- Snap Back - Merging a Snapshot Volume (Volume Snapback)

  Reattaches the snapshot mirror to the original volume.

- Snap Clear - Dissociating a Snapshot Volume (Volume Snap Clear)

  Permanently removes the snapshot mirror from the original volume and releases its space.

- Snap Abort - Aborting a Snapshot

  Aborts the snapshot operation after issuing the **Snap Start** command. **Snap Abort** permanently removes the snapshot mirror from the volume and releases its space.

The five snapshot commands are subcommands of the **Snap** command on the Volume context menu.

Using Snapshot

In summary, the snapshot procedure consists of three steps:

1. Attaching a snapshot mirror to a volume, using **Snap Start**.

2. Detaching the snapshot mirror and creating the snapshot volume that is associated with the snapshot mirror. The **Snap Shot** command is used for this step.

3. Either reattaching the snapshot to the volume after you are done using it, or permanently disconnecting it from the volume. **Snap Back** reattaches the snapshot mirror; **Snap Clear** permanently disconnects the snapshot mirror from the volume, removing the association between the snapshot volume and the original volume.

Snap Abort aborts the snapshot operation after issuing the **Snap Start** command.

Creating a Snapshot Copy of a Volume

Snap Start creates a snap mirror or plex, which is attached to and synchronized with a volume. Once the snap mirror is synchronized, its status, as displayed on the Mirrors tab of the GUI, changes to Snap Ready.

After the snap mirror is synchronized with the volume, it can be used as a snapshot mirror. The synchronization process can take a while, but it does not interfere with use of the volume. If the Snap Start process fails, the snapshot mirror is removed and its space is released. After the mirror is synchronized, it continues to be updated until it is detached.

> **Note** To create a snapshot mirror on a dynamic volume, you must have an empty dynamic disk in the dynamic disk group of that volume.

▼ **To create a snapshot mirror, do the following:**

1. Right-click on the volume that you want to take a snapshot of.

   A context menu is displayed.

2. Select **Snap > Snap Start**.

   A new snapshot mirror is attached to the volume.

   The new mirror is added to the Mirrors tab for the volume. The mirror is identified as a Snapshot plex and is identified with the Snapshot icon. After the mirror is synchronized with the volume, its status becomes Snap Ready.

   The DCO (disk change object) volume is created to track the regions on a volume that are changed while a mirror is detached. The DCO volume is not included in the tree view of the Volume Manager GUI. To view the DCO volume, you must use the Disk View. To access the Disk View, click the Disk View tab in the right pane or select Disk View from a disk's context menu.

> **Note** The **Break Mirror** and **Remove Mirror** commands do not work with the snapshot mirror.

Creating the New Volume

Snap Shot detaches the snapshot mirror and creates a new volume that is associated with that mirror. This process takes a relatively short time, typically less than a minute, during which users can be requested to not access the original volume. After the snapshot volume is detached, it can be used for backup or other purposes.

To take a snapshot, do the following:

1. Right-click on the volume with the snapshot mirror.

   A context menu is displayed.

2. Select **Snap > Snap Shot**.

The Snapshot Volume dialog box is displayed. You are asked to select the snapshot mirror to be used to create the snapshot volume.

3. Select the mirror and click **OK**.

    When there is only one snapshot mirror, "Automatic select mirror to add snapshot" will be highlighted. If there are multiple mirrors and you want to select the mirror to be used, click to select "Manual select which mirror to add snapshot." You then can select the mirror from the list on the screen.

    Click **OK**.

    The snapshot mirror is detached from the original volume and a new volume is created that is associated with the snapshot mirror.

    The snapshot mirror is no longer displayed on the Mirrors tab for the original volume. The new snapshot volume is displayed under the Volumes folder in the tree view. The program assigns it the next available drive letter. You can now use the snapshot volume for backup or other purposes.

Notes:

- FastResync is not supported for RAID-5 volumes
- The **Volume Snapshot Interactive** task requires a volume name and a snapshot name.
- The snapshot volume is an exact copy of the original volume at the time the snapshot phase of the procedure starts.
- After you create the snapshot copy of the volume, remember to back it up to tape or some other media. Remove the snapshot volume when it is no longer needed.
- The snapstart phase of this task may take a long time, depending on the size of the volume.
- If you remove the snapshot mirror, you cannot create a snapshot volume until you repeat the snapstart phase of the procedure.

Merging a Snapshot Volume (Volume Snapback)

The volume **Snap Back** procedure merges a snapshot copy of a volume with the original volume. The snapshot plex is detached from the snapshot volume and attached to the original volume. The snapshot volume is removed. This task resynchronizes the data in the volume so that the plexes are consistent. By default, the data in the original plex is used for the merged volume.

To reattach a snapshot mirror to the original volume, do the following:

1. Right-click the volume whose snapshot you want to reattach.

   A context menu is displayed.

2. Select **Snap > Snap Back**.

3. Specify whether the snapshot volume is resynchronized with the original volume, or the original volume is synchronized to the snapshot volume and click **OK**.

Note One situation where you might want to resynchronize to the snapshot volume rather than the original volume is the case where something has happened to the original volume so that its data integrity is no longer sound.

The snapshot mirror is reattached to the original volume and the snapshot volume is deleted if it is the last plex of the volume. (If the snapshot volume has other mirrors associated with it, it is not deleted.)

Dissociating a Snapshot Volume (Volume Snap Clear)

The volume **Snap Clear** procedure permanently breaks the association between a snapshot and its original volume. The snapshot volume becomes an independent volume.

Snap Clear permanently removes a snapshot mirror from a volume. Snap Clear can be specified only after the snapshot command has been issued.

▼ **To permanently remove a snapshot mirror from a volume, do the following:**

1. Right-click on the volume, whose snapshot mirror you are removing.

   A context mirror is displayed.

2. Select **Snap>Snap Clear**.

   A message box is displayed asking you to confirm the snap clear operation for the specified volume.

3. Click **Yes**.

   The snapshot mirror is permanently disconnected from the original volume and is no longer displayed on the Volume Manager console.

Aborting a Snapshot

The volume **Snap Abort** procedure allows you to abort the snapshot procedure before it completes. If you have started the procedure, through **Snap Start,** but have not yet clicked on **Snap Shot** to complete the procedure**,** you can select **Snap Abort** to abort the procedure.

▼   **To abort a snapshot operation begun with snap start, do the following:**

1. Right-click on the volume that you want to abort the snapshot operation on.

   A context menu is displayed.

2. Select **Snap > Snap Abort**.

   A message box is displayed asking you to confirm the snap abort operation for the specified volume.

3. Click **OK**.

   The snapshot process is aborted.

Preparing to Restore a Volume From Backup

The **Volume Prepare Restore** procedure stops the volume, sets the volume to an uninitialized state, and restarts the volume (without resynchronizing the volume mirrors). The volume can then be reloaded from backup.

This procedure is intended for raw image backups and is not appropriate for file system backups. This procedure is useful for disaster recovery. If the data on a volume is corrupted and you know that you need to restore the volume from backup, you can use this procedure to prepare the volume for restoration.

▼   **To prepare a volume for a restore from backup**

1. Select the volume to be restored from backup.

2. Choose **Volumes** > **Prepare For Restore**.

3. Complete the Prepare Volume For Restore dialog box as follows:

Volume(s):	If the correct volume name does not already display in this field, enter the volume name.

After you have provided all necessary information in the dialog box, click **OK**. After you have completed this task, you can restore the volume data from backup.

> **Note:**
>
> If the volume contains a mounted file system, the file system must be unmounted before this task can proceed. This task does not remount the file system.

Recovering a Volume

The **Recover Volume** procedure performs any necessary volume recovery operations on a volume. The recovery operations depend on the type of volume and include starting disabled volumes, resynchronizing mirrors in mirrored volumes, and resynchronizing parity in RAID-5 volumes. After successful recovery, the volume is again available for use.

Alert icons and the Alert Monitor window can provide clues to let you know that volume recovery is needed.

▼ **To recover a failed volume**

1. Select the volume to be recovered.

2. Choose **Actions > Recover Volume**.

3. In reply to the message "Are you sure you want to recover volume ...," click **OK**.

Note:
In some cases, recovery is not possible. If the volume recovery fails, you can attempt to restore the volume from backup.

Removing a Mirror From a Volume

> **Caution**   Removing a mirror can result in loss of data redundancy.

The **Mirror Remove** procedure removes a mirror from its volume. This procedure breaks the link between the mirror and its volume and returns the mirror disk space to the free space pool for reuse. You can remove an extra mirror from a volume to make the underlying disk space available for use elsewhere. However, this may leave the volume unmirrored and unprotected against disk failure.

▼   **To remove a mirror from a volume**

1. Select the volume that contains the mirror to be removed.

2. Choose **Actions** > **Mirror** > **Remove**.

3. Complete the Remove Mirror dialog box as follows:

Volume Name:	If the correct volume name does not already display in this field, enter the volume name or select the volume from the drop-down menu.
Removal Method:	Specify the mirrors and/or number of mirrors to be removed: - To specify how many mirrors should be removed, select By Quantity/Disk. Enter the number of mirrors to be removed in the Mirror quantity field. - To specify the disks on which mirrors should be preserved, select By quantity/disk. - Specify the names of disks or mirrors to be removed from the list of available disks or mirrors.

After you have provided all necessary information in the dialog box, click **OK**.

Notes:

- The **Mirror Remove** task requires a volume name. This task also requires the number of mirrors to remove, a disk name, or a mirror name.
- If a volume only has two mirrors and one mirror is removed, the volume is no longer redundant.
- The last mirror (plex) cannot be removed from a volume.
- When a mirror is removed, the space occupied by that mirror is returned to the free space pool.

Removing a Log From a Volume

The **Log Remove** procedure removes a log from a mirrored or RAID-5 volume. For a mirrored volume, this removes a DRL log from the volume. For a RAID-5 volume, this removes a RAID-5 log from the volume.

▼ **To remove a log from a volume**

1. Select the volume that contains the RAID-5 or DRL log to be removed.

2. Select **Actions** > **Log** > **Remove**.

3. Complete the Remove Log dialog box as follows:

Volume Name:	If the correct volume name does not already display in this field, select the volume name from the drop-down menu.
Removal Method:	Specify the logs and/or number of logs to be removed: - To specify how many logs should be removed, select By Quantity/Disk. Enter the number of logs to be removed in the Log quantity field. - To specify the disks on which logs should be preserved, select By Quantity/Disk. Select the disk names from the list of available disks. - To specify the name of the log to be removed, select Log, then select the log names from the list of available logs.

After you have provided all necessary information in the dialog box, click **OK**.

Notes:
- This task requires a volume name. - If the only log is removed from a volume, logging (either dirty region logging or RAID-5 logging) is no longer in effect for that volume. When logging is disabled, recovery time increases.

Deleting a Volume

Caution	Deleting a volume can result in data loss.

This procedure permanently removes a volume and all of its data. You should only remove a volume if you are sure that you do not need the data in the volume (or the data is backed up elsewhere). You can remove a volume to make the underlying disk space available for use elsewhere.

▼ **To delete a volume**

1. Select the volume to be deleted.

2. Choose **Actions** > **Delete Volume**.

3. Respond **Yes** when the Confirm deletion dialog appears.

Notes:
- Removing a volume destroys all of the data in that volume.
- When a volume is removed, the space it occupied is returned to the free space pool.

Associating a Plex

The **Plex Associate** procedure associates (attaches) a plex to a volume. This involves copying data from an active mirror on the volume to the new plex (mirror).

▼ **To associate a plex**

1. Choose **Plex Associate**.

2. Complete the Associate Plex dialog box as follows:

Plex Name:	Enter the plex name.
Volume Name:	Enter the name of the volume to be associated with the plex or click **Browse** to select a volume.

After you have provided all necessary information in the dialog box, click **OK**.

Notes:
The **Plex Associate** task:
- Requires a plex name and a volume name.
- Connects a plex to a volume.
- Can take a long time, depending on the amount of data in the volume.

Moving, Splitting, and Joining Subdisks

The commands **Subdisk Move**, **Split**, and **Join**, enable you to move subdisks to other locations within the dynamic group, split subdisks, and join them back together. The flexibility of moving subdisks, splitting them, and joining them lets you make best use of your disk space.

- Moving a Subdisk
- Splitting a Subdisk
- Joining a Subdisk

Moving a Subdisk

> **Note** You are not allowed to move a subdisk that is part of a boot or system volume.

The **Subdisk Move** procedure moves the contents of a volume subdisk from one disk to another. This is useful for moving portions of a volume to a different disk for improved performance.

If disk activities are heavily concentrated on one or a small number of disks in the storage subsystem, it may create bottlenecks. You can use the **Subdisk Move** and possibly the **Subdisk Split** command to spread out disk accesses more evenly across all the disks to balance the load.

You can use the **Subdisk Move** command to move all subdisks to healthier disks. The benefit of moving subdisks instead of copying the volumes is that you need only enough space on the receiving disks for the subdisks on the one failed disk, not for entire volumes that may span multiple disks. Another advantage is that there is no interruption in I/O.

Moving subdisks provides you with a flexible means of making adjustments in your storage system while it is up and running.

▼ **To perform a subdisk move operation:**

You can use the Object View window (**Disk Groups** > **Object View**) or the Volume to Disk Mapping window (**Disk Groups** > **Disk/Volume Map**) to view the subdisks and gaps on disks in a disk group. In the Object View window, you can move a subdisk by placing the pointer over the subdisk and then pressing and holding the mouse button to drag the subdisk to another location.

To display the subdisk in the right pane, click on its volume in the tree view, and then click on the Subdisks tab in the right pane. The subdisks for that volume will display. You can use the Subdisks Properties command to further identify the characteristics of a volume's subdisks.

1. Identify the subdisk that you want to move and display it in the right pane.
   Right-click on the subdisk you want to move to bring up its context menu.

2. Select **Move** from the context menu.

3. The welcome screen of the Subdisk Move wizard appears. Click **Next** to continue.

4. In the screen that appears next, choose either automatic or manual selection of the destination disk for the subdisk to be moved and click **Next**.

   Leave the default value of "Auto assign destination disks" if you want the program to assign the destination disk.

   If you want to select the destination disk, click "Manually assign destinations disks.

5. If you selected the manual assignment of the destination disk, an extra screen appears. Select the hard disk you wish to move the subdisk to and click **Next**.

Note VxVM automatically checks the state of the data before beginning the subdisk move. If the data is degraded, the subdisk can still be moved. After moving, you will need to reactivate the disk to clear the degraded setting.

---

6. The final screen of the Subdisk Move wizard appears. **Click Finish** to complete the command.

After you have provided all necessary information in the dialog box, click **OK**.

Notes:

- Subdisks are typically moved to reorganize disk space.
- The disk space occupied by the original subdisk is returned to the free space pool.
- A subdisk in a mirrored, striped, or RAID-5 volume should not be moved to a disk that already contains a copy or part of that volume.
- If the **Subdisk Move** task fails and leaves some unused subdisks (that is, subdisks that are not associated with a volume) on the system, you can use the **Subdisk Remove** task to free the space occupied by the unused subdisks.

Splitting a Subdisk

The **Subdisk Split** command allows you to split a subdisk. After the subdisk is split, the resulting two subdisks will reside on the same section of the same disk. You can then use the **Subdisk Move** command to move one or both subdisks to other disks. You may want to split and move a subdisk to make the best use of your disk space. A split subdisk can be joined back together again with the **Subdisk Join** command.

You can use the Object View window (**Disk Groups** > **Object View**) or the Volume to Disk Mapping window (**Disk Groups** > **Disk/Volume Map**) to view the subdisks in a disk group. You can use the Volume Layout Details window (**Volumes** > **Show Layout**) to view subdisks in a specific volume.

▼ **To split a subdisk into multiple subdisks**

1. Identify the subdisk that you want to split and display it in the right pane.

2. Right-click on the subdisk you want to split to bring up its context menu.

3. Select **Split** from the context menu.

4. The welcome screen of the Subdisk Split wizard appears. Click **Next** to continue.

5. In the next screen that comes up, specify the subdisk size for the first of the two subdisks and Click **Next**.

The remaining space left over will be assigned to the second subdisk. For example, if the original subdisk was 100 MB and you assigned 40 MB to the first subdisk, the other subdisk will be 60 MB.

6. The final screen of the Subdisk Split wizard appears. **Click Finish** to complete the command.

After a few moments, two subdisks will appear in the right pane of the Volume Manager GUI.

Notes:
- The name of the first subdisk remains the same as the selected subdisk. Other subdisks are automatically named by VxVM.
- The new, smaller subdisks occupy the same regions of the disk that the original subdisk occupied.
- The original subdisk must contain a sufficient number of sectors for the specified split to work.
- A Dirty Region Logging log subdisk cannot be split.

Joining a Subdisk

The **Subdisk Join** procedure joins two or more subdisks together to form a single larger subdisk. Subdisks can only be joined together if they belong to the same volume and occupy adjacent regions of the same disk and mirror. You can join two subdisks that had been one subdisk but that were split by the **Subdisk Split** command. You cannot split a subdisk and join it back to another subdisk that it was not split from. There also has to be room on the disk for the two subdisks.

You can use the Object View window (**Disk Groups** > **Object View**) or the Volume to Disk Mapping window (**Disk Groups** > **Disk/Volume Map**) to view the subdisks in a disk group. You can use the Volume Layout Details window (**Volumes** > **Show Layout**) to view subdisks in a specific volume.

▼ **To join subdisks**

1. Identify one of the two subdisks that you want to join and display it in the right pane.

2. Right-click on the subdisk you want to join to bring up its context menu.

3. Select **Join** from the context menu.

4. The welcome screen of the Subdisk Join wizard appears. Click **Next** to continue.

5. In the screen that comes up next, select the subdisks to be joined together and click **Next**.

6. The final screen of the Subdisk Join wizard appears. **Click Finish** to complete the command.

   Within a short time, the two subdisks will be replaced in the right pane of the Volume Manager GUI with one subdisk.

   After you have provided all necessary information in the dialog box, click **OK**.

Notes:

- The **Subdisk Join** task requires two or more existing subdisk names and a new (joined) subdisk name.
- Only contiguous subdisks on the same disk can be joined.
- The subdisks to be joined must belong to the same volume and mirror.
- For a striped volume, the subdisks must be in the same column.
- The joined subdisk name can be the name of one of the subdisks being joined.

Subdisk Properties

Name

Subdisks on a disk are assigned numbers in a sequence, such as 1-01, 1-02, 1-03 or 12-01, 12-02, 12-03. The subdisk number is an internal number generated by the program. There is no particular significance to the one or two digits before the dash except that, for any one disk, the first one or two numbers identifying its subdisks must be the same. The

numbers after the dash represent a number for the subdisk within the disk. Thus, if the subdisk was the first one created for a particular disk, it would have 01 after the dash, the second disk created would have 02 after the dash, and so on.

Size

This field displays the size of the subdisk.

Column

Column displays the column that the subdisk occupies in the volume. Striped and RAID-5 volumes have multiple columns.

Disk Offset

This is the offset where the subdisk starts on the disk. The reason this is included in the Properties window is because for a subdisk to be split, it must be a contiguous to the subdisk next to it. By looking at the offsets, you can determine which subdisks are contiguous.

Plex Offset

This is the offset of a subdisk within a plex. It shows the distance from the start of a plex to the start of a specific subdisk. The first subdisk within a plex will have an offset of "0." The second subdisk will be offset by the size of the first subdisk.

After you have provided all necessary information in the dialog box, click **OK**.

Viewing Volume Properties

The Volume Properties window contains detailed information about the selected volume. The Properties window contains a set of tabbed pages, each of which contains information about the volume and related objects. You can display a different page by clicking on the appropriate tab label.

◆ To view the properties of a volume, select the volume and then choose **Properties** from the **Volumes** or popup menu. You can also access the Volume Properties window by double-clicking on the volume.

◆ To update the contents of the Properties window to reflect current properties for the volume, click **Refresh**.

File System Tasks 5

File system tasks include:

- [Adding a New File System to a Volume](#)
- [Mounting a File System](#)
- [Unmounting a File System](#)
- [Removing a File System from the File System Table](#)
- [Defragmenting a File System](#)
- [Creating a Snapshot Copy of a File System](#)
- [Checking a File System](#)
- [Viewing File System Properties](#)
- [Using the QuickLog Feature](#)
- [Unmounting a File System from a Cluster Node](#)
- [Removing Resource Information for a Cluster File System](#)

File System Task Roadmap

The following table provides a summary of common VEA file system tasks.

To perform this task …	Use this procedure …
File System Setup Tasks:	
Add a new file system to a volume	Adding a New File System to a Volume
Mount a file system	Mounting a File System
Maintenance Tasks:	
Defragment a file system	Defragmenting a File System
Create a snapshot copy of a file system for backup	Creating a Snapshot Copy of a File System
Recovery Tasks:	
Perform a file system consistency check	Checking a File System
Other Tasks:	
Unmount a file system	Unmounting a File System
Cluster mounting a file system	Mounting a File System
Removing cluster file system resource information	Removing Resource Information for a Cluster File System
Create a QuickLog volume	Creating a QuickLog Volume
Enable a QuickLog device	Enabling a QuickLog Device for a File System
Disable a QuickLog device	Disabling a QuickLog Device for a File System
Remove a QuickLog volume	Removing a QuickLog Volume

Adding a New File System to a Volume

You can use the Volume Manager **New File System** procedure to place a file system onto an existing volume and mount the file system. This also updates the file system table file, if necessary.

▼ **To add a new file system to an existing volume**

1. Select the volume to contain the file system.

2. Choose **Actions** > **File System** > **New File System**.

3. Complete the New File System dialog box as follows:

File system type:	Select the file system type from the options shown.
Create Options:	- See Allocation Unit/Block size for allocation and block and settings. - To specify create details, click **New File System Details** and specify any additional options in the New File System Details dialog box (see Create Options).
Compress (checkbox)	- If your platform supports file compression, then you can select **Compress** to compress the files on your file system.
Mount Options:	- Enter the mount point for the file system, if you want the file system mounted at system startup. - Select the **Create mount point** checkbox if you want the system to create the mount point if it does not already exist. - Select the **Read only** and **Honor setuid** checkboxes, as required. - Select the **Add to file system table** and **Mount at boot** checkboxes to update the system table file and mount the file system at system startup. - Select the **Add to file system table** checkbox, and leave the **Mount at boot** checkbox unselected to update the system table file, and not mount the file system at system startup. - To specify mount details, click **Mount File System Details** and specify any additional options using the checkboxes and **Extra Options** entry in the Mount Details dialog box (see Mount Options).

After you have provided all necessary information in the dialog box, click **OK**.

Allocation Unit/Block size

File System	Allocation Unit Values	Block Size Values
ufs	512, 1024, 2048, 4096, 8192	4096, 8192
vxfs	same as block size	1024, 2048, 4096, 8192
jfs, jfs2	512, 1024, 2048, 4096	512, 1024, 2048, 4096
ext2, ext3	1024, 2048, 4096	1024, 2048, 4096
hfs	1024, 2048, 4096, 8192, 16384, 65536	1024, 2048, 4096, 8192, 16384, 65536

Create Options

Option	File Systems	Description
largefiles/nolargefiles	vxfs, jfs, fs2	File system contains/does not contain files equal or greater than 2 GBytes.
logsize	vxfs	Activity logging area size.

Mount Options

Option	File Systems	Description
largefiles/nolargefiles	vxfs, jfs, fs2	File system contains/does not contain files equal or greater than 2 GBytes.
Quick I/O (checkbox)	vxfs	Enables/disables the VERITAS Quick I/O for Databases option for the filesystem.
QuickLog device (checkbox)	vxfs	Enables the filesystem to use VERITAS QuickLog. Select also the log device number to be used (1 to 31).
Cluster mount (checkbox). This is present in the Mount **File System Details** dialog only if the optional cluster functionality is available.	vxfs	Mounts the filesystem in shared mode. Select the nodes to be mounted.
log/delaylog/tmplog	jfs, jfs2	Controls intent logging. To maintain filesystem integrity after a system failure, logging must be enabled.
blkclear	vxfs	Clears all data extents before file allocation.
mincache	vxfs	File system caching policy Note that, while the tmpcache option to mincache improves performance, it reduces integrity.

noatime	vxfs	Disables access time recording.

Notes:
- The **New File System** task requires a file system type.
- If the file system is to be mounted at startup, a file system mount point is required.
- If the Add to file system table checkbox is selected, then the file system table is automatically updated when the file system is mounted.
- The mount point must be an absolute pathname (that is, it must begin with /).

Mounting a File System

The **Mount File System** procedure mounts a file system and updates the file system table file, if necessary.

▼ **To mount a file system on an existing volume**

1. Select the volume that contains the file system to be mounted.

2. Choose **Actions > File System > Mount File System.**

3. Complete the Mount File System dialog box

▼ **To mount any file system**

1. Select the file system to be mounted.

2. Choose **Actions > Mount File System.**

3. Complete the Mount File System dialog box as follows:

FS Type:	Select the file system type.
Mount Options: (refer to Adding a New File System to a Volume for available options)	- If you want the system to use the mount options defined in the system table, check **Mount using options in the file system table.** - Enter the mount point for the file system, if you want the file system mounted at system startup. - Select the **Create mount point** checkbox if you want the system to create the mount point if it does not already exist. - Select the **Read only** and **Honor setuid** checkboxes, as required. - To specify mount details, click **Mount File System Details** and specify any additional options using the checkboxes and **Extra Options** entry in the Mount Details dialog box (see Mount Options).

After you have provided all necessary information in the dialog box, click **OK**.

Notes:
- The specified volume must contain a file system.
- The mount point must be an absolute pathname (that is, it must begin with /).

Unmounting a File System

The **Unmount File System** procedure unmounts a file system.

▼ **To unmount a file system on a volume**

1. Select the volume containing the file system to be unmounted.

2. Choose **Actions** > **File System** > **Unmount File System.**

3. Click **Yes** in the Unmount File System dialog to confirm that you want the file system unmounted.

▼ **To unmount any file system**

1. Select the file system to be unmounted.

2. Choose **Actions** > **Unmount File System.**

3. Click **Yes** in the Unmount File System dialog to confirm that you want the file system unmounted.

Removing a File System from the File System Table

The file systems **Remove from File System Table** procedure removes its resource information from the file system table.

▼ **To remove file system information from the file system table**

1. Select the file system to be removed.

2. Choose **Actions > Remove from File System Table.**

3. Click **Yes** in the Remove File System dialog to confirm that you want the file system information removed.

Defragmenting a File System

The **Defrag File System** procedure defragments a file system and the underlying volume, removing disjointed extents, and so on.

▼ **To defragment a file system on a volume**

1. Select the volume containing the file system to be defragmented.

2. Choose **Actions > File System** > **Defrag File System**.

3. Select **Yes** in the displayed dialog box

▼ **To defragment any file system**

1. Select the file system to be defragmented.

2. Choose **Actions > Defrag File System**.

3. Select **Yes** in the displayed dialog box.

Creating a Snapshot Copy of a File System

The **File System Snapshot** procedure prepares VxFS for online backup by creating a snapshot copy of the file system. This is done by creating a new volume, mounting a snapshot file system on the new volume, and copying the contents of the original file system to the snapshot file system. The snapshot file system is a consistent copy of the original file system at the time the snapshot was made. You can use the snapshot file system to make a backup of the original file system at a convenient time. After the backup is made, you can remove the snapshot file system by removing the underlying snapshot volume.

▼ **To create a snapshot copy of file system data**

1. Select the file system to be backed up.

2. Choose **Actions > Snapshot > Create...**.

3. Complete the Snapshot File System dialog box as follows:

New Volume Name:	By default, the new volume name displayed is composed of the name of the file system to be backed up and the suffix _vxfssnap (for example, **Vol5_vxfssnap**). You can replace the default name with the volume name of your choice.
Snapshot Mount Point:	By default, the new snapshot mount point displayed is composed of the mount point of the file system to be backed up and the suffix _vxfssnap (for example, /**Vol5_vxfssnap**). You can replace the default name with the mount point of your choice.
Snapshot Size:	Enter the size of the snapshot copy of the file system.
Select disks to use for the volume:	Select the disks for Volume screen. The default setting is for Volume Manager to assign the disks for you. To manually select the disks, click the "Manually select which disks to use for volume" radio button. The disks that you select should be in the right pane when you click **Apply**.
Cluster node (displayed only if your node is part of a cluster):	If your node is part of a cluster, you can now select the node in the cluster to contain the file system. If the node you select is not displayed in the current window, then it resides on a remote node. In order to remove this snapshot, you will have to open the remote node and display the created file system before removing it.

After you have provided all necessary information in the dialog box, click **OK**.

> **Notes:**
>
> - The **File System Snapshot** task requires a file system name, a snapshot mount point, and a snapshot size.
> - The **File System Snapshot** task is only available for VxFS file systems.
> - The snapshot file system is an exact copy of the original file system at the time the snapshot was created.
> - After you create the snapshot copy of the file system, remember to back it up to tape or some other media. Remove the snapshot file system when it is no longer needed.
> - Users can continue to use the original file system during this snapshot backup procedure.
> - Refer to the *VERITAS File System Administrator's Guide* for guidelines on choosing the snapshot file system size.

Checking a File System

The **Check File System** procedure checks an unmounted file system for consistency (using the `fsck` command). See the `fsck_vxfs`(1M) manual page for more information on file system checking.

▼ **To check a file system on a volume**

1. Select the volume containing the file system to be checked.

2. Choose **Actions** > **File System** > **Check File System**.

3. Click **Yes** in the Check File System dialog to confirm that you want the file system checked.

▼ **To check any file system**

1. Select the file system to be checked.

2. Choose **Actions > Check File System**.

3. Click **Yes** in the Check File System dialog to confirm that you want the file system checked.

Notes:
- The file system must be unmounted.
- VxVM assumes that `fsck` does not require user input. If user input is required, this task fails and `fsck` must be run at the command line.

Monitoring File System Capacity

The **Set Usage Threshold** procedure enables you to monitor the capacity of a file system on a mounted volume.

▼ **To monitor the capacity of a file system**

1. Select the file system to be monitored.

2. Choose **Actions > Set Usage Threshold.**

3. Complete the Set Usage Threshold dialog box as follows:

Monitor Capacity	Select the **Monitor Capacity** checkbox to initiate capacity monitoring on the file system. The File Systems Tabular View indicates if capacity monitoring is **Enabled** or **Disabled.**
Threshold Percentage	Select the **Threshold Percentage** value. When usage crosses this value, an alert will be logged.
Alert Interval (vxfs systems only):	Specifies the minimum time between recording alerts. (Avoids multiple recordings if events are moving back and forth over the boundary.)

Notes:
For systems other than vxfs, alert thresholds are not persistent (that is, the information is lost when the server restarts). This means that: - File system objects on the bus reflect the threshold and enabled status for alerts - Once an alert is fired, the status on the bus is disabled so that the alert is not refired at every periodic rescan (This can be avoided by allocating a low value to Threshold Percentage.)

Viewing File System Properties

The File System Properties window contains detailed information about the selected file system. Select **File Systems** then **Properties.**

You can also view the properties associated with each mount point under the file systems.

◆   To view the properties of a particular file system mount point, select **File Systems**, then choose the mount point and **Properties** from the popup menu.

◆   To update the contents of the Properties window to reflect current properties for the file system, click **Refresh**.

Using the QuickLog Feature

- ◆ Creating a QuickLog Volume
- ◆ Enabling a QuickLog Device for a File System
- ◆ Disabling a QuickLog Device for a File System
- ◆ Removing a QuickLog Volume

Creating a QuickLog Volume

The **Make Log** procedure designates a volume as a QuickLog™ volume. After setting up a QuickLog volume, you can enable a QuickLog device for a file system.

▼ **To designate a volume as a QuickLog volume**

1. Select the volume to be used for the QuickLog device.

2. Choose **Actions** > **QuickLog** > **Make Log**

3. Complete the Make QuickLog Log dialog box as follows:

Volume Name:	Check that the correct volume name is displayed in this field.
Log Device Number:	Select the number of the log device to attach to the volume. Log devices are listed in `/dev/qlog`.
Create Cluster Quicklog checkbox (shown only if the volume is part of a cluster):	Check this box is you want the Quicklog volume to be available to the cluster..

After you have provided all necessary information in the dialog box, click **OK**.

Notes:
- The **Make Log** task is only available if QuickLog is installed/licensed.
- The **Make Log** task requires a log device number (1-31).
- Only `VxFS` file systems can be used with a QuickLog device.
- The specified volume cannot contain a file system.
- The size of the specified volume must be at least 32MB.

Enabling a QuickLog Device for a File System

The **QuickLog Enable** procedure enables a QuickLog device on a VxFS file system. Before you enable a QuickLog device, you must designate a volume as a QuickLog volume.

> **Note** You can enable QuickLog on the file system automatically at system startup by selecting **Mount at Boot**, and specifying the appropriate options when completing the New File System dialog box (see Adding a New File System to a Volume).

▼ **To enable a QuickLog device for a file system**

1. Select the file system on which to enable a QuickLog device.

2. Choose **Actions** > **QuickLog** > **Enable**

3. Complete the Enable QuickLog dialog box as follows:

File System Name:	Check that the correct file system name is displayed in this field.
Log Device Number:	Select the number of the log device to be enabled for the file system. Log devices are listed in `/dev/qlog`.
Make QuickLog enable persistent (checkbox):	Check to enable QuickLog whenver the File System is mounted.

After you have provided all necessary information in the dialog box, click **OK**.

Notes:

- This task is only available if QuickLog is installed/licensed.
- This task requires a file system name.
- Only VxFS file systems can be used with a QuickLog device.
- The specified QuickLog device must already have a designated QuickLog volume.
- If no log device number is specified, the least-loaded device is used.

Disabling a QuickLog Device for a File System

The **QuickLog Disable** procedure disables QuickLog for a VxFS file system.

▼ **To disable a QuickLog device for a file system**

1. Select the file system to have QuickLog disabled.

2. Choose **Actions** > **QuickLog** > **Disable**.

3. Check that the correct file system name is displayed in the Disable QuickLog dialog box, then click **OK**.

Notes:
- The **QuickLog Disable** task is only available if QuickLog is installed/licensed.
- The **QuickLog Disable** task requires a file system name.

Removing a QuickLog Volume

The **Quicklog Remove** procedure detaches a QuickLog volume from a QuickLog device. Before you remove a QuickLog volume, you must disable QuickLog for all QuickLog-enabled file systems using that QuickLog device.

▼ **To remove a QuickLog volume**

1. Select the QuickLog volume to be detached.

2. Choose **Actions** > **QuickLog** > **Remove Log**.

Check that the correct volume name is displayed in the QuickLog Remove Log dialog box, then click **OK.**

Notes:

- The **QuickLog Remove** task is available only if QuickLog is installed/licensed.
- QuickLog must be disabled for all QuickLog-enabled file systems using the QuickLog device before the QuickLog volume can be detached.

Unmounting a File System from a Cluster Node

Use the **Unmount File System** procedure to unmount a VxFS file system on a selected volume in cluster (*shared*) mode.

▼ **To unmount a cluster file system from a particular volume**

1. Select the volume containing the cluster file system to be unmounted.

2. Choose **Actions > File System** > **Unmount File System...**

3. Select the nodes to be unmounted from the Unmount Cluster File System dialog box.

▼ **To unmount any cluster file system**

1. Select the File Systems node; then select the volume that containing the cluster file system to be mounted.

2. Choose **Actions** > **Unmount File System...**

3. Select the nodes to be unmounted from the Unmount Cluster File System dialog box.

Removing Resource Information for a Cluster File System

The **Remove Cluster Mount** procedure removes cluster file system resource information from the cluster configuration file.

> **Note** The cluster file system must be unmounted before performing the **Remove Cluster Mount** procedure.

▼ **To remove a cluster file system resource information**

1. Select the file system.

2. Choose **Actions** > **Remove Cluster Mount**.

3. Click **Yes** to remove the cluster file system resource information from the cluster configuration file and dissociate the shared volume from the mount point.

Cluster Tasks 6

VxVM provides access to cluster-related features only if the optional cluster functionality is present.

The following tasks are associated with clusters:

- Working with Clusters
- Creating a Shared Dynamic Disk Group
- Importing a Shared Dynamic Disk Group

The Cluster Task Roadmap shows a summary of common cluster tasks.

Cluster Task Roadmap

The following table provides a summary of common VxVM cluster tasks.

To perform this task …	Use this procedure…
Setup Tasks:	
Set up a shared disk group	Creating a Shared Dynamic Disk Group
Other Tasks:	
Access a deported disk group for cluster use	Importing a Shared Dynamic Disk Group

Working with Clusters

VxVM includes an optional cluster feature that enables VxVM to be used in a cluster environment. To activate the cluster feature, you must obtain a license for the VxVM cluster functionality.

After adding the cluster license to the machine, you must restart the VxVM server to enable cluster support. When a cluster license is present on a machine, VxVM displays a Clusters icon in the object tree (even if the machine is not currently set up as a node in a cluster). When a cluster is shown in the tree, all active/inactive nodes that are members of the cluster are displayed in the tree, as shown in "Tree/Grid View of a Cluster."

Tree/Grid View of a Cluster
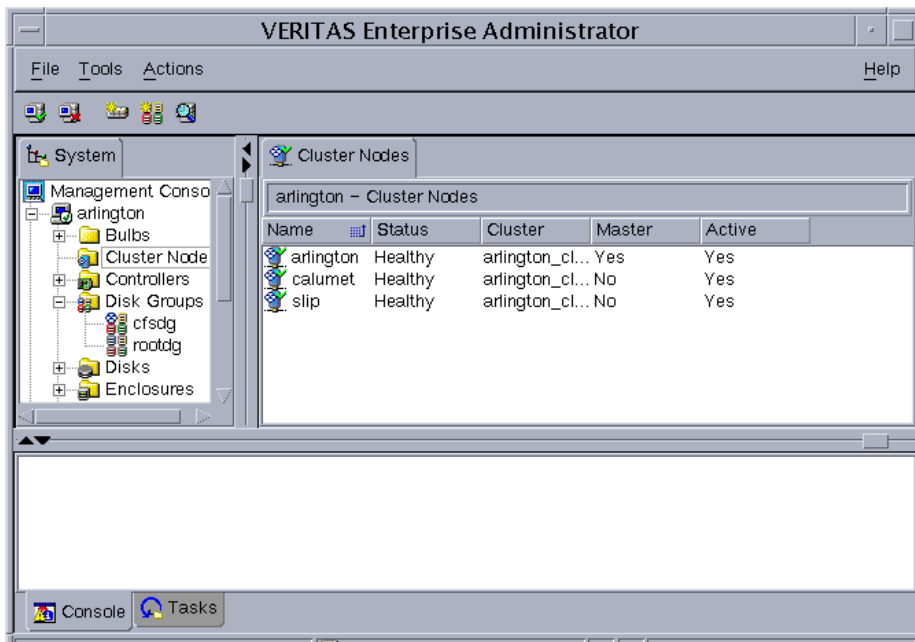
- ◆ To display the objects in a cluster, expand the cluster hierarchy (by clicking on the plus sign next to the Clusters icon).

- ◆ To determine which node is the master in a cluster, expand the cluster hierarchy for the appropriate cluster and select **Hosts** from the cluster hierarchy. The grid displays the names and properties of the nodes in the cluster. The Type column indicates which node is the master.

  The Cluster Properties window also indicates which node is the master. To access this window, select a cluster and choose **Properties** from the Selected or popup window.

> **Notes:**
>
> - When VxVM is connected to a single host, that host is auto-expanded; that is, the hierarchy of objects under that host is fully displayed in the dialog.
> - If VxVM is connected to more than one host, the hierarchy of objects is not auto-expanded.

Creating a Shared Dynamic Disk Group

The **New Dynamic Disk Group** procedure creates an additional dynamic disk group. Disks must be placed in dynamic disk groups before they can be used by VxVM. The default disk group (`rootdg`) is usually created during VxVM installation and always exists on a system running VxVM. You can create additional dynamic disk groups to organize your disks into logical sets of disks.

When you place a disk under VxVM control, the disk is initialized. Initialization destroys any existing data on the disk. (You can use encapsulation to preserve disk data.)

The steps for creating a new dynamic disk group are:

1. Right-click the Disk Groups folder, or right-click a disk.

2. Select **Actions > New Dynamic Disk Group**.

   The New Dynamic Disk Group wizard screen appears.

3. Click **Next** to continue. A new screen appears.

4. Enter a name for the dynamic disk group and check the **Create Cluster Group** checkbox.

5. If your system supports Activation Mode, then select **Activation Mode** and choose the mode from the displayed submenu. Click **OK.**

6. Select which disks you want to include in the group. Make sure the disks you want to include are in the right pane of the window, and click **Next**.

   When you have provided all necessary information in the dialog box, click **OK.**

7. The next screen confirms the disks you have selected. Choose **Yes** to continue if you are satisfied with the disk selection. If you are not satisfied, you can click the **No** button to go back to the previous screen in order to modify your disk choices.

8. Normally, you would add all the disks you want in the group at this point. You can always add more disks later with the **Add Disk to Dynamic Disk Group** command.

   Indicate whether the disk should be initialized or encapsulated. If you initialize the disk, any existing data on the disk will be destroyed. If you encapsulate the disk, any existing data will be preserved in volumes.

9. If you chose to encapsulate the disk, reboot the system.

> **Notes:**
>
> u   The **Add Disk to Dynamic Disk Group** task requires a dynamic disk group name and the name of at least one disk.
>
> u   The dynamic disk group name must be unique.
>
> u   The new dynamic disk group must contain at least one disk.
>
> u   Only disks that are online and do not belong to a dynamic disk group can be used to create a dynamic disk group.
>
> u   The Volume Manager disk name must be unique within the dynamic disk group.
>
> u   If multiple disks are specified in the Disk Device(s) field and only one disk name is specified in Disk Name(s) field, VxVM appends numbers to the disk name so that each disk name is unique within its dynamic disk group.

Importing a Shared Dynamic Disk Group

The **Import Dynamic Disk Group** procedure makes a deported (inaccessible) shared dynamic disk group and its volumes accessible again. To import a deported dynamic disk group, you must know the former name of the dynamic disk group, and this name must not be in use. In addition, at least one disk name formerly assigned to the deported dynamic disk group must not be in use.

▼ **To import a shared dynamic disk group**

1. Select the appropriate host machine node.

2. Choose **Actions** > **Import Dynamic Disk Group**.

3. Complete the Import Dynamic Disk Group dialog box as follows:

New Name:	Enter a new dynamic disk group name in the New Name field. to change the name of the dynamic disk group at import.
Clear host ID	Select **Clear host ID** to clear the existing host ID stamp on all disks in the dynamic disk group at import, Do not use this option if another host is using any disks in the dynamic disk group.
Force	Select **Force t**o force the dynamic disk group import when the host cannot access all disks in the dynamic disk group This option can be used to import a dynamic disk group that contains a failed disk, but can lead to dynamic disk group inconsistency if all disks are still usable.
Import Shared	Select **Import Shared** to import the dynamic disk group as a shared dynamic disk group, This option is only applicable in a cluster environment.

When you have provided all necessary information in the dialog box, click **OK**.

Notes:

u   Only deported dynamic disk groups can be imported.

u   A deported dynamic disk group cannot be imported if another dynamic disk group with the same name has been created since the dynamic disk group was deported.

u   When a dynamic disk group is imported, the system stamps its host ID on all disks in the dynamic disk group. A dynamic disk group import fails if one of the disks is stamped with a host ID that does not match the others. This ensures that dual-ported disks cannot be managed (and possibly corrupted) by two systems at the same time. If you are *sure* that the dynamic disk group is *not* in use by another host, you can clear the host IDs and import the dynamic disk group by selecting the **Clear Host ID** option.

Troubleshooting 7

Select one of the following options for information on alerts, object states, and other troubleshooting topics. If you are unable to resolve a problem by following the instructions provided, please contact Customer Support for additional information.

◆ Alerts

◆ Disk Troubleshooting

◆ Volume Troubleshooting

◆ General Troubleshooting

   - Client/Server Problems

   - Configuration Changes

Alerts

When an object fails or experiences an error, an alert icon appears on the object and the object state usually changes to an unhealthy state. The unhealthy object also appears in the Alert Monitor window, which summarizes the problem and indicates whether any associated objects have problems. When an object enters an unhealthy state and has an alert, you should review the contents of the Alert Monitor window and then try to correct the problem. For more information about an object listed in the Alert Monitor window, review the object Properties window.

❖ To display the Alert Monitor window, click the **Alert** button in the toolbar.

❖ To view the properties of an object listed in the Alert Monitor window, select the object and choose **Object Properties** from the **Alert** or popup menu. You can also access object properties by double-clicking on the object.
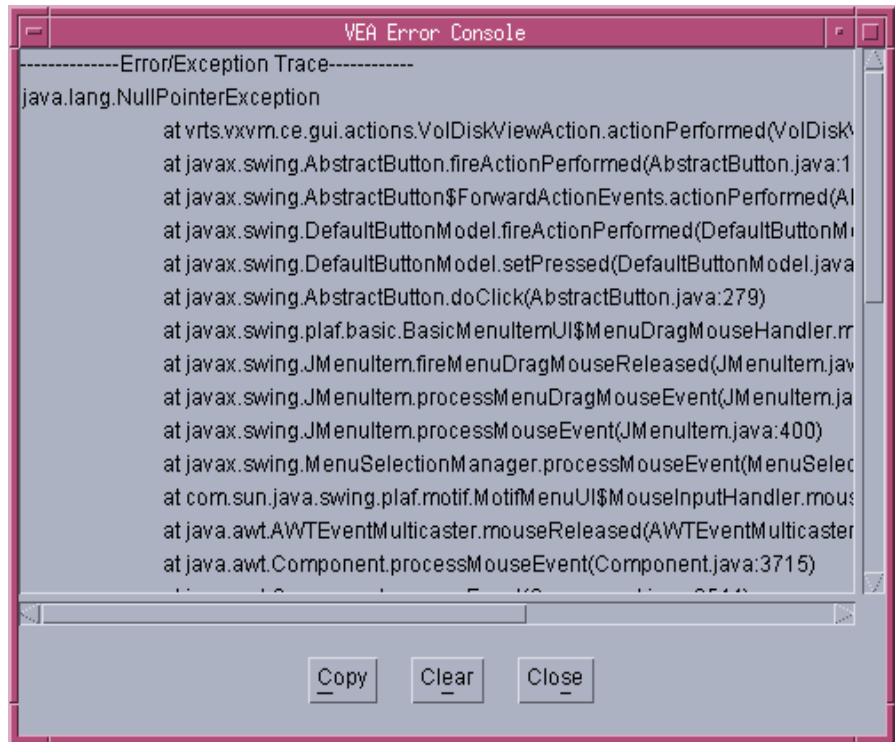
Client Java Exceptions and Errors

When a client Java exception or error occurs, an error alert icon is displayed on the bottom of the main window.
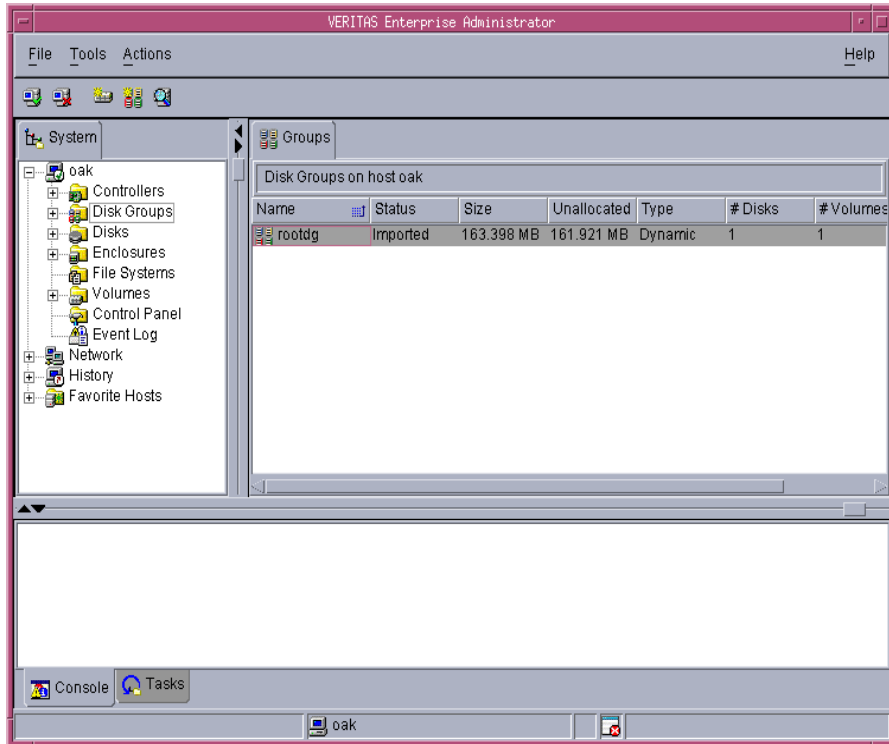
Click on this icon to display the Java console containing the text of the errors or exceptions.

```
┌─┬──────────────────────────────────────────────────────────┬─┬─┐
│─│                    VEA Error Console                      │▪│□│
├─┴──────────────────────────────────────────────────────────┴─┼─┤
│--------------Error/Exception Trace-----------                 │▲│
│java.lang.NullPointerException                                 │ │
│            at vrts.vxvm.ce.gui.actions.VolDiskViewAction.actionPerformed(VolDiskV│ │
│            at javax.swing.AbstractButton.fireActionPerformed(AbstractButton.java:1│ │
│            at javax.swing.AbstractButton$ForwardActionEvents.actionPerformed(Al│ │
│            at javax.swing.DefaultButtonModel.fireActionPerformed(DefaultButtonM │ │
│            at javax.swing.DefaultButtonModel.setPressed(DefaultButtonModel.java │ │
│            at javax.swing.AbstractButton.doClick(AbstractButton.java:279)        │ │
│            at javax.swing.plaf.basic.BasicMenuItemUI$MenuDragMouseHandler.m│ │
│            at javax.swing.JMenuItem.fireMenuDragMouseReleased(JMenuItem.jav│ │
│            at javax.swing.JMenuItem.processMenuDragMouseEvent(JMenuItem.ja│ │
│            at javax.swing.JMenuItem.processMouseEvent(JMenuItem.java:400)     │ │
│            at javax.swing.MenuSelectionManager.processMouseEvent(MenuSelec│ │
│            at com.sun.java.swing.plaf.motif.MotifMenuUI$MouseInputHandler.mous│ │
│            at java.awt.AWTEventMulticaster.mouseReleased(AWTEventMulticaster│ │
│            at java.awt.Component.processMouseEvent(Component.java:3715)       │▼│
│                                                                               │ │
├───────────────────────────────────────────────────────────────┤ │
│◁│                                                             │▷│ │
├───────────────────────────────────────────────────────────────┴─┤
│                  ┌──────┐  ┌──────┐  ┌──────┐                     │
│                  │ Copy │  │ Clear│  │ Close│                     │
│                  └──────┘  └──────┘  └──────┘                     │
└──────────────────────────────────────────────────────────────────┘
```

Disk Troubleshooting

The disk state indicates the current condition of a disk. The disk state appears in the state column of the grid and in the Disk Properties window. When a disk is unhealthy, an alert icon appears on the disk and the disk is listed in the Alert Monitor window. Disk states can be one of the following:

- Disk State: Imported
- Disk State: Free
- Disk State: Not Setup
- Disk State: Import Failed
- Disk State: Disconnected
- Disk State: Deported
- Disk State: Offline

- Disk State: Not Initialized
- Disk State: Locked
- Disk State: Inactive
- Disk State: Foreign Owned

Disk State: Imported

The disk is accessible and has no known problems. The disk is under VxVM control and belongs to a dynamic disk group. This is the normal disk state. No user action is required.

Disk State: Free

The disk is freely available. A disk that is freely available is under VxVM control, but does not belong to a dynamic disk group.

◆ To make the disk available for VxVM use, add the disk to a dynamic disk group.

Disk State: Not Setup

The disk is not under VxVM control.

❖ To make the disk available for VxVM use, place the disk under VxVM control and add the disk to a dynamic disk group.

Disk State: Import Failed

The disk was previously under VxVM control, but VxVM cannot access the disk and/or configuration information for the disk. The disk is not available for use. This can happen after you upgrade VxVM. This can also happen if some disks are inaccessible at system startup.

❖ Make sure that the physical disk is turned on, plugged in, and attached to the computer. Repair any disk, controller, or cable problems. Scan the disks on the system (**Actions** > **Rescan**) to make sure that VxVM recognizes all attached hardware. Try to import the dynamic disk group for the disk.

❖ If the dynamic disk group is imported and the disk does not have a VxVM disk name, place the disk under VxVM control and add the disk to a dynamic disk group.

Disk State: Disconnected

The connection between the VxVM disk and the underlying physical disk (device) is broken. This can occur when a disk fails or when you disconnect a disk.

❖ Make sure that the physical disk is turned on, plugged in, and attached to the computer. Repair any disk, controller, or cable problems. Scan the disks on the system (**Actions** > **Rescan**) to make sure that VxVM recognizes any newly attached hardware.

❖ Try to reconnect the disconnected VxVM disk to its physical disk (using the **Replace Disk** task).

❖ If you cannot fix the problem, replace the disk with another physical disk.

Disk State: Deported

The disk belongs to a dynamic disk group that is currently deported. The disk is not available for use in the deported dynamic disk group and cannot be added to a new dynamic disk group.

❖ To return the disk to a usable state, import the dynamic disk group for the disk.

❖ To move the disk to another dynamic disk group, import the current disk group, remove the disk, and add the disk to a new dynamic disk group.

❖ If the disk group import fails and you want to free the disk space for use in other dynamic disk groups, you can use the **Initialize Disk** task.

Caution This command overwrites the disk header and configuration information on the disk. Any volume copies or regions located on the disk are not accessible after you reinitialize the disk.

Disk State: Offline

VxVM cannot access the disk.

❖ To return the disk to an accessible state, bring the disk online.

Disk State: Not Initialized

A configuration error prevents the disk from being used.

❖ To make the disk available for VxVM use, place the disk under VxVM control and add the disk to a dynamic disk group.

❖ If the disk cannot be added to VxVM, it can be necessary to reinitialize the disk with the **Initialize Disk** task.

Caution This command overwrites the disk header and configuration information on the disk. Any volume copies or regions located on the disk are not accessible after you reinitialize the disk.

Disk State: Locked

The disk belongs to a dynamic disk group that is currently imported by another machine or was last imported by another machine and was not deported cleanly. The disk is not currently usable on the local machine.

❖ To make all of the disks in the dynamic disk group available for use on the local machine, deport the disk group on the remote machine and then import the dynamic disk group on the local machine.

❖ To make one disk available for use on the local machine, remove the disk from its dynamic disk group (on the other machine) and add it to a dynamic disk group on the local machine.

❖ If the dynamic disk group is *not* imported on another machine, it can be necessary to re-import the dynamic disk group and clear the host ID on all disks in the dynamic disk group. You can do this by selecting the **Clear Host ID** option in the Import Disk Group dialog box.

Caution If any of the disks in the dynamic disk group are in use by another machine, this command can cause the disks to be managed by two systems at the same time, which can lead to corruption.

Disk State: Inactive

The disk appears to belong to a dynamic disk group, but is not active in the disk group. The disk may have become (temporarily) inaccessible. Alternatively, the disk may have been inaccessible at dynamic disk group import, but may be accessible now.

❖ Make sure that the physical disk is turned on, plugged in, and attached to the computer. Repair any disk, controller, or cable problems. Scan the disks on the system (**Rescan**) to make sure that VxVM recognizes any newly attached hardware.

❖ It may be necessary to reattach the disk to its dynamic disk group with the **Replace Disk** task.

After a successful reattach, volume recovery can be necessary.

❖ If the reattach fails and you want to free the disk space for use, you can use the **Initialize Disk** task.

Caution This command overwrites the disk header and configuration information on the disk. Any volume copies or regions located on the disk is not accessible after you reinitialize the disk.

Disk State: Foreign Owned

The disk is under the control of another disk management product. The disk is not available for use with VxVM.

❖ To make the disk available for VxVM use, remove the disk from the other disk management product control and place the disk under VxVM control.

Volume Troubleshooting

The volume state indicates the current condition of a volume. The volume state appears in the state column of the grid and in the Volume Properties window. When a volume is unhealthy, an alert icon appears on the volume and the volume is listed in the Alert Monitor window. Unhealthy states include:

- ◆ Volume State: Started
- ◆ Volume State: Stopped
- ◆ Volume State: Uninitialized
- ◆ Volume State: Degraded
- ◆ Volume State: Unusable

Volume State: Started

The volume is accessible and has no known problems. This is the normal volume state. No user action is required.

Volume State: Stopped

The volume is disabled and is not available for use.

❖ To return the volume to a usable state, start the volume.

Volume State: Uninitialized

The volume is enabled, but is not initialized. If this state appears during volume creation, no user action is necessary.

❖ To put the volume in a usable state, start the volume.

Volume State: Degraded

The RAID-5 volume is in a degraded mode. This usually occurs when one or more subdisks are unavailable and read requests require data reconstruction. An underlying disk may have failed completely or there may be I/O errors on part of a disk. Alternatively, an underlying disk may be disconnected.

❖ Make sure that the physical disks are turned on, plugged in, and attached to the computer. Repair any disk, controller, or cable problems. Scan the disks on the system (**Rescan**) to make sure that VxVM recognizes any newly attached hardware.

To return the RAID-5 volume to a healthy state, recover the volume.

❖ If there has been a partial or complete disk failure, either replace the disk or move the affected subdisks to another disk.

Volume State: Unusable

The RAID-5 volume is unusable. This usually occurs when there is a double disk failure (that is, when two subdisks in the same stripe or the parity and one subdisk in a stripe are damaged or inaccessible). The underlying disks may have failed or become inaccessible.

❖ Make sure that the physical disks are turned on, plugged in, and attached to the computer. Repair any disk, controller, or cable problems. Scan the disks on the system (**Rescan**) to ensure that VxVM recognizes any newly attached hardware.

Run the following command to reattach the disks to their disk group:

    # **/etc/vx/bin/vxreattach [*device_name*]**

To return the RAID-5 volume to a healthy state, recover the volume.

❖ If two of the volume disks have failed, the RAID-5 volume data is unusable. Replace the failed disks and then try to restart the volume by running the following command:

    # **vxvol -f start *volume_name***

Restore the volume from backup.

To prevent this problem in the future, enable logging for RAID-5 volumes.

General Troubleshooting

General troubleshooting includes:

◆ Client/Server Problems

◆ Configuration Changes

Client/Server Problems

User is not authorized to connect to the server.

This error can occur for the following reasons:

- ◆ The user name is incorrect.
- ◆ The password is incorrect.
- ◆ The user does not have an account on the machine.
- ◆ The password and group files or NIS tables do not contain entries for the user.
- ◆ The user is not listed in the vrtsadm group entry.

- ❖ Enter the user name and password again. If the same error appears, ask the administrator of the machine to make sure that your user name is included in the vrtsadm group entry and your user name and password are entered correctly in the appropriate password and group files or NIS tables.

There is no such server.

The specified host machine does not exist or is not in the Domain Name System (DNS).

- ❖ Check the machine name and enter the machine name again.

Unable to connect to the server.

The VEA system may not be running on the machine to be administered.

- ❖ Make sure the server is running and the client and server are properly configured. If necessary, restart the VEA system.

Possible client/server versions mismatch.

The VEA client and server versions may be incompatible.

- ❖ Check the client and server versions using the following commands:

  ```
  # vea -V
  # vxsvc -V
  ```

  If necessary, upgrade the client or server.

Server connection lost.

The VEA service has been stopped.

❖ Restart the server.

The server seems to have multiple addresses.

The server (host) may be known by multiple addresses.

❖ Try to specify one of the server IP addresses as the server host name.

Configuration Changes

VxVM is dynamic, so it automatically displays new objects or changes to existing objects on the system. These changes or additions are usually reflected in VEA immediately (or within a short time).

If you add objects (such as new disks) to the system and VxVM does not display these objects within a short time, you can force VxVM to check for new objects in one of the following ways:

1. Scan the disks on the system (**Rescan Disks**) to make sure that VxVM recognizes any newly attached hardware.

2. Update the system configuration database.

Icons 8

The following tables show icons that appear in VxVM VEA:

◆ Object Icons

◆ Toolbar Icons

◆ Task Status Icons

◆ Performance Monitoring Icons

◆ Miscellaneous Icon

Object Icons

Icon	Description
	host
	connect/disconnect host
	mirror
	log
	disk

Icon	Description
	subdisk
	disk group
	volume
	new volume
	Stopped volume
	Quicklog volume
	task log
	controller
	enclosure (disk array)
	file system - snapshot
	file system - not mounted
	file system - mounted
	cluster node

Toolbar Icons

Icon	Description
	Alert Monitor window
	Search
	Properties
	Search window
	New Volume dialog box
	Print dialog box
	collapse/expand disks
	collapse/expand volumes
	projection

Task Status Icons

Icon	Description
⚠	Exited task

Performance Monitoring Icons

Icon	Description
	Low I/O Activity
	Normal I/O Activity
	High I/O Activity
	Critical I/O Activity

Miscellaneous Icon

Icon	Description
	alert
	error message
	information
	question
	warning

Glossary

alert

An indication that an error or failure has occurred on an object on the system. When an object fails or experiences an error, an alert icon appears.

alert icon

An icon that indicates that an error or failure has occurred on an object on the system. Alert icons usually appear in the status area of the main window and on the group icon of the affected object.

Alert Monitor

A window that provides information about objects that have failed or experienced errors.

browse dialog box

A dialog box that is used to view and/or select existing objects on the system. Most browse dialog boxes consist of a tree and grid.

button

A window control that the user clicks to initiate a task or display another object (such as a window or menu).

CFS

Cluster file system. A VxFS file system mounted on a selected volume in cluster (*shared*) mode.

check box

A control button used to select optional settings. A check mark usually indicates that a check box is selected.

children

Objects that belong to an object group.

cluster

A set of host machines (*nodes*) that shares a set of disks.

cluster file system

See CFS.

command log

A log file that contains a history of VERITAS Volume Manager (VxVM) tasks performed in the current session and previous sessions. Each task is listed with the task originator, the start/finish times, the task status, and the low-level commands used to perform the task.

device name

The physical disk device name (or *disk access name*).

dialog box

A window in which the user submits information to VxVM. Dialog boxes can contain selectable buttons and/or fields that accept information.

disk group

A set of disks that are under VxVM control and share a common configuration. A disk group configuration is a set of records containing detailed information on existing VERITAS Volume Manager objects (such as disk and volume attributes) and their relationships. Each disk group has an administrator-assigned name. The root disk group (`rootdg`) is a special private disk group that always exists. Volumes can only be created on disks that belong to disk groups.

disk name

The VERITAS Volume Manager disk name (or *disk media name*). This is the logical name given to the disk by VxVM or the administrator.

dock

To separate or attach the main window and a subwindow.

enclosure

A disk array.

gap

A disk region that does not contain VERITAS Volume Manager objects (subdisks).

graphical view

A window that displays a graphical view of objects. In VxVM, the graphical views include the Object View window and the Volume Layout Details window.

grid

A tabular display of objects and their properties. The grid lists VERITAS Volume Manager objects, disks, controllers, or file systems. The grid displays objects that belong to the group icon that is currently selected in the object tree. The grid is dynamic and constantly updates its contents to reflect changes to objects.

group icon

The icon that represents a specific object group.

GUI

Graphical User Interface.

host

A machine or system.

launch

To start a task or open a window.

main window

The main VERITAS Volume Manager window. This window contains a tree and grid that display volumes, disks, and other objects on the system. The main window also has a menu bar, a toolbar, and an optional Command Launcher.

menu

A list of options or tasks. A menu item is selected by pointing to the item and clicking the mouse.

menu bar

A bar that contains a set of menus for the current window. The menu bar is typically placed across the top of a window.

mirror

A copy of a volume and its data. There can be several mirrors per volume. The terms *mirror* and *plex* are used synonymously.

node

In the VxVM tree, a node is an element attached to the tree.

In a cluster environment, a node is a host machine in a cluster.

object group

A group of objects of the same type. Each object group has a group icon and a group name. In VxVM, object groups include disk groups, disks, volumes, controllers, free disk pool disks, uninitialized disks, and file systems.

object tree

A dynamic hierarchical display of VERITAS Volume Manager objects and other objects on the system. Each node in the tree represents a group of objects of the same type.

Object View Window

A window that displays a graphical view of the volumes, disks, and other objects in a particular disk group. The objects displayed in this window are automatically updated when object properties change. This window can display detailed or basic information about volumes and disks.

plex

A copy of a volume and its data. There can be several plexes per volume. The terms *mirror* and *plex* are used synonymously.

popup menu

A context-sensitive menu that only appears when you click on a specific object or area.

properties window

A window that displays detailed information about a selected object.

radio buttons

A set of buttons used to select optional settings. Only one radio button in the set can be selected at any given time. These buttons toggle on or off.

read-only mode

Read-only mode allows you to view objects on the system through VxVM, but prevents administrative actions from taking effect.

scroll bar

A sliding control that is used to display different portions of the contents of a window.

Search window

The VERITAS Volume Manager search tool. The Search window provides a set of search options that can be used to search for objects on the system.

Selected menu

A context-sensitive menu that changes its menu options to match the type of object that is selected. By default, the Selected menu is greyed out. When an object is selected, the Selected menu provides access to tasks appropriate for the selected object.

splitter

A bar that separates two panes of a window (such as the object tree and the grid). A splitter can be used to adjust the sizes of the panes.

status area

An area of the main window that displays an alert icon when an object fails or experiences some other error.

subdisk

A set of contiguous disk blocks that form a logical disk segment. Subdisks are associated with plexes (mirrors) to form volumes.

task properties window

A window that displays detailed information about a task listed in the Task Request Monitor window.

Task Request Monitor

A window that displays a history of tasks performed in the current VERITAS Volume Manager session. Each task is listed with the task originator, the task status, and the start/ finish times for the task.

toolbar

A set of buttons used to access VERITAS Volume Manager windows. These include another main window, a task request monitor, an alert monitor, a search window, and a customize window.

tree

A dynamic hierarchical display of objects on the system. Each node in the tree represents a group of objects of the same type.

uninitialized disks

Disks that are not under VxVM control.

volume

A virtual disk or entity that is made up of portions of one or more physical disks.

Volume Layout Details Window

A window that displays a graphical view of a volume and its components. The objects displayed in this window are not automatically updated when the volume properties change.

Volume to Disk Mapping Window

A window that displays a tabular view of volumes and their underlying disks. This window can also display details such as the subdisks and gaps on each disk.

VxFS

VERITAS File System.

VxVM

VERITAS Volume Manager.

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