

VERITAS FlashSnap™ Agent *for Symmetrix 4.0*

Administrator's Guide

Solaris

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Preface

This guide describes how to use the VERITAS FlashSnap Agent *for Symmetrix* (VxFAS) and how to use VERITAS Volume Manager™ (VxVM) in an EMC environment.

This guide is intended for system administrators responsible for configuring and maintaining the VERITAS FlashSnap Agent *for Symmetrix* and the VERITAS Volume Manager. This guide assumes you have:

- ◆ A working knowledge of the UNIX operating system.
- ◆ A basic understanding of volume management.
- ◆ A basic understanding of the EMC *TimeFinder* product.

What's In This Guide

- ◆ [Chapter 1. “Overview” on page 1](#), describes how the Volume Manager and VERITAS FlashSnap Agent *for Symmetrix* work in an EMC environment.
- ◆ [Chapter 2. “Introduction to VERITAS FlashSnap Agent for Symmetrix” on page 11](#), introduces VxFAS operations.
- ◆ [Chapter 3. “Using VERITAS FlashSnap Agent for Symmetrix with VxVM” on page 21](#), describes how to use the VERITAS Volume Manager and the VxFAS commands in an EMC environment.
- ◆ [Chapter 4. “Using the VERITAS FlashSnap Agent for Symmetrix With VEA” on page 47](#), describes how to perform VxFAS operations from the VERITAS Enterprise Administrator console.



Conventions

Typeface	Usage	Examples
monospace	Computer output, files, directories, software elements such as command options, function names, and parameters	Read tunables from the <code>/etc/vx/tunefstab</code> file. See the <code>vxtnfs(1M)</code> manual page for more information.
monospace (bold)	User input	# mount -F vxfs /h/filesys
<i>italic</i>	New terms, book titles, emphasis, variables replaced with a name or value	See the <i>User's Guide</i> for details. The variable <code>vxfs_ninode</code> determines the value of...

Symbol	Usage	Examples
%	C shell prompt	
\$	Bourne/Korn/Bash shell prompt	
#	Superuser prompt (all shells)	
\	Continued input on the following line; you do not type this character	# mount -F vxfs \ /h/filesys
[]	In a command synopsis, brackets indicates an optional argument	<code>ls [-a]</code>
	In a command synopsis, a vertical bar separates mutually exclusive arguments	<code>mount [suid nosuid]</code>
blue text	Indicates an active hypertext link	In PDF and HTML files, click on links to move to the specified location



Related Resources

- ◆ *VERITAS FlashSnap Agent for Symmetrix Release Notes*
- ◆ *VERITAS FlashSnap Agent for Symmetrix Installation Guide*
- ◆ *VERITAS Cluster Server Agents for VERITAS FlashSnap Agent for Symmetrix Installation and Configuration Guide*
- ◆ *VERITAS Volume Manager Installation Guide*
- ◆ *VERITAS Volume Manager Administrator's Guide*
- ◆ *VERITAS Volume Manager User's Guide - VERITAS Enterprise Administrator*
- ◆ *VERITAS File System Administrator's Guide*
- ◆ *EMC PowerPath Product Guide*
- ◆ *Online manual pages*



Getting Help

For assistance with any of the VERITAS products, contact VERITAS Technical Support:

- ◆ U.S. and Canadian Customers: 1-800-342-0652
- ◆ International: +1-650-527-8555
- ◆ Email: support@veritas.com

For license information:

- ◆ Phone: 1-650-527-0300
- ◆ Email: license@veritas.com
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For software updates:

- ◆ Email: swupdate@veritas.com

For information on purchasing VERITAS products:

- ◆ Phone: 1-800-327-2232
- ◆ Email: sales.mail@veritas.com

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

<http://www.veritas.com>

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

<http://support.veritas.com>

Unique Message Number

If you encounter a product error message, record the unique message number preceding the text of the message. When contacting VERITAS Technical Support, either by telephone or by visiting the VERITAS Technical Support website, be sure to provide the relevant message number. VERITAS Technical Support will use this message number to quickly determine if there are TechNotes or other information available for you.

A unique message number is an alpha-numeric string beginning with the letter “V”. For example, in the message number:

V-5-732-8018 At least one disk must be specified

the “V” indicates that this is a VERITAS product error message. The text of the error message follows the unique message number.



This chapter provides an overview of the VERITAS FlashSnap Agent *for Symmetrix* (VxFAS). Topics include:

- ◆ VERITAS FlashSnap Agent for Symmetrix
- ◆ VERITAS FlashSnap Agent for Symmetrix Utilities
- ◆ VERITAS Cluster Server Agents for VERITAS FlashSnap Agent for Symmetrix
- ◆ EMC Symmetrix Disk Arrays
- ◆ Device Names
- ◆ EMC Rules for Volume Manager
- ◆ Task Roadmap

VERITAS FlashSnap Agent *for Symmetrix*

VERITAS FlashSnap Agent *for Symmetrix* combines the strengths of the VERITAS products with specific enhancements to manage EMC *TimeFinder* product. VxFAS comprises the following products:

- ◆ VERITAS FlashSnap Agent *for Symmetrix*
An extension to the EMC Corporation *TimeFinder* product that uses special features within the VERITAS File System™ (VxFS) and VERITAS Volume Manager™ (VxVM).
- ◆ VERITAS Cluster Server™ (VCS) Agents for VERITAS FlashSnap Agent *for Symmetrix*
An add-on feature to VxFAS to provide high availability.



VERITAS FlashSnap Agent *for Symmetrix Utilities*

EMC *TimeFinder* is a business continuance solution that lets you create and use copies of EMC Symmetrix devices while the standard devices remain online and accessible. Business Continuance Volume (BCV) devices contain copies of Symmetrix standard (STD) devices and provide redundancy. You can temporarily detach BCV mirrors and use the BCVs to perform backups, testing, and other administrative tasks.

VxFAS is a set of commands that allow you to use EMC *TimeFinder* in conjunction with the VERITAS Volume Manager. You can use Volume Manager to build disk groups and volumes on Symmetrix STD devices, then use VxFAS on the Volume Manager disk groups. Using VxFAS commands, you can:

- ◆ Associate Symmetrix STD devices in a disk group with identical BCV devices.
- ◆ Initiate *TimeFinder* mirroring for Symmetrix STD devices in a disk group.
- ◆ Split Symmetrix STD devices from their BCV devices and create duplicate volumes on the BCV devices. You can use the resulting BCV volumes for administrative tasks such as backups and testing.
- ◆ Reattach and resynchronize the STD and BCV devices. The devices can be remirrored from the STD copy or restored from the BCV copy.
- ◆ Detach the STD devices from their BCV devices.

VERITAS Cluster Server Agents for VERITAS FlashSnap Agent *for Symmetrix*

VERITAS Cluster Server lets you monitor systems and application services, and restart services on a different system when hardware or software fails. VERITAS Cluster Server Agents for VERITAS FlashSnap Agent *for Symmetrix* are add-ons to VERITAS Cluster Server to enable such high availability for the VxFAS. For a detailed description of this feature, see the *VERITAS Cluster Server Agents for VERITAS FlashSnap Agent for Symmetrix Installation and Configuration Guide*.

EMC Symmetrix Disk Arrays

The EMC Symmetrix disk array is an integrated cached disk array with capabilities such as internal mirroring, RAID-S, and striping. EMC *TimeFinder* supports mirroring of data by associating STD type devices with BCV type devices to establish an STD-BCV pair (mirror). This mirror can later be split and each split device can be used separately for backup, testing, and other applications.

The Symmetrix disk array has various device types, which include:

- ◆ Standard/primary device (STD)
- ◆ Business Continuance Volume (BCV)
- ◆ 2-way mirror (mirror-2), 3-way mirror (mirror-3), 4-way mirror (mirror-4)
- ◆ RAID-S
- ◆ Remote Data Facility (RDF1, RDF2)

These devices can be combined to make additional configurations, such as STD-mirror-3 and RDF1-RAID-S.

Device Names

Disks in Volume Manager disk groups have two names:

- | | |
|-------------|---|
| device name | The physical disk device name (or <i>disk access name</i>). This usually takes the form <code>c#t#d#[s#]</code> . |
| disk name | The Volume Manager disk name (or <i>disk media name</i>). This is the logical name given to the disk by the Volume Manager or the administrator. |

If the EMC PowerPath feature is installed, device names can be in a format other than `c#t#d#[s#]`. Depending on the PowerPath release, device names use one of the following formats:

- ◆ `c#t#d#[s#]`
- ◆ `emcpower#c`
- ◆ `safe#c`

When using PowerPath, make sure that you specify the correct PowerPath device name format to VxFAS commands.



EMC Rules for Volume Manager

EMC provides Volume Manager with a set of rules to ensure that Volume Manager works correctly with intelligent storage hardware in an EMC environment. Most of the rules optimize the Volume Manager configuration on Symmetrix devices and prevent inappropriate configurations. These rules apply to Volume Manager tasks such as creating a disk group, adding disks to a disk group, and allocating storage for a volume.

The underlying hardware configuration within a Symmetrix disk array may provide a misleading view to Volume Manager. For example, Symmetrix can divide an internal physical disk into two or more parts called *hyper volumes* or *hypers*. Each hyper can participate in setting up a different logical device as a Logical Unit Number (LUN) visible to the host. VxVM and the dynamic multi-pathing (DMP) feature interpret these devices to be two different disks, and you can create a mirrored VxVM volume on these disks. However, this mirrored volume has no redundancy because parts of all the mirrors reside on the single disk shared by the underlying LUNs. The EMC rules provide information that can be used to avoid such situations. There are two types of rules:

- ◆ *Alert rules* improve performance and ensure that any new Volume Manager objects are compatible with the FlashSnap Agent for Symmetrix. These rules warn about situations that can result in a configuration with objects that cannot be administered by VxFAS, potential incompatibilities between objects, or performance loss.
- ◆ *Prevent rules* try to avoid situations that can cause loss of data protection and availability. These rules help you and Volume Manager prevent inappropriate configurations, such as creating a mirrored volume on Symmetrix devices that are really part of the same physical disk or adding incompatible disks to a disk group.

Note The rules are not checked when the disk groups and volumes are created using the VxVM Allocator service.

Disk Group Rules

This section summarizes the EMC rules that apply to Volume Manager disk groups. Following are the prevent rules:

- ◆ Adding CKD, VCMDB (Volume Logix Database), DRV (Dynamic Reallocation) types of Symmetrix devices to a Volume Manager disk group
- ◆ Adding a Symmetrix device that is write disabled (WD)

The alert rules warn against doing the following:

- ◆ Mixing devices of type STD with devices of type BCV in the same Volume Manager disk group
- ◆ Mixing devices of type non-RDF with devices of type RDF in the same Volume Manager disk group
- ◆ Mixing devices of type R1 with devices of type R2 in the same Volume Manager disk group
- ◆ Mixing RDF devices from different RA groups in the same Volume Manager disk group
- ◆ Adding Symmetrix and other storage type devices to a Volume Manager disk group
- ◆ Adding gatekeeper devices, as defined through the SYMAPI library, to a Volume Manager disk group
- ◆ Removing devices that have been attached using VxFAS commands from a disk group. See “[Attaching Devices](#)” on page 29.
- ◆ Destroying a disk group that contains devices that were attached using VxFAS commands



Volume Rules

This section summarizes the EMC rules that apply to Volume Manager volumes.

- ◆ The subdisks of a plex cannot reside on multiple device types, such as a combination of Symmetrix and other devices or Symmetrix devices of different protection levels.
- ◆ A column of a striped or RAID-5 plex cannot reside on the same Symmetrix back-end device as another column of the plex.
- ◆ A column of a striped or RAID-5 plex on a Symmetrix disk must be based on a different RAID group from another column of the plex.
- ◆ The subdisks of a mirror cannot reside on the same Symmetrix back-end device as any other subdisk of another mirror.
- ◆ If one subdisk of a plex resides on a PowerPath parent device, all other subdisks of the same plex must also reside on PowerPath parent devices.
- ◆ If one subdisk of a plex resides on an RDF device, all subdisks of the plex must reside on RDF devices with the same RA number.
- ◆ The stripe size for a striped or RAID-5 plex must be 128K.

The volume rules apply while creating the volume using the `vxassist` command, resizing the volume using `vxassist` or `vxresize` commands, or mirroring the volume using `vxassist` or `vxmirror` commands.

Unenforced Rules

The EMC rules for volumes are not enforced in the following situations:

- ◆ For layered volumes. In an EMC environment, VxVM cannot create layered volumes with `vxassist make|convert` command.
- ◆ The `vxassist` command does not support layered volumes in an EMC environment. If you change the layout of a volume, the resulting volume does not comply with EMC rules, and there is no way to salvage the original volume.
- ◆ With the `-o override` option.
- ◆ The Volume Manager hot-relocation feature is disabled in an EMC environment.

Task Roadmap

This section summarizes Volume Manager and FlashSnap Agent *for Symmetrix* tasks. The tasks are grouped into required setup tasks and optional maintenance tasks. The procedures for these tasks are included in later chapters. To perform these tasks at the command line, go to “[Using VERITAS FlashSnap Agent for Symmetrix with VxVM](#)” on page 21. To perform these tasks using the VERITAS Enterprise Administrator, go to “[Using the VERITAS FlashSnap Agent for Symmetrix With VEA](#)” on page 47.

Setup Tasks (required)

▼ **To install and set up the FlashSnap Agent *for Symmetrix*:**

Install the FlashSnap Agent *for Symmetrix* package (VRTSfas). See the VERITAS product installation guides and the VERITAS FlashSnap Agent *for Symmetrix* Release Notes.

▼ **To set up devices and volumes:**

1. Add devices to Volume Manager. Create a disk group (if necessary) and add STD devices to the disk group.
2. Create volumes in the disk group that contains STD devices.
3. Scan devices to update the Symmetrix configuration information.
4. Attach Symmetrix STD devices to BCV devices to create STD-BCV pairs through disk group or device pair operations.
5. Mirror the STD devices to BCV devices. This initiates *TimeFinder* mirroring for the devices. An optional secondary disk group (BCV disk group) name can be specified with which STD devices are synchronized. If no name is specified, the currently attached BCV disk group is taken as default.



Administrative Tasks (optional)

▼ To use BCV mirrors for administrative tasks:

1. Split the STD-BCV disk group pairs. This temporarily splits the BCV devices from the STD devices and creates a disk group with duplicate volumes on the BCV devices. Up to 16 such BCV disk groups can be created through a series of attach, mirror and split operations on the STD disk groups with different BCV disk groups, one at a time. This allows up to 16 BCV devices associated to each STD device in an STD disk group, but at a time only one BCV device can be in synchronization with the STD device in the disk group. Split operation allows the user to specify the name of the BCV disk group to be created after split operation in the command line. If the user does not specify the BCV disk group name, a default BCV disk group name is selected.
2. Use the split BCV disk groups for administrative tasks such as backups and testing.

▼ Resynchronize STD and BCV devices:

After splitting the STD-BCV disk group, the STD and BCV devices can be resynchronized. There are two ways to do resynchronization:

- ◆ Mirror. This operation can be used on the STD-BCV disk group pair after the BCV disk group is no longer needed for administrative tasks and you want the BCV disk group to be synchronized with the STD disk group. This copies data from the STD devices in the STD disk group to the BCV devices in the BCV disk group.
- ◆ Restore. This operation can be used on the STD-BCV disk group pair when you want to replace the contents of the STD devices in the disk group with the contents of the BCV devices in a BCV disk group. This may be necessary if the data on the STD devices is corrupted. This copies data from the BCV devices to the STD devices.

There are two ways of specifying the BCV disk group with which the STD disk group can be resynchronized:

- ◆ Reattach. The `vxsymsetup reattach` command reattaches the STD disk group with one of the previously associated BCV disk groups.
- ◆ Specifying the BCV disk group in resynchronization commands (that is, in mirror or restore commands).

▼ **To detach an STD-BCV pair:**

1. Split the STD-BCV device pairs. This splits the BCV devices from the STD devices and creates a disk group with duplicate volumes on the BCV devices.
2. Detach the STD devices from the BCV devices. This breaks the connection between the STD and BCV devices.
3. Use `detachall` to detach all the attached BCV devices from the STD devices. This breaks the attachment and association between the STD and all the associated BCV devices corresponding to the STD disk group.
4. The `detach` and `detachall` operations can be done on a disk group. `detach` breaks the attachment and association between the STD and BCV devices of the corresponding disk groups. If `detachall` is specified, all the attached BCV devices from the STD devices of the specified STD disk group are detached. See “[Detaching Devices](#)” on page 40.

▼ **To monitor objects:**

- ◆ Use VERITAS Enterprise Administrator to view information about Volume Manager objects and Symmetrix devices.
- ◆ Use the `vxprint` or `vxsymquery` commands to view information about Volume Manager objects. See “[Viewing Device Information](#)” on page 43.

▼ **Enable VxFAS trace messages:**

VxFAS operations write trace messages to the VEA Server log file `/etc/vx/isis/vxisis.log`. This log is useful when trying to identify a VxFAS problem. By default, only critical trace messages are logged. You can increase the level of tracing if you think that a VxFAS operation is behaving erroneously or is giving unexpected results. To increase the level of trace messages for VxFAS, enter:

```
# vxregctl /etc/vx/isis/Registry setvalue \
Software/VERITAS/VxSvc/CurrentVersion/Providers/vx_emc_symmetrix \
TRACELEVEL REG_INT 3

# vxregctl /etc/vx/isis/Registry setvalue \
Software/VERITAS/VxSvc/CurrentVersion/Providers/vxtf \
TRACELEVEL REG_INT 3
```

The TRACELEVEL attribute value can be set from 0 to 6, where 0 indicates all possible trace messages. Setting the TRACELEVEL attribute to 0 increases the log file size considerably.





Introduction to VERITAS FlashSnap Agent for Symmetrix

2

This chapter explains how to perform the various tasks on the VERITAS FlashSnap Agent for Symmetrix (VxFAS). These tasks include mirroring the Business Continuance Volumes (BCV) with the standard device (STD), splitting the STD-BCV pairs, creating usable volumes on the BCV devices, and remirroring or restoring the primary devices from the corresponding BCV devices.

Business Continuance Processes

BCVs are Symmetrix devices that are specially configured in Symmetrix to be dynamic mirrors. After BCVs are created, they can be split from their production mirrored volumes and used for loading data warehouses, testing new applications, running batch jobs, making backups, and other functions that typically disrupt normal business support. BCVs can also be used to restore the environment following testing or system changes, and can be locally mirrored (RAID-1) for additional protection.

Each BCV device has its own host address and is configured as a standalone Symmetrix device. The VERITAS FlashSnap Agent for Symmetrix business continuance sequence is initiated and controlled from a single host. This sequence involves three processes:

- ◆ Setting, or establishing, a BCV as an additional mirror of a VxVM volume within a disk group.
- ◆ After the BCVs are established as a mirror of the disk group, the BCV disk group can be separated, or split, from the standard Symmetrix disk group with which it was previously paired.

At this point, the BCV disk group has valid data and is available for backup or other host processes through the new volumes. A different set of BCVs can then be attached, mirrored, and split with the same set of STD disks to get a different point-in-time copy of the data in the STD disk group. This way up to 16 snapshots can be created for an STD, but only one BCV can be in an established state with the STD at a time.

- ◆ After host processes on the BCV disk group volumes are complete, the BCV disk group can again be mirrored to the standard Symmetrix disk group to acquire new data for other business continuance processes or to update the standard volume with the data from the completed business continuance processes.



VxFAS Components

The main components of VERITAS FlashSnap Agent *for Symmetrix* are:

- ◆ Standard devices and standard device mirrors
- ◆ BCV devices and mirrors
- ◆ VxVM Disk Groups, Volumes, and VxFS File Systems

BCV devices and Standard devices reside in the same cabinet.

standard devices	Standard Symmetrix devices are configured for typical Symmetrix operation under a designated protection method, such as RAID-1, RAID-S, SRDF. The standard device can have any mirror structure (RAID-1, RAID-S, or RAID with SRDF). There can be up to three mirrors because establishing a BCV pair requires assigning the BCV device as the next available mirror of the standard device. Symmetrix standard devices can be used as VxVM disks and included in VxVM disk groups. Non-Symmetrix disks are ignored during VERITAS FlashSnap Agent <i>for Symmetrix</i> operations.
BCV devices	A BCV device is a standard Symmetrix device for dynamic mirroring. A BCV device has additional attributes that allow it to independently support host applications and processes. A BCV device can be RAID-1 or SRDF protected, but not RAID-S protected.
mirrors	After a BCV device is established as a mirror of a standard device, the two devices together constitute a <i>BCV pair</i> . The pair is comprised of two types of mirrors: the standard device mirrors and the BCV mirror.
standard device mirrors	Each mirror contains a copy of the data contained in the standard device. There can be up to three standard device mirrors.
BCV mirrors	A BCV mirror is a standard mirror (one of M2, M3, or M4) that is assigned upon creation of the BCV pair.
VM Disk Groups	Symmetrix devices can be used as VM disks and included in VxVM disk groups, volumes, and VxFS file systems. While Symmetrix internal <i>TimeFinder</i> operations are performed at the device level, VxFAS provides the necessary logical mapping and control functions to allow <i>TimeFinder</i> operations to be carried out at the disk group level.
Snapshots of STD disk group	A BCV mirror can be split with the STD disk group to create a snapshot of the STD disk group. This process creates a BCV disk group that is an exact copy of the STD disk group.

Multiple BCV Support

Starting from microcode 5266 and SYMAPI 4.1, the Symmetrix maintains track tables for up to 16 BCVs per STD device, with only one BCV mirrored at a time. This is a change from the previous versions of microcode where track information about only one BCV was maintained per STD device. Thus VxFAS commands now deal with multiple BCV disk groups for setup, split, remirror, and restore operations. This allows taking up to 16 snapshots of the STD disk group (one at a time) for which incremental mirroring or restore (which is relatively quick because only invalid tracks are updated) operations are possible. Some rules for multiple BCV support:

- ◆ Multiple BCV support is at the disk group abstraction level, not the device level.
- ◆ VxFAS does not allow successive attaching of multiple BCVs with one STD device before creating the first mirror with the previously attached BCV.
- ◆ If an STD-BCV pair is attached, and no subsequent first mirror was created, a reattach of the same STD and different BCV will fail.
- ◆ With a file option, you can specify the pairs that show the explicit correspondence between the STD and BCV devices.
- ◆ For detaching a STD-BCV pair, the STD must be in split state.
- ◆ The `vxsymsetup` command has a disk group reattach option for multiple BCV support.
- ◆ Only one BCV device at a time can be in the synched or restored state for an STD device.



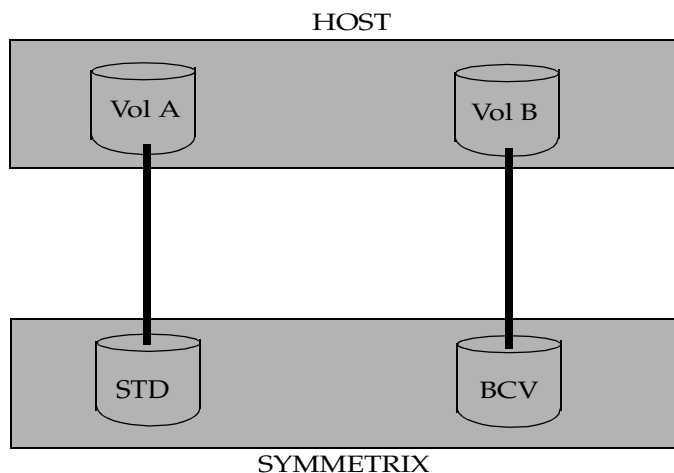
VxFAS Operations

VERITAS FlashSnap Agent *for Symmetrix* is used to provide a foundation for various host business continuance processes. The following operations are available through host commands described in this guide.

Establish

The command `vxsymmir` assigns the BCV disk group as a mirror of a standard disk group and copies the entire contents of the standard disk group to the BCV disk group. The following figure illustrates the initial Symmetrix configuration prior to performing any *TimeFinder* operation.

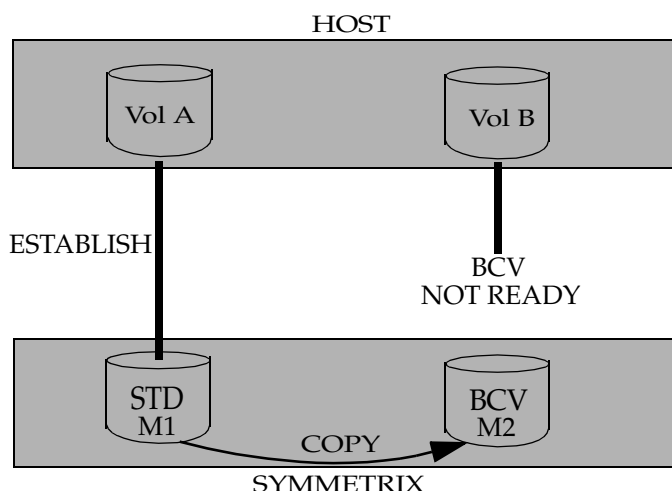
Symmetrix Configuration Prior to *TimeFinder* Operations



To obtain a copy of the data on a standard Symmetrix disk group, a BCV disk group association must be created. A BCV disk group association consists of BCV devices and standard devices that make up the volumes in the VxVM disk group. The standard devices within a disk group can have up to three mirrors. The mirror structure can be normal, RAID-1, or RAID-5 with SRDF. This constraint is because establishing a BCV pair requires assigning the BCV disk group as the next available mirror of the Standard disk group. Because there is a maximum of four mirrors allowed per disk group in the Symmetrix, a disk group already having four mirrors is not able to accommodate another one.

The `vxsymmir` command determines the standard Symmetrix devices and BCV devices corresponding to VxVM volumes in the specified VxVM disk group, and issues the appropriate Symmetrix interface commands to establish the BCV disk group as a mirror of the standard disk group. The following figure shows a BCV pair being established after a `vxsymmir` command.

Symmetrix Configuration During an Establish Operation



Symmetrix internal functions create the appropriate mirror relationships and copy data from the standard to the BCV devices. The BCV disk group is synchronized when the standard device mirrors and the BCV mirrors contain identical data. To use a BCV disk group for business continuance procedures, the BCV disk group must be split to make the BCV disk group and volumes available to the host.

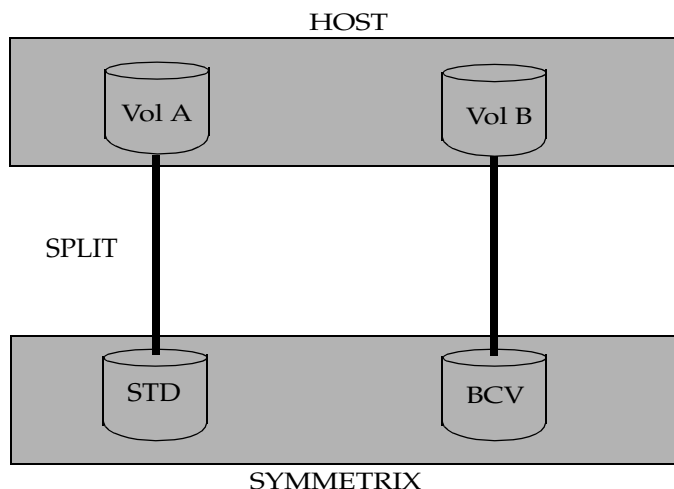
Note The BCV devices are not available for host use during the time that it is assigned as a BCV mirror on a standard device. However, any new data written to the standard device is copied to the BCV device while the BCV pair exists.



Split

After an association is established between the STD and BCV devices, the BCV disk group contains a copy of the data from the STD device. Both devices have identical data until the `vxsymssplit` command is issued. The `vxsymssplit` operation makes the BCV disk group available to the host. The figure shows the result of the split operation.

Symmetrix Configuration After a Split Operation



The following operations are carried out by the split operation:

- ◆ If the STD disks are mounted on a VxFS file system, I/O to the file system is frozen and buffers are flushed to ensure a consistent point-in-time image on the BCV devices. If a file system other than VxFS is in use, it must be unmounted.
- ◆ Devices containing VxVM volumes are split from the STD devices.
- ◆ VxFS file systems that were frozen are thawed after the split is complete.
- ◆ The new disk group name has the original disk group name prefixed by `bcv`.
- ◆ Volumes on the BCV disk group have names identical to the original volume name.
- ◆ If the volumes on STD devices are mounted on VxFS file system, the BCV volumes are mounted by default.

Any required operations can be done now. The following options are available:

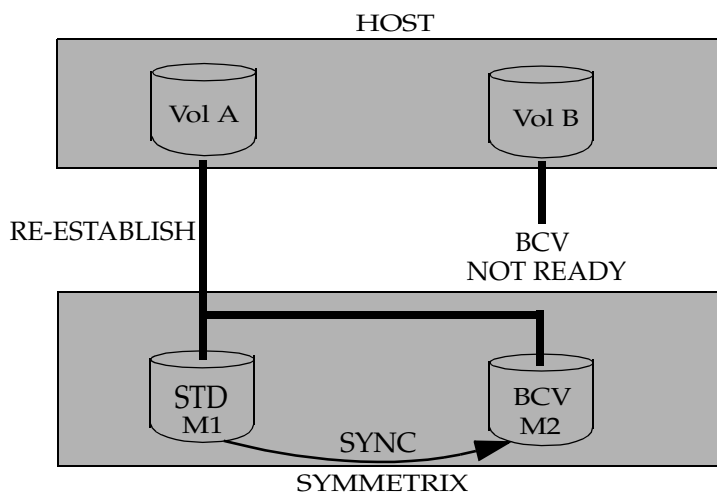
- ◆ Re-establish the BCV disk group (`vxsymmir`).
- ◆ Restore data from the BCV disk group to its STD disk (`vxsymrestore`).
- ◆ Establish a new pair consisting of the same BCV disk group with a new STD disk group (`vxsymsetup`).
- ◆ Attach a new BCV disk group to current STD disk group for taking another snapshot through split operation after mirroring. In this way up to 16 snapshots of the STD disk group at a different instance in time can be taken. All these BCVs are associated with the STD disk.

Re-Establish

Re-establishing a BCV disk group involves copying data from the STD disk group to the BCV disk group. The data copied to the BCV disk group is the data that changed while the BCV devices were split. This process overwrites data that changed on the BCV device. This ensures maximum efficiency of the synchronization. This process is useful if the data on the BCV device is not needed or if the current data is needed.

The `vxsymmir` command re-establishes the BCV disk group as a mirror of the STD disk group. The BCV disk group is synchronized when the STD device mirrors and the BCV mirrors contain identical data.

Symmetrix Configuration During a Re-establish Operation



The following functions take place when a `vxsymmir` command is issued:

- ◆ The `vxsymmir` command unmounts the VxFS file systems that are mounted on the BCV volumes and are not in use. The command fails if the file system is in use or if a file system other than a VxFS file system is mounted.
- ◆ VxVM volumes are removed from the BCV devices.
- ◆ The BCV disk group is deported.
- ◆ The state of the BCV devices is Not Ready.
- ◆ Incremental establish copies data from STD to BCV devices.

The BCV disk group must be split to make the BCVs available to its host.

Restore

The restore operation copies the entire contents of the BCV disk group to the standard disk group. The `vxsymrestore` command determines the standard Symmetrix devices and BCV devices corresponding to VxVM volumes in the specified VxVM disk group. The `vxsymrestore` command issues the appropriate Symmetrix interface commands to restore the contents of the BCV disk group to the standard disk group.

All applications must be stopped, and all file systems associated with the standard disks must be unmounted, to ensure that access is suspended during this operation.

Symmetrix internal functions create the appropriate mirror relationships and copy data from the BCV devices to the standard devices.

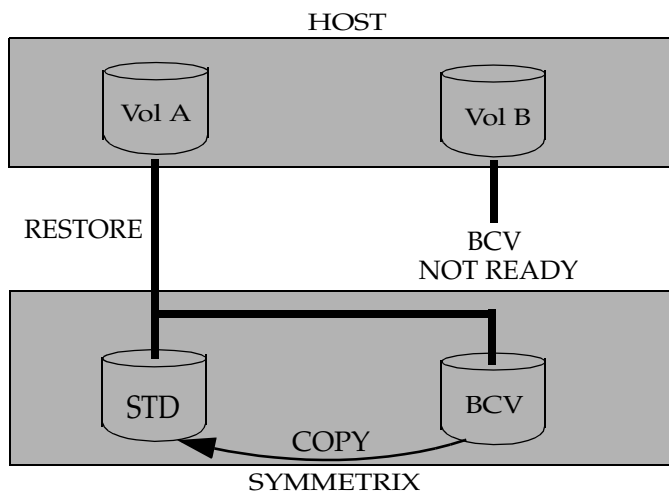
The following functions take place internally when a `vxsymrestore` command is issued:

- ◆ Any VxFS file systems that are mounted on the BCV volumes and are not in use are unmounted and the mount point is removed. The command fails if the file system is in use or if a file system other than VxFS is in use.
- ◆ VxVM volumes are removed from the BCV devices.
- ◆ The private regions of the volumes are copied from the standard devices to the BCV devices.
- ◆ Copy data from BCV devices to standard devices.
- ◆ The BCV pair is synchronized when the standard device and the BCV device contain identical data. The restoration process is complete when the devices are synchronized.

The restoration process is complete when the standard device and the BCV device contain identical data.

The following figure shows the standard and BCV devices containing identical data after the restoration process is complete.

Symmetrix Configuration During a Restore Operation



Note The device is not available for host use during the time that it is assigned as a BCV mirror on a standard device. However, any new data written to the standard device is copied to the BCV device while the BCV pair exists.

The BCV disk group must be split again before it can be used for BC procedures.

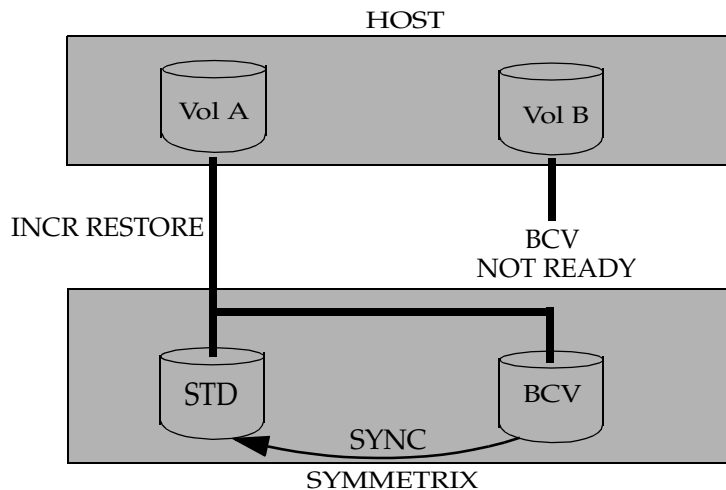
Incremental Restore

The incremental restore accomplishes the same thing as the restore process with one time-saving exception: the BCV copies only new data to the standard disk group that was updated on the BCV disk group while the BCVs were split. Any changed tracks on the standard disk group are also overwritten by the data on the corresponding track on the BCV disk group. This maximizes the efficiency of the synchronization process.

This process is useful if the results from running a new application on the BCV disk group were desirable, and you want to port the data and the new application to the standard disk group.



Symmetrix Configuration During an Incremental Restore



Note The `vxsymmir` and `vxsymrestore` commands, by default, perform incremental mirror and incremental restore between the associated STD-BCV disks. To perform full mirror or restore (which is required when the STD-BCV disks are being mirrored or restored for the first time), use the commands with the `-o full` option.

Using VERITAS FlashSnap Agent *for Symmetrix* with VxVM

3

This chapter describes how to use the VERITAS Volume Manager and the VERITAS FlashSnap Agent *for Symmetrix* commands in an EMC environment. The following topics are discussed in this chapter:

- ◆ Adding Devices to VxVM Disk Group
- ◆ Creating Volumes
- ◆ Attaching Devices
- ◆ Mirroring Disk Groups
- ◆ Splitting Disk Groups
- ◆ Remirroring Disk Groups
- ◆ Restoring Disk Groups
- ◆ Reattaching Disk Groups
- ◆ Detaching Devices
- ◆ Recovering Crashed Commands
- ◆ Viewing Device Information



Adding Devices to VxVM Disk Group

Before you can use the Volume Manager and the FlashSnap Agent for *Symmetrix*, you must place the Symmetrix standard (STD) and BCV devices under VxVM control. New disks must be set up on the system, placed under Volume Manager control, and added to a disk group before volumes can be created on these disks.

All VxFAS commands follow the UNIX standard command syntax. All commands work at the disk group level. Device pair operations are supported only for the `attach` and `detach` options of the `vxsymsetup` command.

VxFAS commands require the VERITAS Enterprise Administrator (VEA) service. Before running any VxFAS commands, ensure that VEA is available on that host by executing the following command:

```
# /opt/VRTSob/bin/vxsvc -m
```

If the service is not up, start it:

```
# /opt/VRTSob/bin/vxsvc
```

See the `vxsvc(1M)` manual page for more information.

Using EMC PowerPath Devices with VxVM

In previous versions of VxVM, it was necessary to perform `powervxvm init` and `powervxvm online` to use EMC PowerPath devices with VxFAS. Now EMC PowerPath devices are brought under VxVM control as *foreign* devices (see the `vxddladm(1M)` manual page for more information).

The following sections describe procedures for using PowerPath *pseudo* (`emcpower`) devices with VxFAS.

New Installation

If you are not already using EMC PowerPath devices with VxVM, perform the following procedure to put the PowerPath devices under VxVM control:

1. Make sure that there are no *emcpower* nodes in `/dev/vx/rdump` and `/dev/vx/dmp` directories. If they exist, remove them.
2. Install EMC PowerPath software.
3. Make sure that *emcpower* devices are present in `/dev/rdisk` directory.

4. Disable the DMP *Restore daemon*:

```
# /usr/sbin/vxdmpadm stop restore
```

5. Configure *emcpower* devices as foreign devices for VxVM:

```
# /usr/sbin/vxddladm addforeign pathname=/dev/rdsk/emcpower*c  
# /usr/sbin/vxddladm addforeign pathname=/dev/dsk/emcpower*c
```

6. Make the *emcpower* devices visible to VxVM:

```
# /usr/sbin/vxdctl enable
```

7. Start the DMP *Restore daemon* that was previously stopped:

```
# /usr/sbin/vxdmpadm start restore
```

8. Restart the `vxsvc` daemon.



Existing Installation of EMC PowerPath Devices

If you have already configured *emcpower* devices for use with VxVM using `powervxvm` commands, perform the following procedure:

1. Remove *emcpower* nodes from `/dev/vx/rdmp` and `/dev/vx/dmp` directories:

```
# /etc/powervxvm remove
```

2. Disable the DMP Restore daemon:

```
# /usr/sbin/vxdmpadm stop restore
```

3. Configure *emcpower* devices as foreign devices for VxVM:

```
# /usr/sbin/vxddladm addforeign pathname=/dev/rdsk/emcpower*c  
# /usr/sbin/vxddladm addforeign pathname=/dev/dsk/emcpower*c
```

4. Make the *emcpower* devices visible to VxVM:

```
# /usr/sbin/vxdctl enable
```

5. Start the DMP Restore daemon that was previously stopped:

```
# /usr/sbin/vxdmpadm start restore
```

Using PowerPath Native Devices

After the above procedure, if you decide not to use PowerPath pseudo (*emcpower*) devices for VxFAS, but instead want to use the PowerPath *native* devices, perform the following steps:

1. Unconfigure *emcpower* devices as foreign devices for VxVM by using the commands:

```
# /usr/sbin/vxddladm rmforeign pathname=/dev/rdsk/emcpower*c  
# /usr/sbin/vxddladm rmforeign pathname=/dev/dsk/emcpower*c
```

2. Put the native PowerPath devices online in VxVM:

```
# /usr/sbin/vxdctl enable
```

Note EMC PowerPath devices must be initialized as simple disks only.

Using VxVM Commands

To create a new Volume Manager disk group and add new devices to it, use the `vxdg init` command:

```
vxdg [-o verify|override] init diskgroup [medianame=]accessname...
```

where *diskgroup* is the Volume Manager disk group. *accessname* is the device name and *medianame* is the Volume Manager disk name.

To add new devices to an existing Volume Manager disk group, use the `vxdg adddisk` command:

```
vxdg -g diskgroup [-o verify|override] adddisk [medianame=]accessname
```

For example:

```
# vxdg -g emcdg adddisk c1t1d1s2
```

EMC provides a set of rules to ensure that the Volume Manager operates with intelligent storage in an EMC environment. The `vxdg` command has a `verify` option that checks that the device being added conforms with the EMC rules. The `verify` option syntax is:

```
vxdg -g diskgroup -o verify adddisk accessname
```

If no EMC rules are broken, `vxdg -o verify` exits silently and without creating any Volume Manager objects. To create the specified objects, repeat the `vxdg` command *without* the `-o verify` option.

If any of the EMC rules are broken, `vxdg -o verify` displays a relevant error message and exits without creating any Volume Manager objects. To force Volume Manager to add or create an object that does not comply with the EMC rules, use the `-o override` option:

```
vxdg -g diskgroup -o override adddisk accessname
```

It is not advisable to override the EMC rules as it can result in severe performance degradation or loss of data redundancy. For more details on the EMC rules, see the [“Overview”](#) on page 1.

See the *VERITAS Volume Manager Administrator’s Guide* or the `vxdg(1M)` manual page for details on adding devices to the Volume Manager.



Notes

- ◆ When a disk is placed under Volume Manager control, the disk is either initialized or encapsulated. Encapsulation preserves existing data on the disk in the form of volumes. Initialization destroys existing data on the disk. Encapsulation is recommended for the root/boot disk and any other disks that contain valuable data. Encapsulation requires a system reboot.
 - ◆ Disks that already belong to a disk group cannot be added to another disk group.
 - ◆ Disks cannot be added to deported disk groups.
 - ◆ The Volume Manager disk name must be unique within the disk group.
 - ◆ In an EMC environment, this command may display an error message that indicates that the task or selected disks do not comply with the EMC rules. If you choose to force the Volume Manager to add a disk that does not comply with the EMC rules, the resulting configuration may contain incompatible disks or objects that cannot be administered by VxFAS.
 - ◆ In an EMC environment, you cannot mix some device types in a Volume Manager disk group.
 - ◆ Encapsulated disks are not supported by VxFAS. Do not encapsulate disks that you plan to include in STD-BCV pairs.
 - ◆ For `bootdg`, all VxFAS functions except `restore` are supported. See the *VERITAS Volume Manager Administrator's Guide* or the `vxchg(1M)` manual page for details on how to check the `bootdg`.
 - ◆ If the STD devices in a disk group have attachments, the disk group cannot be destroyed. The disk group can be deported.
 - ◆ If one or more NR (not ready) devices were made RW (read-write) without using any VxFAS command, you may have to run `vxctl enable` to refresh the correct state of the device in VxVM. To check the state of a device (NR or RW), run the `sympd list` command.
 - ◆ VxFAS supports disk group names containing alphanumeric characters, hyphen (-) and underscore (_) only.
 - ◆ VxFAS does not support CVM shared disk groups, VxVM SAN disk groups, or disk groups containing VVR replicated volume groups (RVGs).
-

Creating Volumes

After the STD devices are added into a disk group, you can create volumes on the STD devices. To create volumes, use the `vxassist` command:

```
vxassist -g diskgroup [-o verify|override] make volume_name \length  
[attribute...]
```

Example:

```
vxassist -g emcdg make volemc 50m
```

The `vxassist` command has a `verify` option that checks whether the volume being created or changed conforms to the EMC rules. Use the `verify` option as follows:

```
vxassist -g diskgroup -o verify make volume_name length [attribute...]
```

If no EMC rules are broken, `vxassist -o verify` exits silently and without creating any Volume Manager objects. To create the specified objects, repeat the `vxassist` command *without* the `-o verify` option.

If any of the EMC rules are broken, `vxassist` displays a relevant error message and exits without creating any Volume Manager objects. If you want to force the Volume Manager to add or create an object that does not comply with the EMC rules, use the `-o override` option:

```
vxassist -g diskgroup -o override make volume_name length [attribute...]
```

Overriding the EMC rules is not recommended as it can result in a configuration with objects that are incompatible or objects that cannot be administered by VxFAS, or cause performance degradation and loss of data redundancy.

For more details on the EMC rules, see [“EMC Rules for Volume Manager”](#) on page 4. See the *VERITAS Volume Manager Administrator’s Guide* or the `vxassist(1M)` manual page for details on creating volumes.



Notes

- ◆ The volume size must be less than or equal to the available free space on the disks.
- ◆ A striped volume requires at least two disks.
- ◆ If no disks are specified in the command, Volume Manager uses the available space on disks in the specified disk group.
- ◆ A mirrored volume requires at least two disks. If logging is enabled, the volume requires at least one additional disk.
- ◆ The data in a concatenated or striped volume is not protected against disk failure unless the volume is mirrored. At least one additional disk is required to mirror a volume.
- ◆ In an EMC environment, this task may display an error message that indicates that the task or specified disks do not comply with the EMC rules. If you choose to force the Volume Manager to create a volume that does not comply with the EMC rules, you may not be able to use VxFAS to administer the resulting volume.
- ◆ EMC rules are enforced when a volume is resized. Volumes resized using the `vxassist growto|growby` command have to comply with EMC rules.
- ◆ The `vxassist` command does not support layered volumes in an EMC environment, VxVM cannot create layered volumes with the `vxassist make|convert` command. If you change the layout of a volume, the resulting volume may not comply with EMC rules and there is no way to salvage the original volume.
- ◆ A stripe size of 128 KB or its multiple is recommended for striped and RAID-5 volumes in an EMC environment. You can modify the `/etc/default/vxassist` file to ensure a default stripe size of 128 kilobytes. Add the following line to the file:

```
stwidth=128kb
```



Attaching Devices

The `vxsymsetup` command sets up the pairing information for STD and BCV devices. This command must be run before you run any other VxFAS commands. The `vxsymsetup` command attaches an STD device to a BCV device to create an STD-BCV pair (or *attachment*). You can move devices from a device group to the required group. Use any of these commands to associate the STD and BCV pair for all devices in a disk group on which you run VxFAS.

To attach an STD device to a BCV device, use the following commands:

```
vxsymsetup -g PriDg [-o enclosure_sno=Symmetrix-id] \  
            -s PriDev:SecDev[,PriDev:SecDev,...] [-n] attach  
vxsymsetup -g PriDg [-o enclosure_sno=Symmetrix-id] \  
            -o filename=file [-n] attach  
vxsymsetup -g PriDg:SecDg [-n] attach
```

where:

PriDg is the VxVM disk group to which the STD devices currently belong.

SecDg is the VxVM disk group to which the BCV devices currently belong.

Symmetrix-id is the Symmetrix serial ID of STD/BCV devices.

PriDev and *SecDev* are STD and BCV device names. If the `-o enclosure_sno` option is specified, use Symmetrix device names. Without the `-o enclosure_sno` option, use VxVM disk access name.

file is the file containing device pairs.

Examples

```
vxsymsetup -g emcdg -s c0t0d0s2:c0t6d0s2 attach
```

```
vxsymsetup -g emcdg -o enclosure_sno=000111222333 \  
            -s 012:0A8 attach
```

```
vxsymsetup -g emcdg:bcvdg attach
```

```
vxsymsetup -g emcdg -o filename=file attach
```

The entries in the file will be:

```
#STD      #BCV  
c0t0d0s2 c0t6d0s2
```

or this when `enclosure_sno` is specified:

```
#STD      #BCV  
012      0A8
```



After setting up an STD-BCV pair, mirror the device pair (see “[Mirroring Disk Groups](#)” on page 31) before you perform any of the following VxFAS tasks:

- ◆ Split
- ◆ Resynchronization
- ◆ Restore
- ◆ Reattach

Notes

- ◆ The specified STD device must belong to a disk group containing only STD devices.
 - ◆ The specified STD and BCV devices must have compatible device types.
 - ◆ The specified STD and BCV devices must have identical capacities.
 - ◆ The specified STD and BCV devices must belong to same Symmetrix.
 - ◆ Encapsulated disks are not supported by VxFAS. Avoid using encapsulated disks to set up an STD-BCV pair.
 - ◆ The `bootdg` disk group can be used for all operations except restore.
 - ◆ The disk group attach operation may not find a pairing solution, even if one exists, because no backtracking is done while finding pairs.
-



Mirroring Disk Groups

The `vxsymmir` command mirrors STD devices in a disk group. This command initiates *TimeFinder* mirroring for the Symmetrix STD devices that correspond to the specified disk group. The STD devices are mirrored to Symmetrix BCV devices. Use the `vxsymmir` command with `-o full` option to mirror Symmetrix STD devices for the first time with the selected BCV devices. To mirror Symmetrix STD devices, use the following command:

```
vxsymmir -g PriDg[:SecDg] [-n] [-o full] [-o wait]
```

where:

PriDg is the VxVM disk group to which the STD devices currently belong.

SecDg is the VxVM disk group to which the BCV devices currently belong and it is associated with *PriDg*.

With multiple BCV support, you can associate up to 16 secondary disk groups with the primary disk group. If the secondary disk group is not specified, the primary disk group is mirrored to the currently attached secondary disk group. If the secondary disk group is specified, the primary disk group is mirrored to the specified secondary disk group.

All of the disks in the specified disk group are mirrored. The `-n` option runs the command without a confirmation request. If the `-o full` option is not specified, the incremental mirror is created. If the `-o wait` option is specified, the command waits until all devices are synchronized.

Examples

```
vxsymmir -g emcdg -o full
```

While Symmetrix devices are being mirrored, do not perform any tasks on them until the process completes. This command may fail if a synchronization or split operation is in progress on one of the devices.

If the mirroring is being created for the first time with the BCV devices, and the `-o full` option is not specified, a message is displayed informing the user that incremental mirroring is not possible.

After the initial mirroring completes, you must split the device pair before performing any other (see [“Splitting Disk Groups”](#) on page 32).

Notes

- ◆ This task copies all data from a Symmetrix STD device to a BCV device.
 - ◆ All the STD devices in the specified disk group must be paired with BCV devices.
 - ◆ This task may take several minutes to complete.
-



Splitting Disk Groups

After you have mirrored the STD devices to BCV devices, you can split the BCV devices from the STD devices, then use the BCV devices for administrative tasks, such as backups and testing, while the STD devices remain online.

The `vxsysmsplit` command splits a Symmetrix STD-BCV pair and creates a new disk group on the BCV devices. The `vxsysmsplit` also creates a set of volumes (that are identical to the STD volumes and have the same names) in the BCV disk group. The new BCV volumes are visible to VxVM and are available to applications. The BCV disk group is referred to as the *alternate disk group* and its volumes are referred to as *alternate volumes*.

Microcode 5x66 supports *instasplit*. This feature returns the command quickly while continuing the operation in the background. The `vxsysmsplit` command supports this feature through `-o type=instant` option. The `vxsymmir` or `vxsymrestore` commands fail if a background split is in progress for any associated STD or BCV device on which a mirror or restore operation is executed. The `vxsysmsplit` command also supports the differential split feature using the `-o type=diff` option.

To split an STD-BCV disk group, use the following commands:

```
vxsysmsplit -g PriDg[:SecDg] [-o wait] [-n] \
    [-t timeout] [-o type=split-type] [-F FSType] \
    [-m snapshot_mount_point] [-o ro|rw|nm]
vxsysmsplit -o filename=file [-o wait] [-n] [-t timeout] \
    [-o type=split-type] [-F FSType]
```

where:

PriDg is the VxVM disk group to which the STD devices currently belong.

SecDg is the VxVM disk group created after the `vxsysmsplit` completes, to which the BCV devices belong.

The `vxsysmsplit` operation splits all the Symmetrix STD devices that belong to the specified disk group from their BCV devices. The name of the secondary disk group created after the split operation is determined by the argument *SecDg*. When the secondary disk group name is not specified, a default name is selected. The format of this default name is *bcvPriDg[n]*, where $n=m+1$ such that m is the largest positive integer with *bcvPriDg[m]* being an imported VxVM disk group.

For example, if the *PriDg* name is *emcdg*, the default name for the secondary disk group will be one of the following:

```
bcvemcdg
bcvemcdg1
bcvemcdg2
...
```

The `-n` option runs the command without a confirmation.



The `vxsysmplit` operation creates all the VxVM objects that are in the primary disk group in the secondary disk group using the same names. If any VxFS file systems are mounted on the primary VxVM volumes, `vxsysmplit` mounts VxFS file systems on the corresponding secondary VxVM volumes. The default BCV mount point directory is `/name_of_the_BCV_dg[n]`, where `n` is the lowest available positive integer such that the directory name `name_of_the_BCV_dg_n` does not exist. If the `-m` option is specified, instead of the default mount point, all the VxFS file systems on the secondary VxVM volumes are mounted under the specified mount point. The specified mount point must satisfy following conditions:

- ◆ Absolute path name must be specified
- ◆ If the path name already exists, it must be a directory
- ◆ If the path name does not already exist, it must be possible to create a directory with that name.

The `-o mount_options` option specifies the mount options for the BCV file systems. If the `-o nm` option is specified, VxFS file systems will not be mounted on BCV volumes and the `-m` option is ignored. The `rw` (read write) option is the default mount option for the file systems.

The `-F` option is used if the VxFS file system is mounted on STD volumes. If this option is not specified and a VxFS file system on an STD is mounted, `vxsysmplit` exits with an error message. The `vxsysmplit` operation rejects the `mount` and `timeout` options if `-F` is not specified.

The `-t` option specifies the file system freeze timeout in seconds. This is the total timeout value (for all STD-BCV pairs). If the timeout value is not specified on the command line, `vxsysmplit` checks the environment variable `VXFS_FREEZE_TIMEOUT`. If this variable is set to a positive integer, `vxsysmplit` uses this value. If the timeout is not specified on the command line or with the environment variable, `vxsysmplit` calculates and uses the default timeout value: 14 seconds multiplied by the number of STD-BCV pairs.

The `-o type=split-type` option is specified, the `split` is one of the supported split types: `diff` (for differential) or `instant`. The `diff` split type performs a differential (or incremental) synchronization between the first mirror of the BCV devices involved in the operation and their additional mirrors (local or remote). This option can only be used if the Symmetrix Differential Data Facility (SDDF) is enabled in the Symmetrix disk array (see the Symmetrix array documentation from EMC for more information). The `instant` split type performs a quick foreground split at the director ports while continuing the actual split in the background.



Example

```
vxsysmsplit -g emcdg:bcvdg
```

This creates a disk group named `bcvdg` on BCV devices. The volumes in the `emcdg` disk group are duplicated in the `bcvdg` disk group with the same names.

After a split is performed on the STD-BCV device pair, the devices can be remirrored (see [“Remirroring Disk Groups”](#) on page 35), restored (see [“Restoring Disk Groups”](#) on page 37), or detached (see [“Detaching Devices”](#) on page 40).

Notes

- ◆ All of the devices involved in this task must be in the synchronized or restored state.
 - ◆ If more than one disk is found with duplicate disk IDs, Volume Manager chooses the disk for the disk group using the following rules:
 - Import the first non-NR-non-WD STD disk, ignore all BCVs
 - If no STD disk is found then import the first non-NR-non-WD BCV
 - ◆ This task may take a few minutes to complete.
 - ◆ If `instant split` is specified, followed immediately by an `incremental establish` operation, the split will fail with a “background split is in progress” message. An `incremental restore` operation will succeed.
-

Remirroring Disk Groups

After using the BCV devices for administrative tasks, you can remirror the STD devices to the BCV devices. This reattaches and resynchronizes the STD and BCV devices. The data is incrementally copied from the STD devices to the BCV devices.

The `vxsymremir` command, or `vxsymmir` without the `-o full`, option remirrors Symmetrix STD devices in a disk group. This command also removes the alternate volumes created by the `vxsymsplit` command. Use the `vxsymremirk` or `vxsymmir` command to mirror Symmetrix devices that were previously mirrored and split.

To remirror Symmetrix devices, use any of the following commands:

```
vxsymremir -g PriDg [-n] [-o wait]
vxsymmir -g PriDg[:SecDg] [-n] [-o wait]
```

where:

PriDg is the VxVM disk group to which the STD device currently belongs.

SecDg is the VxVM disk group to which the BCV device currently belongs.

The `-n` option runs the command without a confirmation request.

The `vxsymremir` or `vxsymmir` commands unmount any VxFS file systems that are not in use and are mounted on VxVM volumes on the secondary disk group, then removes the mount points. If the volumes with mounted VxFS file systems are in use, the file systems are not unmounted and `vxsymremir` or `vxsymmir` aborts with an error message. If this happens, use the `fuser -ck` command to kill the processes that use these mount points (but do not unmount the file system). Then run the command again.

The remirror command tries to remove all VxVM objects from the BCV devices that are paired with the STD devices underlying the volumes in the specified disk group. After the objects are removed, the devices are removed from the BCV disk group, the BCV disk group is deported, and the Symmetrix mirror operation is initiated.

If you proceed with the remirror task, any changes in the BCV disk group are lost.

Examples

```
vxsymremir -g emcdg
vxsymmir -g emcdg
```

If you intend to back up the remirrored data, you must split the devices first (see [“Splitting Disk Groups”](#) on page 32).



Notes

- ◆ This task removes all Volume Manager objects from the BCV devices.
 - ◆ This task incrementally copies data from STD devices to BCV devices.
 - ◆ All of the devices involved in this task must be in the split state.
 - ◆ The STD devices in the specified disk group must be paired with BCV devices.
 - ◆ Before running this task, unmount any file systems (other than VxFS file systems) that are mounted on volumes on BCV devices and stop any I/O to BCV devices.
 - ◆ BCV devices must not be active when the `vxsymremir` or `vxsymmir` command is invoked.
 - ◆ The `vxsymremir` command is supported in this release only for backward compatibility and will not be supported in the next VxFAS release. Use the `vxsymmir` command for incremental mirroring.
-



Restoring Disk Groups

If you want to replace the contents of the STD devices with the contents of the BCV devices, you can restore the STD devices from the BCV devices. This may be necessary if data on the STD devices is damaged. The data is incrementally copied from the BCV device to the STD device.

The `vxsymrestore` command restores data from the secondary VxVM disk group to the primary VxVM disk group. If the `-o full` or `-R` option is specified, all tracks from the BCV devices are copied to the STD devices. Without these options only the changed tracks are copied. The corresponding BCV devices must be defined previously by the `vxsymsetup` command.

To restore Symmetrix devices, use the following command:

```
vxsymrestore -g PriDg[:SecDg] [-nR] [-o wait] [-o full] [-o config]
```

The disk group containing STD devices is referred to as primary disk group (*PriDg*). The disk group containing BCV devices is referred to as secondary disk group (*SecDg*).

If the secondary disk group is not specified, the disk group containing BCV disks that are currently attached to the STD disks is selected as the secondary disk group.

The `vxsymrestore` command fails if file systems are mounted on the STD volumes. In this case, unmount the STD file systems and run `vxsymrestore` again.

The `vxsymrestore` unmounts any file systems that are not in use and are mounted on the BCV volumes. The mount points are removed. If the file systems are mounted and are in use, `vxsymrestore` does not unmount them and aborts the operation with an error message.

If the mount points are in use, identify the processes using the `fuser -c` command. Close these applications or kill the processes if required. It is not necessary to unmount the file system on the BCV disk group. Run the `vxsymrestore` command.

The `vxsymrestore` command restores the configuration of the secondary disk group to the primary disk group; the previous configuration of the primary disk group is overwritten.

If the `-o config` option is specified, `vxsymrestore` restores the VxVM disk group configuration from the secondary disk group to the primary disk group. This option is included only for backward compatibility. This is the default behavior.

The `-n` option runs the command without a confirmation request.

Example

```
vxsymrestore -g PriDg:SecDg
```

If you intend to use the BCV disk group, previously restored with STD disk group, you must split the disk groups first (see [“Splitting Disk Groups”](#) on page 32).



Notes

- ◆ This task restores data from BCV devices to STD devices.
 - ◆ All of the devices in a disk group involved in this task must be in the split state.
 - ◆ Before running this task, unmount any file systems that are mounted on the STD disk group and stop any I/O to the BCV and STD devices.
 - ◆ BCV devices must not be in active use when the `vxsymrestore` command is invoked.
 - ◆ Both the primary and secondary VxVM disk groups are deported before the restore starts. None of the disks participating in the operation can be used while the restore operation is in progress.
 - ◆ The `vxsymrestore` command is not supported on the `bootdg`.
 - ◆ The `vxsymrestore` command waits until the restore operation is completed if the `-o wait` option is specified. This process may take more time depending on the number of invalid tracks. The `vxsymquery` command displays the restoration status.
 - ◆ Options `-R` and `-o config` are supported in this release only for backward compatibility and will not be supported in the next VxFAS release.
-



Reattaching Disk Groups

The `vxsymsetup reattach` command attaches BCV devices to STD devices that were earlier mirrored and then split.

The secondary disk group must have been previously split from the primary disk group.

To reattach an STD disk group and BCV disk group use the following command:

```
vxsymsetup -g PriDg:SecDg [-n] reattach
```

Notes

- ◆ All the devices in each of the primary disk groups and the secondary disk groups must be of the same type: REGULAR, RDF1, or RDF2.
 - ◆ All the devices in each of the primary disk groups and the secondary disk groups must be in the same state.
 - ◆ The operation succeeds if for every STD device in the primary disk group, there is a BCV device to which it can reattach.
-



Detaching Devices

The `vxsymsetup detach` command detaches a Symmetrix STD device from a BCV device. An STD-BCV pair must be detached before a disk is moved from one VxVM disk group to another.

The `vxsymsetup detach` command removes the pairing information previously set by the `vxsymsetup attach` command. If the disk group pair is specified, the command finds the STD-BCV pairs and detaches them. If a device pair is specified, detach is performed only for that device pair. After being detached, the pair cannot be incrementally mirrored or incrementally restored.

For detach operations on a disk group:

- ◆ All devices in the primary disk group and secondary disk group must be attached.
- ◆ None of the pairs can be in the Synchronized or Restored state.

For detach operations on device pairs:

- ◆ The device pair must be previously attached.
- ◆ The device pair must not be in the Synchronized or Restored state.
- ◆ The device pair must be in the Split or Never Established state before detaching.

To detach STD devices from the BCV devices, use any of the following commands:

```
vxsymsetup -g PriDg [-o enclosure_sno=Symmetrix-id \  
                    -s PriDev:SecDev [, PriDev:SecDev, ...] [-n] detach  
vxsymsetup -g PriDg [-o enclosure_sno=Symmetrix-id \  
                    -o filename=file [-n] detach
```

To detach a STD disk group from a BCV disk group use the following command:

```
vxsymsetup -g PriDg:SecDg [-n] detach
```

where:

PriDg is the VxVM disk group to which the STD device currently belongs.

SecDg is the VxVM disk group to which the BCV device currently belongs.

Symmetrix-id is the Symmetrix serial ID of STD/BCV devices.

PriDev and *SecDev* are STD and BCV device names. If `-o enclosure_sno` is specified, use Symmetrix device names. Without the `-o enclosure_sno` option, use the VxVM disk access name.

The `file` argument is the file containing device pairs.

Examples

```
vxsymsetup -g emcdg -s c0t0d0s2:c0t6d0s2 detach
vxsymsetup -g emcdg -o enclosure_sno=000111222333 \
-s 012:0A8 detach
vxsymsetup -g emcdg:bcvdg detach
vxsymsetup -g emcdg -o filename=file detach
```

The entries in the file will be:

```
#STD      #BCV
c0t0d0s2  c0t6d0s2
```

or this when enclosure_sno is specified:

```
#STD      #BCV
012       0A8
```

The `vxsymsetup detachall` command detaches all the BCV devices from an STD device that were earlier attached or mirrored and split (and with which incremental mirror or incremental restore was possible). If only the primary disk group is specified, this operation is performed on all the STD devices in this VxVM disk group. If STD devices are specified, the command detaches all the BCV devices attached to or mirrored with these STD devices.

To detach all devices use the following commands:

```
vxsymsetup -g PriDg detachall
vxsymsetup -g PriDg [-o enclosure_sno=Symmetrix-id] \
-s PriDev[,PriDev,...] [-n] detachall
```

Examples

```
vxsymsetup -g emcdg detachall
vxsymsetup -g emcdg -s 01A,01B detachall
```



Recovering Crashed Commands

The `vxsymrecover` command can recover any of the following VxFAS commands if they crash:

- ◆ `vxsymsetup attach`
- ◆ `vxsymsetup reattach`
- ◆ `vxsymsetup detach`
- ◆ `vxsymsetup detachall`
- ◆ `vxsymsplit`
- ◆ `vxsymmir`
- ◆ `vxsymremir`
- ◆ `vxsymrestore`

When any of the above commands is executed, it creates the log file `/etc/vx/emc.d/vxtflog.txt`. The file exists only as long as the command is running. The log file remains when a command crashes. Run `vxsymrecover` to recover this crashed command.

Similarly, if any VxFAS commands are killed, it leaves a log in the log file. If any other VxFAS command is executed before recovering the crashed command, the command exits with an error message. In this case, run `vxsymrecover` to recover the crashed command first, then run any other VxFAS command.

Example

```
vxsymrecover
```

Viewing Device Information

To view information about devices or confirm the initialization or state of the devices, use the `vxprint` and `vxsymquery` commands.

The `vxprint` Command

To display information about Volume Manager objects, use the `vxprint` command:

```
vxprint [-g diskgroup]
```

Example

If `c0t2d0s2` is added to VxVM disk group `emcdg` as `disk02` and a volume named `foo` is created, `vxprint` displays the following information:

```
# vxprint -g emcdg
Disk group: emcdg
```

TY	NAME	ASSOC	KSTATE	LENGTH	PLOFFS	STATE	TUTIL0	PUTIL0
dg	emcdg	emcdg	-	-	-	-	-	-
dm	disk02	c0t2d0s2	-	4152640	-	-	-	-
v	foo	fsgen	ENABLED	1331520	-	ACTIVE	-	-
pl	foo-01	foo	ENABLED	1331520	-	ACTIVE	-	-
sd	disk02-01	foo-01	ENABLED	1331520	0	-	-	-

The `vxsymquery` Command

The `vxsymquery` command displays the status of Symmetrix devices operated on by VxFAS. The `vxsymquery` command displays information about the state of devices in the specified VxVM disk group. If the disk group name is not specified, `vxsymquery` displays information about all VxVM disk groups under operation by VxFAS.

To display information about STD and BCV Symmetrix devices, use the `vxsymquery` command:

```
vxsymquery [-g PriDg] [-o multibcvs]
vxsymquery -g PriDg -o verify[=synched|restored]
```

where:

PriDg is the VxVM disk group to which the STD devices currently belong.

If `synched` or `restored` is used with the `-o verify` option, `vxsymquery` checks if all the devices are in a synchronized or restored state, respectively.



The `-o multibcvs` option shows information for multiple BCVs. It shows device status for all the BCV devices attached to or mirrored with the STD devices. In the output, BCV devices currently attached to the STD devices are indicated by an asterisk (*) following the BCV device name.

After attaching STD device `c0t1d0s2` to BCV device `c2t2d4s2` using `vxsymsetup attach`, the `vxsymquery` output looks like this:

```
# vxsymquery -g emcdg
Symmetrix id: 000183600433
Device group: vxvm_emcdg
PrimaryInv TracksSecondaryInv TracksState
-----
c0t1d0s20 c2t2d4s2 45 Split
```

An STD-BCV pair can be in one of the following states:

NeverEstab	Never established state
SyncInProgress	Synchronization in progress
Synchronized	Synchronization done
SplitInProgress	Split in progress
Split	Split done
SplitNoInc	Device cannot be incrementally established or restored
SplitBfrSync	Split before synchronization
Restored	Restore done
RestInProgress	Restore in progress
SplitBfrRest	Split before restore

The `-o verify` option of `vxsymquery` indicates whether some or all device pairs in the specified disk group are in the Synchronized or Restored state. The `verify=synched` option checks whether the devices are in the Synchronized state. The `verify=restored` option checks whether the devices are in the Restored state. Because this option verifies the states of devices in a particular disk group, the disk group must be specified.



Example

```
vxsymquery -g emcdg -o verify=synched
```

Notes:

- ◆ No VxFAS operation, except the Query operation, can be executed when another VxFAS operation or recovery of a crashed VxFAS operation is already in progress on the same host.
 - ◆ A recovery operation for VxFAS (`vxsymrecover` command or from the GUI) cannot be executed when any VxFAS operation (except Query operation) or a recovery operation is already in progress on the same host.
-





Using the VERITAS FlashSnap Agent for Symmetrix With VEA

4

This chapter describes how to use the FlashSnap Agent *for Symmetrix* (VxFAS) using the VERITAS Enterprise Administrator (VEA) GUI interface. The following topics are covered in this chapter:

- ◆ [The VEA Console](#)
- ◆ [Configuring Options for EMC Symmetrix Arrays in the VEA Server](#)
- ◆ [Attaching Devices](#)
- ◆ [Mirroring Devices](#)
- ◆ [Splitting Devices](#)
- ◆ [Restoring Devices](#)
- ◆ [Detaching Devices](#)
- ◆ [Querying Snapshot Information](#)
- ◆ [Recovering a Crashed VxFAS Operation](#)
- ◆ [Recovering a Crashed Disk Group Reconfigure Operation](#)
- ◆ [Viewing Object Properties](#)
- ◆ [Notes on VxFAS Menu Options](#)

The VEA Console

The VERITAS Enterprise Administrator console is the interface through which you can perform various management operations on hosts running the VEA server. You can connect to multiple VEA servers from one console.

See the *VERITAS Volume Manager User's Guide - VERITAS Enterprise Administrator* and the *VERITAS Volume Manager Installation Guide* for more information about the VEA console.

Note To run VEA, you must have the VEA GUI client package, *VRTSobgui*, installed on your system.



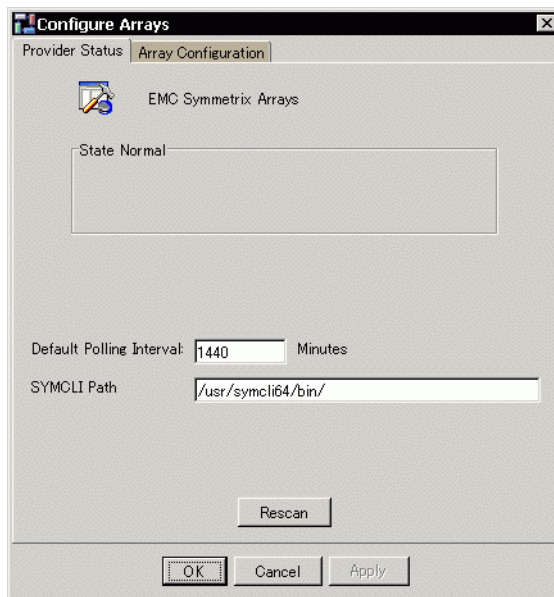
Configuring Options for EMC Symmetrix Arrays in the VEA Server

The VEA server collects information about EMC Symmetrix arrays periodically and makes the Symmetrix devices and device group configuration information available for management.

▼ **Configure the options for the array:**

1. Expand the node corresponding to the connected host and select the **Control Panel** node in the tree view.
2. Double click the **EMC Symmetrix Arrays** icon in the details view to bring up the following dialog box.

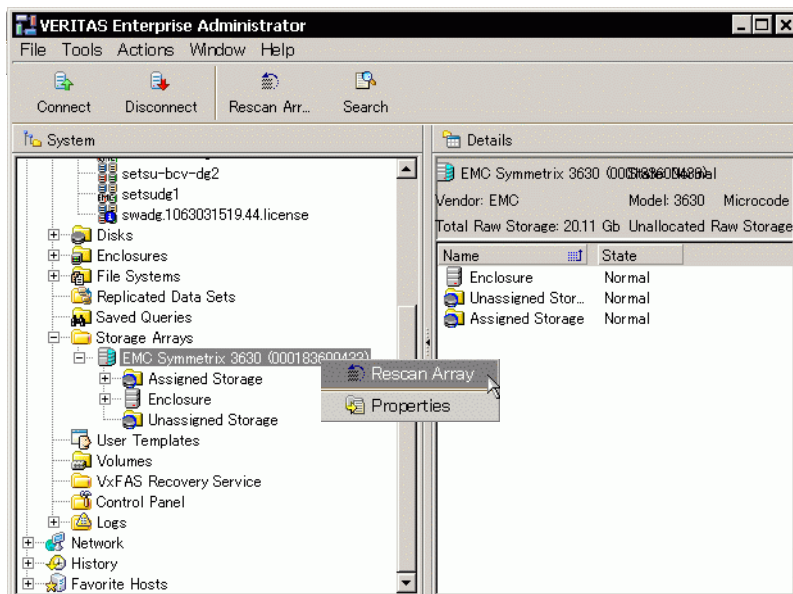
Set Symmetrix Polling Interval



The default polling interval is the interval at which the VEA server automatically refreshes the configuration information for the EMC Symmetrix arrays connected to that host. You can change the interval by specifying a new value in the **Default Polling Interval** field.

To refresh the configuration information manually, click the **Rescan** button. You can also refresh the configuration information by clicking the **Rescan Array** menu option in the context menu that displays when you right click on the array object (see the figure below).

VERITAS Enterprise Administrator Console Rescan Array



Caution Rescanning the configuration information for the Symmetrix arrays may take a significant amount of time to complete.

All VxFAS operations fail if a rescan is in progress. To determine if a rescan operation is in progress, look for the **Discovering EMC Symmetrix Arrays** task in the VEA console task pane.



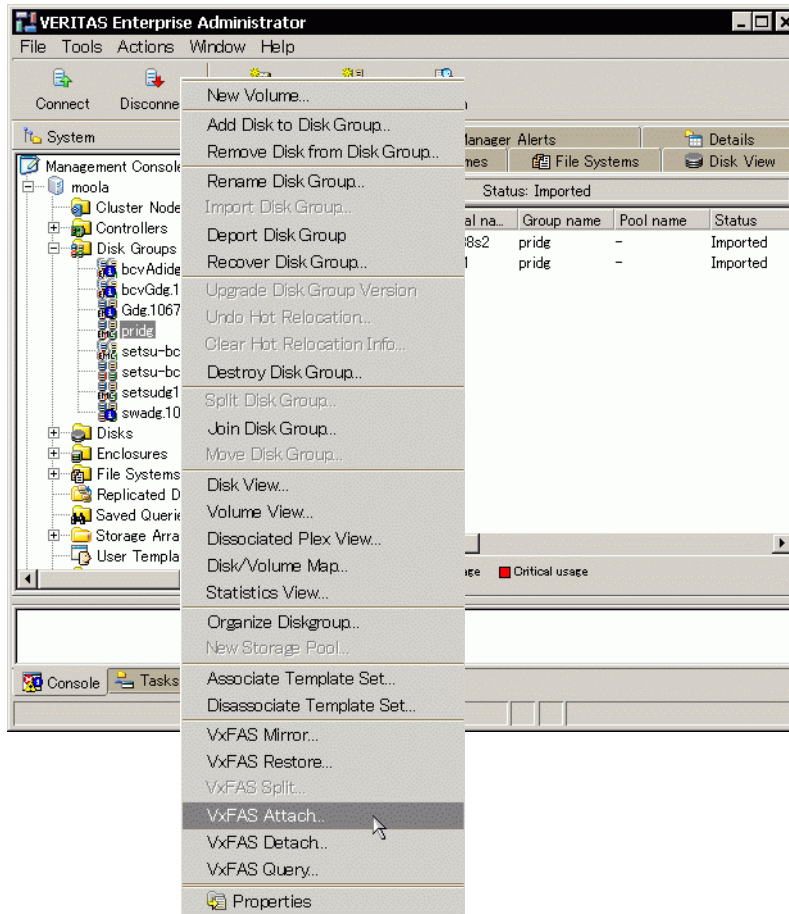
Attaching Devices

Before you can set up *TimeFinder* mirroring, you must associate a Symmetrix standard (STD) device with a Business Continuance Volume (BCV) device. This procedure attaches an STD device to a BCV device to create an STD-BCV pair (or *attachment*).

▼ To perform the attach operation:

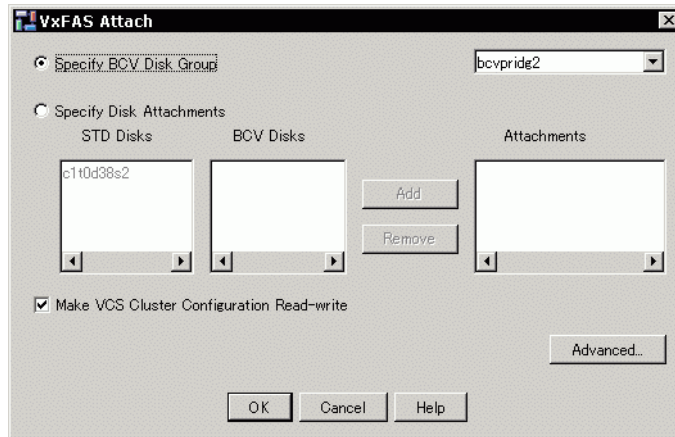
1. Right click the **STD disk group** node in the tree view to display the context menu. The context menu has options corresponding to the operations that can be performed on this disk group. The same menu can be accessed from the main menu bar under the **Actions** menu.

STD Disk Group Context Menu



2. Click the **VxFAS Attach...** menu option. The following dialog is displayed:

VxFAS Attach Dialog



3. You can specify a disk group containing BCV disks or individual STD-BCV disk pairs for the attach operation.

To specify a BCV disk group, select the **Specify BCV Disk Group** radio button, then select the name of the BCV disk group from the drop down list box.

To specify individual STD-BCV disk pairs:

- a. Select the **Specify Disk Attachments** radio button.
- b. Select the STD device from **STD Disks** list. A list of compatible BCV disks appears in the **BCV Disks** list.
- c. Select a BCV device from **BCV Disks** list.
- d. Click the **Add** button to add the selected STD-BCV pair to the **Attachments** list.
- e. Repeat [step b](#) through [step d](#) to specify more pairs.
- f. To remove a pair, select that pair in the **Attachments** list and click the **Remove**.

Note The **BCV Disks** list shows only those BCV disks that are compatible with the selected STD disk and are not already selected for attachment with some other STD disk in the same VxVM disk group.



4. Check **Make VCS Cluster Configuration Read-write** if the operation is going to be executed in HA mode and you want the VCS cluster configuration to be read-write (if necessary) automatically.
5. Click the **Advanced...** button to bring up a dialog with additional options:

VxFAS Attach Advance Dialog



Check **Reattach devices** if you want to reattach the BCV disks in the specified BCV disk group during the attach operation.

Check **Allow to move devices from their device groups** if you want VxFAS to move devices from their existing device group to the correct device group.

Click **Cancel** to discard the options, or click **OK** to accept the options and return to the **VxFAS Attach** dialog.

Note These options are mutually exclusive.

Reattach devices option is meaningful only if you have specified the BCV disk group for attach operation.

6. After you have provided all necessary information in the **VxFAS Attach** dialog, click **OK**.

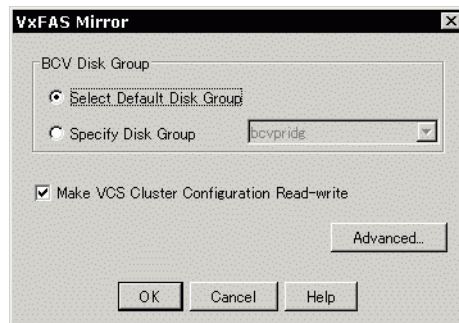
Mirroring Devices

This procedure mirrors Symmetrix STD devices in a disk group. This operation initiates *TimeFinder* mirroring for the Symmetrix STD devices that correspond to the specified disk group. The STD devices are mirrored to attached Symmetrix BCV devices.

▼ To mirror STD devices:

1. Display the STD disk group context menu by following the procedure described in [step 1](#) on page 50 in “[Attaching Devices](#).”
2. Select the **VxFAS Mirror...** menu option. The following dialog is displayed:

VxFAS Mirror Dialog



3. Choose **Select Default Disk Group** if you want VxFAS to use the default BCV disk group name for mirror operation. Choose **Specify Disk Group** if you want to specify an existing BCV disk group to mirror from the drop down list box.
4. Check **Make VCS Cluster Configuration Read-write** to execute the option in HA mode and if you want the VCS cluster configuration to be read-write (if necessary) automatically.



5. Click the **Advanced...** button to bring up a dialog with additional options:

VxFAS Mirror Advance Dialog



Mirror Type specifies the type of mirror operation to carry out.

Select **Full Mirror** if this is the first time you are mirroring the disk group.

If you select **Incremental Mirror**, only changed disk tracks are copied to the BCV device.

Check **Wait for Synchronization** if you want the VxFAS operation to wait until the mirror synchronization completes.

Click **Cancel** to discard the options. Click **OK** to accept the options and return to the **VxFAS Mirror** dialog box.

6. After you have provided all necessary information in the **VxFAS Mirror** dialog, click **OK**.

Splitting Devices

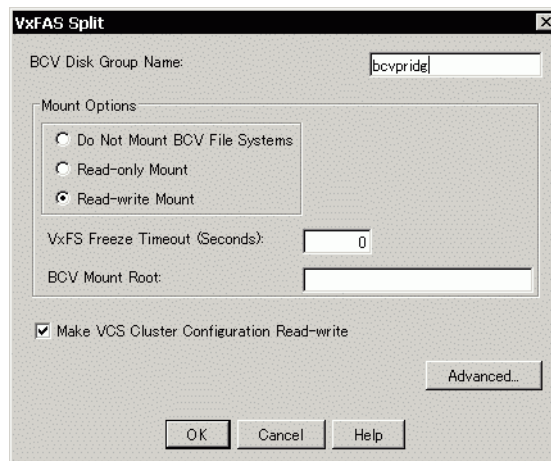
After mirroring the STD devices to BCV devices, you can split the BCV devices from the STD devices and use the BCV devices for administrative tasks, such as backups and testing, while the STD devices remain online.

This procedure splits Symmetrix STD-BCV pairs and creates a new disk group on the BCV devices. This disk group is a clone of the STD disk group.

▼ **To split STD-BCV pairs:**

1. Display the STD disk group context menu by following the procedure described in [step 1](#) on page 50 in “[Attaching Devices.](#)”
2. Select the **VxFAS Split...** menu option. The following dialog is displayed:

VxFAS Split Dialog



3. In the **BCV Disk Group Name** text box you can specify the name of the BCV disk group that is created when the split is complete, or you can accept the default name shown.
4. The mount options indicate the options for the BCV file system.

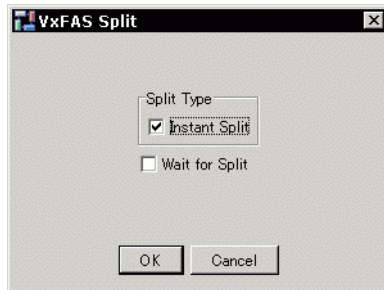
Options	<ul style="list-style-type: none"> ◆ Select Do Not Mount BCV File Systems if you do not want the file systems on BCV volumes to be mounted after the split operation. ◆ Select Read-Only Mount if you want the BCV file systems to be mounted with read-only permissions after the split operation. ◆ Select Read-write Mount if you want the BCV file systems to be mounted with read-write permissions after the split operation. ◆ Specify the timeout value in seconds in the VxFS Freeze Timeout text box for freezing the VxFS file system on STD volumes. ◆ Specify the location where you want to mount the BCV file systems in the BCV Mount Root text box.
---------	--

5. Check **Make VCS Cluster Configuration Read-write** if the operation is going to be executed in HA mode and you want the VCS cluster configuration to be read-write (if necessary) automatically.



6. Click the **Advanced...** button to bring up a dialog with additional options:

VxFAS Split Advanced Dialog



The **Instant Split** option is selected by default. Unselect this option if you do not want to perform the Instant Split operation.

Check **Wait for Split** if you want the VxFAS operation to wait until the split completes.

Click **Cancel** to discard the options, or click **OK** to accept the options and return to the **VxFAS Split** dialog box.

7. After you have provided all necessary information in the **VxFAS Split** dialog, click **OK**.



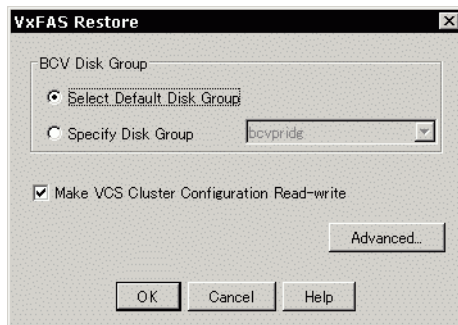
Restoring Devices

To replace the contents of the STD devices with the contents of the BCV devices, restore the STD devices from the BCV devices. This may be necessary if the STD devices are damaged. The data is copied from the BCV device to the STD device.

▼ **To restore STD devices:**

1. Display the STD disk group context menu by following the procedure described in [step 1](#) on page 50 in “[Attaching Devices](#).”
2. Select the **VxFAS Restore...** menu option. The following dialog is displayed:

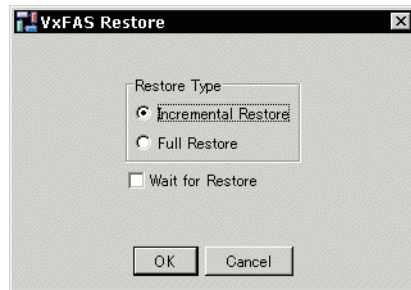
VxFAS Restore Dialog



3. Select **Select Default Disk Group** if you want VxFAS to use the default BCV disk group name for restore operation. Select **Specify Disk Group** to specify an existing BCV disk group to restore from the drop down list box.
4. Check **Make VCS Cluster Configuration Read-write** if the operation is going to be executed in HA mode and you want the VCS cluster configuration to be read-write (if necessary) automatically.

5. Click the **Advanced...** button to bring up a dialog with additional options:

VxFAS Restore Advanced Dialog



Restore Type specifies the type of restore operation to perform.

Select **Full Restore** if this is the first time you are restoring the disk group.

If you select **Incremental Restore**, only changed disk tracks are copied to the STD device.

Check **Wait for Restore** if you want the VxFAS operation to wait until the restore is completed.

Click **Cancel** to discard the options, or click **OK** to accept the options and return to the **VxFAS Restore** dialog box.

6. After you have provided all necessary information in the **VxFAS Restore** dialog, click **OK**.



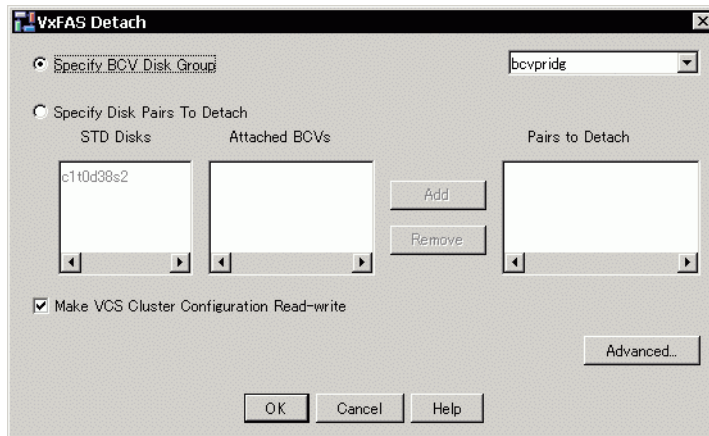
Detaching Devices

This procedure detaches Symmetrix STD devices from attached BCV devices. An STD-BCV pair must be detached before a disk is moved from one VxVM disk group to another.

▼ To perform the detach operation:

1. Display the STD disk group context menu by following the procedure described in [step 1](#) on page 50 in “[Attaching Devices](#).”
2. Select the **VxFAS Detach...** menu option. The following dialog is displayed:

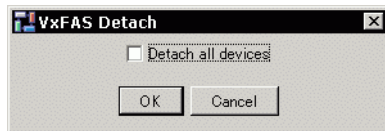
VxFAS Detach Dialog



3. You can either specify a disk group containing BCV disks or individual STD-BCV disk pairs for the detach operation. To specify a BCV disk group, select **Specify BCV Disk Group** and select the name of the BCV disk group from the drop down list box. To specify individual STD-BCV disk pairs:
 - a. Select **Specify Disk Pairs to Detach**.
 - b. Select the STD device from the **STD Disks** list. A list of attached BCV disks appears in the **Attached BCVs** list.
 - c. Select a BCV device from the **Attached BCVs** list.
 - d. Click **Add** to add the selected STD-BCV pair to the **Pairs to Detach** list.
 - e. Repeat [step b](#) through [step d](#) to specify more pairs.

- f. To remove a pair, select that pair in the **Pairs to Detach** list and click **Remove**.
4. Check **Make VCS Cluster Configuration Read-write** if the operation is going to be executed in HA mode and you want the VCS cluster configuration to be read-write (if necessary) automatically.
5. Click the **Advanced...** button to bring up a dialog with additional options:

VxFAS Detach Advanced Dialog



Check **Detach all devices** if you want to detach all the BCV disks that are attached to the STD device.

Click **Cancel** to discard the option, or click **OK** to accept the option and return to the **VxFAS Detach** dialog.

6. After you have provided all necessary information in the **VxFAS Detach** dialog, click **OK**.

Note The **Attached BCVs** list shows only those BCV disks that are attached with the selected STD disk.



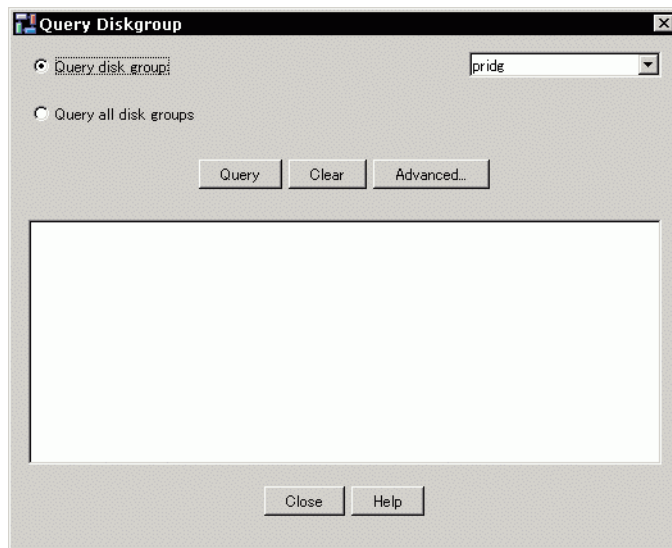
Querying Snapshot Information

You can query the snapshot information for a disk group or all disk groups on the server. You can query the status of the STD-BCV pairs in a disk group using this menu.

▼ **To query snapshot information:**

1. Display the STD disk group context menu by following the procedure described in [step 1](#) on page 50 in “[Attaching Devices.](#)”
2. Select the **VxFAS Query...** menu option. The following dialog is displayed:

VxFAS Query Dialog



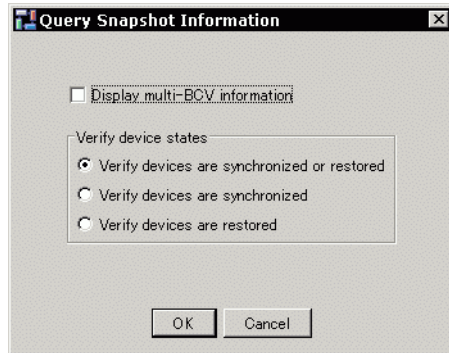
3. You can specify a disk group or query setup information for all disk groups on the server.

To query snapshot information for a disk group, select the **Query Diskgroup** radio button and select the name of disk group from the drop down list box.

To query snapshot information for all disk groups on the server, select **Query all disk groups**.

4. Click the **Advanced...** button to bring up a dialog with additional options:

VxFAS Query Advanced Dialog



Select **Display multi-BCV information** to query the multiple BCV information for the disk group.

Select an option from **Verify device states** to determine if the devices can reach the preferred state.

Click **Cancel** to discard the option, or click **OK** to accept the option and return to the **VxFAS Query** dialog.

5. Click **Query** to start the query operation. The output of the query operation is shown in the text box on the **VxFAS Query** dialog.
6. You can clear the contents of the text box by clicking **Clear**.
7. Click **Close** to close the **VxFAS Query** dialog.

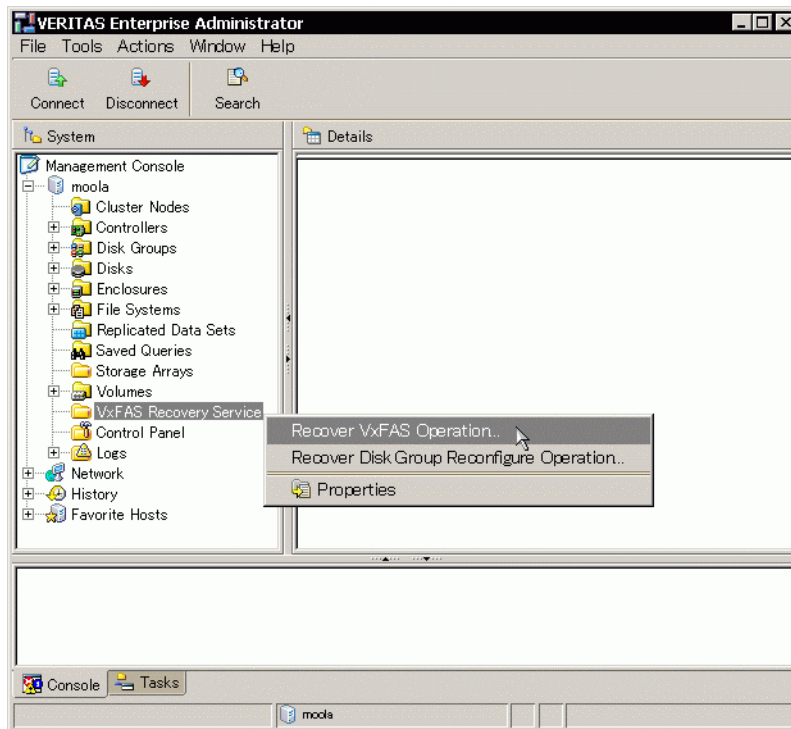


Recovering a Crashed VxFAS Operation

▼ To recover a crashed VxFAS operation from the VEA console:

1. Right click on the **VxFAS Recovery Service** node in the tree view to display the context menu. The context menu has options corresponding to the operations that the VxFAS Recovery Service can perform. The same menu can be accessed from the main menu bar under the **Actions** menu.

VxFAS Recovery Service Context Menu



2. Select the **Recover VxFAS Operation...** menu option. A message box prompting whether to perform recovery of a VxFAS operation is displayed.
3. Click **OK** to start recovery of a crashed VxFAS command.

Recovering a Crashed Disk Group Reconfigure Operation

- ▼ **To recover a crashed disk group reconfigure operation from the VEA console:**
 1. Display the VxFAS Recovery Service context menu by following the procedure described in [step 1](#) on page 64 in “[Recovering a Crashed VxFAS Operation.](#)”
 2. Select the **Recover Disk Group Reconfigure Operation...** menu option.
A message box prompting whether you want recovery of a disk group reconfigure operation is displayed
 3. Click **OK** to start recovery of a crashed disk group reconfigure operation.



Viewing Object Properties

- ◆ To view the snapshot-related properties of all disks, select the **Assigned Storage** node under the **EMC Symmetrix Array** object node in the tree view of the left pane. The snapshot view displays the snapshot properties for all disks mapped to that host. Each row of the snapshot view corresponds to one disk, and the columns correspond to the properties of the disk.
- ◆ To view the properties of a disk, click the disk node in the tree view of the left pane and select **Properties** from the context menu.
- ◆ The **Properties** window contains a set of tabbed pages, each of which contains categorized information about the selected object. You can display a different page by clicking the appropriate tab label.

Notes on VxFAS Menu Options

- ◆ All the menu options for VxFAS operations are disabled during the interval when the first rescan operation is in progress on the selected Symmetrix array after starting the VEA server.
- ◆ Menu options for all VxFAS operations except **Query** are enabled only on disk groups containing STD disks.
- ◆ Menu options for VxFAS operations (except the **VxFAS Query** operation) on a disk group are disabled if a VxFAS operation is already in progress on that disk group.
- ◆ Menu options for only those VxFAS operations that are valid for a specified disk group are enabled on the menu. For example, after you perform the **VxFAS Mirror** operation, only the **VxFAS Split** operation is enabled on the menu. The **VxFAS Query** operation, however, is always enabled on the menu.
- ◆ VxFAS operations are not supported on Cluster Volume Manager (CVM) shared disk groups, VxVM SAN disk groups, or disk groups containing VVR replicated volume groups, so for these disk group types, VxFAS menu options are not enabled.

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